Post Office Telecommunications Journal

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Contents

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Taking Stock

WITH THIS ISSUE WE OPEN THE SIXTH VOLUME of the Post Office Telecommunications Journal. This is something of a landmark, and it is useful to take stock of what has been achieved in the first five years, how far we have fulfilled the aims set for the *Journal* when it was launched in 1948, and what our plans should be for the future.

The *Journal* was planned as a contribution to discussion of current practices and new ideas and to be, with an individuality of its own, a source of information on modern telecommunications problems and developments. We have published more than 400 articles covering many, but by no means all, aspects of telecommunications services. In addition to the services of this country, we have gone further afield and have published articles on telecommunications services of other countries and of the merchant fleets; nor have we neglected the vital services linking the countries of the Commonwealth and of the world. The articles have included records of outstanding events over the years and the contribution that telecommunications have made to them. In particular, we took great pride in recording the part that telecommunications played in the arrangements for the celebration of the Coronation.

The *Journal* now has a circulation of about 13,000 copies and that, of itself, shows that we have fulfilled the original aim and that the *Journal* has met a very real need. But we do not want to rest on our laurels, and the Editorial Board would like to think that, at the end of the next five years, the record, both in the range of the contents and in the circulation figures, will be even better.

Telecommunications in the Antarctic

Vital Aids to the Whaling Industry

L. Harris-Ward.

Wireless Telegraphy Section, Overseas Telecommunications

EVERY READER WILL ASSOCIATE THE WORDS "There she blows" with the spotting of a whale by the lookout on a whaling ship. The warning is still used because the spotting is still largely carried out by sight, though modern aids such as A.S.D.I.C. are used and radar plays an important part in the recovery of carcasses. Radio aids and telecommunications are so much a part of the industry that it is impossible to write of the one without the other. I will therefore try to give a general picture of the industry with emphasis on telecommunications where they fit into the picture.

Man has hunted the whale for its meat and its by-products, particularly whale oil, for a number of years. The Norwegians still hunt whales on a small scale in the North and, at one time, the Arctic provided a flourishing industry, the headquarters of which were established at Dundee in Scotland. The Arctic industry collapsed after 1913 because of over-fishing and it is one of the greatest concerns of the International Whaling Commission that the Antarctic industry should not suffer a similar fate. In 1935, international law prohibited the taking of whales of less than 60 feet long—this, despite the "Discovery Committee's" findings in 1929 that a whale does not become sexually mature until it is over 70 feet long. Thus, for a number of years, whales were being taken before they had a chance to reproduce themselves. The 1935 agreement has been the subject of several amendments, and the 1946 Whaling Conference at Washington established an improved Whaling Convention which was proclaimed on February 5, 1948. This prohibited the taking of whales of less than 70 feet. The Convention was signed by all nations, including Japan (under American supervision). In previous years Japan had been a great offender by indiscriminately slaughtering whales and by her failure to recognise the Convention.

Thus, although a small number of whales are caught in the Arctic regions, the industry is no longer great. All efforts are concentrated on the Antarctic but, even here, unless the blue whale quota is reduced or the size of whale to be taken is kept higher, deep sea whaling in Antarctica must decrease.

The International Whaling Commission is the authority controlling Pelagic or Deep Sea whaling. The site of the Commission's Headquarters at Sandefjord in Norway is appropriate because the first whaling expedition to the South Seas was equipped in Sandefjord in 1904 when the company then formed established the first whaling station in South Georgia. In later years bases were established in South Shetlands and South Orkneys and, in 1923, 23 companies were operating eight land stations, 24 floating factories and 110 catchers.

Five-Week Voyage

The expeditions leave their home bases in the autumn and, after a five-week voyage, arrive at their Antarctic bases to await the signal for the opening of the season.

The whaling season lasts over the Antarctic summer, from November to March. Its legal duration is regulated by the International Commission which opens the season and brings it to a close when it is seen that the quota of 16,000 blue units will be reached.

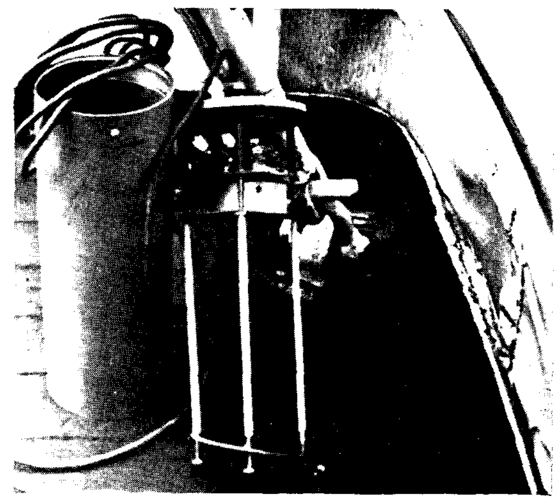
Telecommunications are an important factor in achieving maximum yields from many enterprises, but it is doubtful if they are more essential to any undertaking than to the Deep Sea Whaling Industry. The whaling ships in the Antarctic not only have to maintain contact with one another, and to steam safely in all kinds of weather in deep waters, but they also have to maintain efficient communications for five months, half-way round the world. A glance at the way the whalers work will show how closely they depend for success and safety on radiotelephony, radiotelegraphy, direction finding, radio beacons and radar.

At the close of World War II, the whaling catchers which had been converted for naval duties were rapidly re-converted and the building of new factory ships was put in hand. Two factors were strong incentives towards reviving the industry; first, the desperate shortage of world fats because of devastation of the vegetable oil producing territories and, second, the need of the United Kingdom to augment its resources in foreign exchange, and increase self-sufficiency in the supply of essential fats.

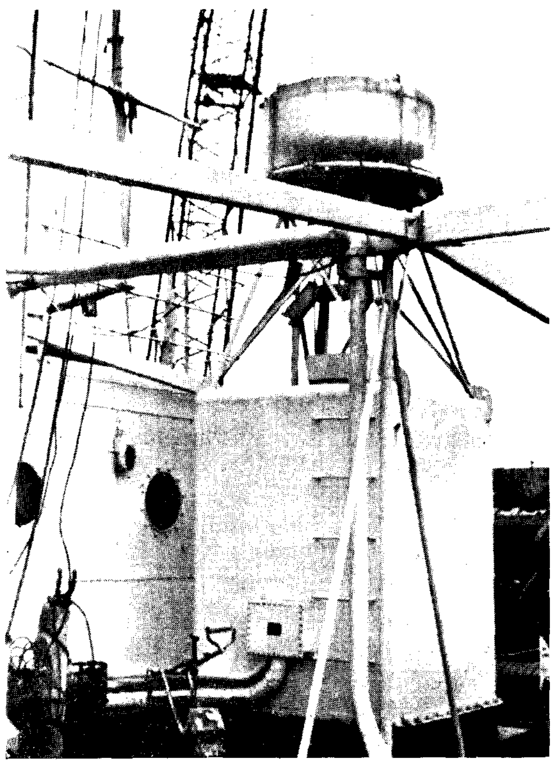
The present price of whale oil is approximately £80 per ton. By-products include lamp oil, soaps, lubricating oils, margarine and particularly the now important whale liver oil whose vitamin content is two to three times that of halibut oil; ambergris for perfumery, whale-bone, whale-meal for cattle and bone-meal for fertilisers; and last, but not least, edible meats.

A fair yield for one expedition, comprising factory ship, which contains all the necessary processing plant, refineries and boilers and employs a crew of 500 men, 10 or more catchers and perhaps two corvette type tow boats, might be about 150,000 barrels of whale oil.

The Blue whale, the most valuable, is taken as the standard unit and is worth about £2,000. The Fin whale or Finback is equal to half a Blue unit, the Sei or small whale is worth one-sixth of a blue unit, and the Sperm whale which may be caught in certain latitudes in or out of season is worth two-fifths of a blue unit. A fully-grown blue whale might be 100 feet long and weigh about 100 tons. It will thus be appreciated that the harpoon head has to expand on explosion and establish a firm hold in the body of the whale. Sometimes, where an almost direct hit is obtained to the heart, death can be practically instantaneous. Many whales, however, start a long chase, towing the



Portable D.F. beacon for fitting to killed whales



Met. Vick. cabin and scanner: access to cabin—port side

catcher at speeds of over 15 knots until exhaustion and death take place. The whale has no vocal cords and it has been stated that if the death throes were accompanied by any sort of sound, the catchers would probably be so influenced as to give up the unequal struggle. When the kill is completed, the carcass is flagged and inflated so as to keep it afloat and left to be recovered later by tow boat or catcher.

Radiotelegraph and radiotelephone communications play a major part in the control and the operation of the whole industry. All factory ships maintain contact with their owners regularly via Portishead Radio, Capetown Radio or Bergen Radio.

Once the announcement of the opening of the season is received at the Antarctic bases, individual expeditions make their own programmes and itineraries. Each expedition searches for suitable "grounds" where whales are plentiful. The factory ship is preceded by its fleet of catchers, all of which are specially built to act as icebreakers. Radiotelephone communication keeps parent ship and catchers in constant contact and once the work of killing is started, radiotelephone instructions are given to the catchers about the flagging of carcasses and their eventual recovery and towage to the factory ship. As the British expeditions deal with approximately 2,000 blue units each during the season, the killing, towing and flensing rate of one whale an hour must be maintained throughout the whole operational period. ("Flensing" is the term used for the processes of cutting up and slicing the fat from the whale and slicing the blubber from the bones.) The arrival of carcasses at the factory ship must therefore be maintained with regularity if the full yield is to be achieved; moreover, the arrivals must be precisely timed to prevent carcasses being lined up alongside the factory ship and thus becoming a prey to the numerous "killer" whales.

Radio Aids

Operations are continued despite bad weather, fog gloom and snow, and the parent ship is often lost to sight, so that radiotelephony is the only means of contact. Direction-finding and radar are relied upon for about a third of the season because of the vagaries of the weather. In many instances these aids are the only safe means available to the parent ship for positioning and "homing", the latter operation being carried out by means of direction-finding bearings on the parent ship's radio beacon. Supply ships and tankers, carrying supplies and fuel replenishments for the various expeditions, seek out their own appropriate ships by radio, direction-finder and, finally, by radar, deliver their cargoes once or twice during the season, and return with by-products from the factory ships.

The importance of direction-finding and radar can best be appreciated when it is remembered that in these waters landmarks are few, coasts are unlit and navigation among ice floes, small ice and large bergs is difficult enough when visibility is good. Modern electronic aids are the eyes and ears of the expedition and are, indeed, two of the main factors in keeping the factory ship's plant working to full capacity day and night. It is important that killing, flagging and subsequent re-location and towing of carcasses back to the factory ship be carried out as expeditiously as possible and in order that the "kills" can be rapidly located in darkness, experiments have

been carried out with portable radio beacons which can be attached to the killed inflated whales. These beacons comprise a small two-valve transmitter unit, complete with its low and high tension supply, an automatic keying device actuated by an ordinary alarm clock mechanism, which are housed in a cylindrical container. The whole unit, held in a double clamping ring, is fitted with long spikes for securing it firmly in the whale's blubber coat. The clamping rings also support bamboo flag poles which carry the short aerial.

Satisfactory ranges and bearings have been obtained on these transmitters up to 40 miles and much valuable time in re-locating floating carcasses has been saved by their use. Catchers and tow boats return to the parent ship towing as many as six to eight carcasses at a time. Radiotelephoned instructions from the parent ship bring the catchers alongside and the valuable tows are secured at the stern of the factory ship to await hauling up the flensing deck. After replenishing harpoons and other supplies the catchers return to the chase.

Throughout the season the expeditions report by radiotelegraphy to their owners and to the Commission in Norway where a tally is kept and general progress towards the attainment of the 16,000 blue unit quota is noted. The records of catches and the average rate of catching enable the Commission to make fairly accurate assessment of the probable date of quota achievement. A date is then chosen when the official season is to end and advice of closure is given to the expeditions of all nations. The entire operations are therefore controlled by radio.

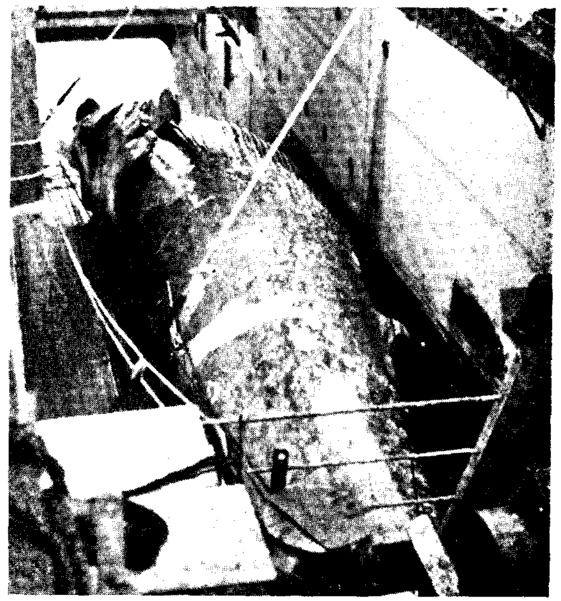
Radio Staff

The radio staff on each factory ship normally consists of four officers, one of whom is employed mainly in operating and maintaining the expedition's radar equipment. The others carry out all routine operational transmissions. In addition, they handle and account for all radiotelegraphic correspondence between members of the crew and home. Besides all this, news bulletins are regularly copied and published daily so that the crews are kept in touch with home affairs.

The radio officers on factory ships are of necessity exceptionally well-equipped. The number and power of the transmitters installed, besides complying with the statutory requirements for seagoing ships, must cater for all the ancillary services performed in the interest of attaining maximum yields, including the operation of the radiotelephony and beacon equipment. The equipment operates on the required frequencies in the medium band and the shortwave transmitters are capable of transmitting on all the assignable frequencies between 4 and 22 megacycles as well as the eight frequencies used for radiotelephony.

Maintaining equipment

The efficiency of the communications system is vitally important to the industry, which is highly competitive, and secrecy of movement and progress is an essential requirement if a good share of the season's quota is to be secured. All communications maintenance is carried out by the radio staffs on factory ships. Sufficient spares, usually 300 per cent., are kept in the radio workshops. A catcher or tow boat requiring service to its transmitter, receiver, D.F. or radar simply obtains a spare unit or a complete set from the parent ship, the faulty unit being hoisted aboard the factory ship for repair and subsequent re-issue. Overall reliability and speed in repair work is a tribute to the efficiency of the radio staffs. Equipment working under such conditions must be soundly made, efficiently installed and adequately



A blue whale being hauled up the stern ramp of a factory ship housed to be able to withstand the rough and continuous handling to which it is subjected. Although not strictly telecommunications there are other general aspects which should be mentioned, indeed the story is incomplete without them. The commodities derived from the whale are available only in such great variety because of plant efficiency which enables the greater part of the whales to be used. Renewals and annual repairs constitute a heavy charge on the industry and new and better extractors are constantly replacing worn out or less efficient plant, thus increasing the average yield per whale. The contribution which radio makes towards the attainment of the maximum yield in the shortest possible time, despite weather conditions, cannot be assessed in strict terms of cash though it probably contributes a saving of about one-sixth of the operational time and may thus be responsible for a sixth of the total yield of the expedition.

Blue whale on flensing deck: 93 feet in length ; estimated weight 100 tons

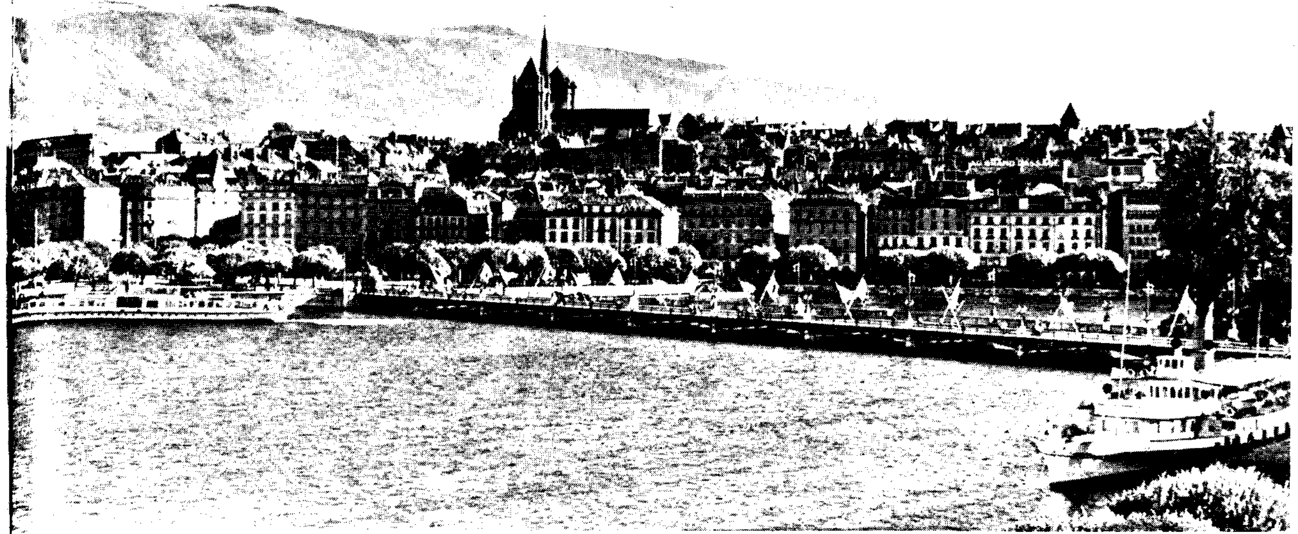
The comparatively high yields attained by the British expeditions are due also to the employment of expert harpoon gunners, most of whom are Norwegian. Trials have already been made involving new methods of harpooning. It is stated that there is a reluctance on the part of some gunners to want improvements since quicker and more humane methods of killing will eventually lead to fewer catchers and hence fewer gunners being needed, but it is generally agreed that reform is long overdue. Alternative methods such as drugging with curare and gassing with carbon dioxide are objected to because of the possible effect on the edible meat. A third method, that of electrocution, is favoured. Current-carrying cables are attached to the harpoons and the success of these methods may eventually lead to the adoption of new methods of killing which will ensure a higher yield of edible meats.

The explosive harpoon head, at present in use, can cause devastating damage to the whale's intestines when making a kill and this invariably results in rapid deterioration of meat and oil content. Increase in the edible meat product would necessitate quicker and more humane killing, early flensing and deep freezing. Such an increase could be handled only by extra expenditure on freezing plant and more " fridge " ships to convey the products to world markets.

The present yield of edible meat from an efficient factory is about 1.5 tons per whale. The possible yield is estimated at 10 tons per whale, 30 per cent. being prime steaks, 20 per cent. sausage meat, and the remainder cattle food. It is estimated that the sale of meat meal products alone could pay for the entire costs of the expedition. The total yield per expedition, at present day efficiency and existing market prices, is about £4 millions.

It is safe to say that radio aids are recognised as an essential and vital part of all expeditions to Antarctica. No expedition can afford to be without radio communication in all its branches if it is to secure even a fair share of the total quota before the season is drawn to a close. One might ask, " How did the catchers find their way back to the factory ships in fog before radio was available ? " I asked this question on one of the factory ships visited and the answer given was—" By smell ! ! "

The photographs in this article are by courtesy of the Canadian Geographical Magazine and the Ministry of Transport.



Geneva

International Telecommunications Conferences

Col. A. H. Read, C.B., O.B.E., T.D.,
Director of Overseas Telecommunications

IN RECENT YEARS INTERNATIONAL CONFERENCES have become more prominent in the conduct of the world's affairs. This article explains a little about international telecommunications conferences and about the International Telecommunication Union, under whose aegis most of these conferences are held.

International Telecommunication Union

The Union originated in 1865. It grew from the necessity for having common standards for equipment, procedures, and accounting in the rapidly expanding international telegraph (and, later, telephone and radio) services, and it proved simpler and more economical of time for representatives to agree on these in conference in preference to lengthy correspondence. The purposes of the Union, set out in its Convention, are :—

(*a*) to maintain and extend international co-operation for the improvement and rational use of telecommunications of all kinds ;

(*b*) to promote the development of technical facilities and their most efficient operation with a view to improving the efficiency of telecommunication services, increasing their usefulness and making them, so far as possible, generally available to the public ;

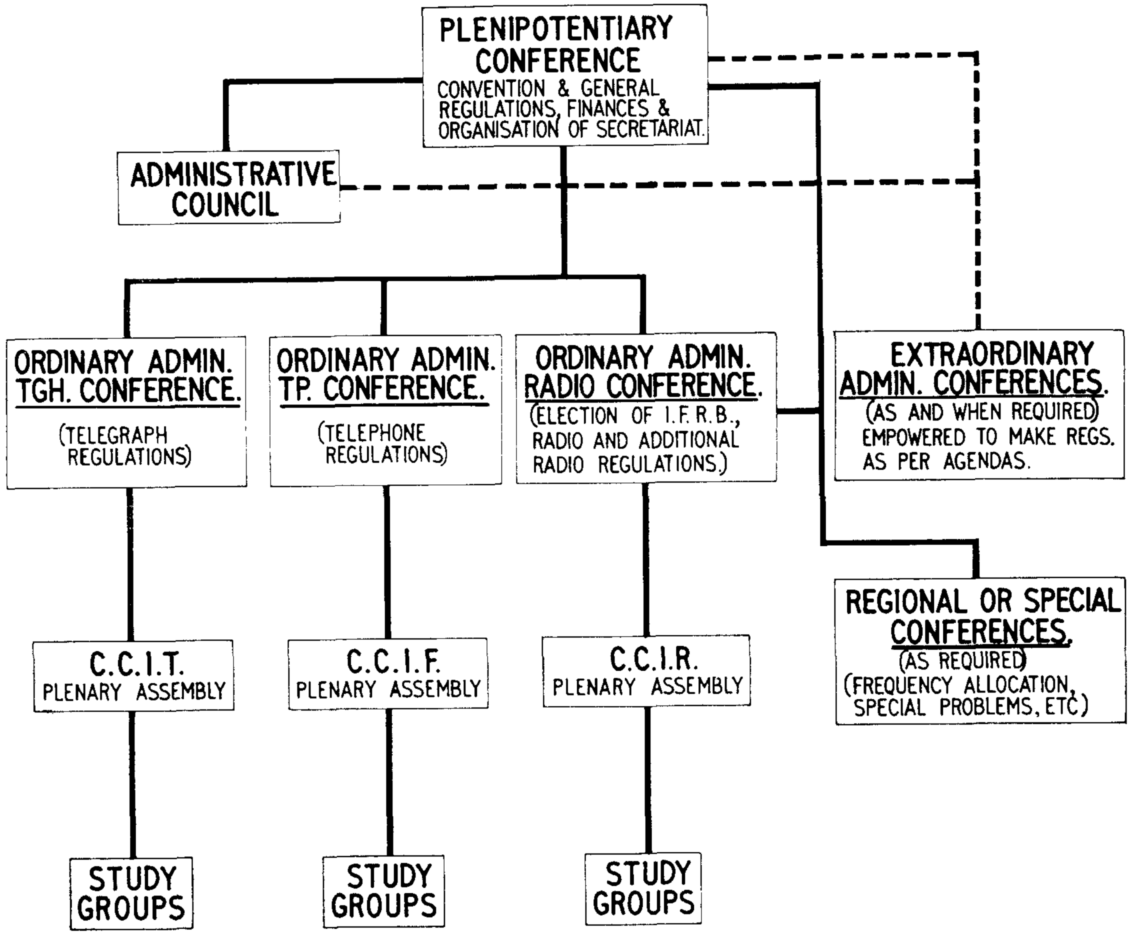
(*c*) to harmonise the actions of nations in the attainment of those common ends.

The Union is composed of 90 Members (member countries), and a permanent secretariat with a staff of about 150 under a Secretary-General is established at the seat of the Union in Geneva.

Conferences

The main work of the Union is done by means of periodic conferences of various kinds, and its conference structure (see diagram) follows broadly the main purposes of administrative co-operation and technical development set out above.

Governing the whole field of the Union's work



Conference organisation diagram based on Articles 4 and 10 of the Buenos Aires Convention

is the International Telecommunication Convention; a Convention established, and revised from time to time, by delegates of member countries, meeting to decide upon its terms. These delegates, bearing plenipotentiary powers, meet in plenipotentiary conference, the supreme organ of the Union. Conferences of this type met in Madrid in 1932, in Atlantic City in 1947, and in Buenos Aires in 1952, when the current Convention was established.

In order to bridge the period between plenipotentiary conferences, which should normally take place every five years, the Atlantic City conference set up an Administrative Council of 18 Members whose nominated representatives hold an annual session and deal with certain matters needing early attention and beyond the powers of the permanent secretariat, although still within the framework of the Convention. Such matters as co-ordination with other international organisations having related interests, the appointment of certain senior officials of the Union, approval of the annual budget and accounts, and the general supervision of the administrative functions of the Union, are dealt with by the Council, which also arranges for the convening of plenipotentiary and administrative conferences.

Questions and proposals considered at plenipotentiary conferences relate to matters such as the purposes and aims of the Union, membership composition, organisation, and the structure and finances of the Union. The Plenipotentiary

Conference also elects Members of the Administrative Council.

The Convention is completed by three sets of Regulations—the Telegraph, Telephone and Radio Regulations—which are not, however, reviewed at plenipotentiary conferences but at separate administrative conferences. These are the detailed rules under which the international telegraph, telephone and radio services operate, and contain matters such as service operating requirements and procedures, rates and charges and their composition, and, in the case of radio, the international radio-frequency allocation table; and it is matters such as these which are considered, discussed and agreed at the administrative conferences of the Union, which take place also every five years or so and, if practicable, at the same time and place as the plenipotentiary conference.

Technical Conferences

There is another form of conference which meets every three years primarily to deal with the development of technical facilities. These conferences (or meetings in plenary assembly) of the three international consultative committees for telegraph, telephone and radio matters study and discuss technical and operating detail. They issue recommendations (*avis*) to guide administrative conferences in making regulations and to assist member nations throughout the world in developing their international services to agreed common standards. In the case of the telegraph and telephone committees, tariff questions are also considered.

From time to time, if matters arise needing urgent consideration before an ordinary administrative conference is due, the need can be met under the Convention by calling an extraordinary administrative conference. This is, however, rare. Of more frequent occurrence is the need for discussion of matters affecting only a limited, or a regional, group of members, and special or regional conferences of those concerned are provided for under the Convention to avoid delaying progress.

The work associated with a plenipotentiary or ordinary administrative conference commences almost as soon as the previous conference has finished, because at this point the application of the provisions newly arrived at comes under study and the recent conclusions are of course already beginning to lag behind further development and technical progress. But the main preparation commences about eighteen months or two years in advance of a conference, when the effect of the operation of current provisions in the Convention and Regulations, as the case may be, can be better seen and studied with the view to revision and adjustment to current and future needs. From these studies are derived the definite proposals which many member countries consider it desirable to make, and these proposals, with the reasons for them, are sent to the secretariat of the Union eight months or so in advance of a conference for grouping together, numbering, and circulating to all Members of the Union at least three months before the conference. This time is needed to enable Members to study proposals, of which there may be several hundreds, before their delegates leave for the conference. Moreover, the margin of time must admit of translation, for better study, in those countries not freely conversant with one of the working languages of the Union (English, French and Spanish) in which the proposals are printed.

Preparation for plenary assemblies of the international consultative committees (C.C.I.F., C.C.I.T., and C.C.I.R.*) is rather different. The C.C.I.s themselves consist of a number of separate international study groups each dealing with specific questions more or less continuously between the triennial meetings of plenary assemblies. At these assemblies all the study groups are represented and their reports are reviewed. Agreed recommendations based on their studies are then issued. New questions are suggested at each assembly for study and report to the succeeding plenary assembly in three years' time, and earlier questions may be recommended for further study.

Concurrently with the preparation of proposals for plenipotentiary and administrative conferences, the Secretary-General has been occupied with other preliminary work. He is the administrative head of a permanent secretariat responsible for handling not only the day-to-day work of the Union but also for organising and servicing conferences. Conferences may take place at the seat of the Union, or elsewhere if one of the Members wishes to extend an invitation for the conference to meet in his country. In the former case the Secretary-General is responsible for

* *C.C.I.F.—Comité consultatif international téléphonique.*
C.C.I.T.—Comité consultatif international télégraphique
C.C.I.R.—Comité consultatif international des radio communications.

sending invitations and organising the whole of the conference arrangements, in the latter he shares the work with the Administration of the inviting or host country, which he or his representative visits and with which he makes a contract specifying the respective responsibilities. Broadly, the responsibilities lie with the Secretary-General for servicing the conference in its work and with the host country for accommodating it and seeing to its welfare.

For plenipotentiary and ordinary administrative conferences invitations are sent to Members about a year ahead, and by this time the Secretary-General is already organising the secretariat's side of the conference work; such as documentation and mimeographing facilities, translation and interpretation personnel and equipment, and earmarking basic staff from his secretariat to attend the conference. These provisions will be supplemented later by arrangements for local equipment and facilities and locally recruited temporary personnel. He or his representative has meanwhile discussed with the host country the working accommodation and location for the conference, equipping the accommodation, local staffing, hours of work and conditions, and facilities and amenities generally needed by delegates in the course of their work. Concurrently the host country, by means of its own reception and organising committees, has been planning the layout and equipping of conference working accommodation, arranging for the reception of delegates at stations, ports and airfields, organising the formal opening of the conference and official functions, and catering for the needs of delegates for relaxation, and visits within the country during their stay.

Conference activities and organisation

A conference is not fully constituted until it appoints its chairman (usually from the host country), whose responsibility it is to organise its work. But the outline of a suitable organisation can usually be foreseen and tentatively planned from past experience by the Secretary-General as soon as the bulk of the proposals has been received. The basic committee structure which is the working heart of a conference usually consists of four or five committees to handle the various proposals grouped round each main aspect of the work; a budget committee to oversee conference expenditure, a credentials committee to verify that delegations are properly accredited, a drafting committee to prepare the texts of the final decisions, and, if needed, a steering committee to oversee and direct progress. The chairman, after approving or modifying the committee organisation, submits it to the conference, generally with his suggestions for chairmen of committees. With this approved in plenary session, and any general questions settled, committees proceed under their own arrangements, either handling proposals in full detail themselves or distributing much of the detail work to sub-committees or working groups.

The chairman of the conference, by himself or with the aid of a steering committee (for example, composed of committee chairmen), plans for each week the daily schedule of committees, where the control of progress now largely rests; but it is the chairman's duty to ensure that good progress is maintained and to keep a watchful eye on the expenditure of time and of the budget allotment.

Initial Difficulties

In the initial stages of a conference, progress is almost certain to be slow. Major points, political and representation matters, rules of procedure and the like, often call for lengthy plenary meetings at the outset which prevent an immediate start on committee work; small delegations cannot cover several committees simultaneously and have a hard job keeping an eye on all the proposals in which they are concerned; and committees in the early stages frequently have to refer major points of principle back to a plenary meeting which suspends all committee work; and finally delegates are only too anxious to enter into lengthy discussion—there always seems to be plenty of time at the outset. But the later stages bring out the need to speed discussion and to extend working into the night hours and even into the early morning. This causes acute discomfort to most delegations who have preparatory work to do each night for the next day's meetings, and to chairmen who have the additional task of checking minutes, drafting texts, and carefully preparing work for their own committee meetings.

The final stages of a conference, working against time and a target finishing date, are usually periods of heavy pressure. Clearing up committee work, drafting, checking and redrafting texts, and bringing order and sequence to a large volume of conclusions entail heavy work, and target dates are sometimes exceeded. The first readings of final texts in plenary session mark the peak. And even at this point a good deal of study and care is needed to correct errors and omissions, to guard

against last-minute challenges to agreed decisions, and to ensure that texts in the three languages used in working in I.T.U. conferences are in close agreement. But from this point pressure eases through the second and third readings, usually for checking and minor correction before the formal ceremony of signature. Unfortunately, in many ways the signing ceremony, which marks the close of a conference, tends to be rather an anti-climax.

The drafting committee, the hardest worked committee at the end of a conference and the only committee active after the first readings, is working right to the last. Other committees have thinned out as the various phases of their work have been completed and delegations have mostly reduced their numbers to correspond with the closing of committees, except for a limited few who will sign the final acts. The timing of suitable homegoing transport—air, sea and land—also means in many cases anticipating the closing ceremony, and delegates, though still perhaps numerous, number far less than at the outset. Where a conference started with five or six hundred delegates, less than half may remain to the end.

Signing, though a rather calm and leisurely proceeding, is, nevertheless, an interesting ceremony. Differences are at last settled and strong feelings are replaced by satisfaction at a heavy task accomplished. Procedure follows a long-established practice as each delegation in (French) alphabetical order proceeds to the signing table. Opponents are ready to acclaim one another as they sign and to join in the general exchange of good wishes and *bon voyage* which mark the end of a conference. And the over-riding feeling, after many weeks of wondering if and when the conference will end, is perhaps that of regret at seeing friends depart on their homeward journeys across the world.

Languages used at Conferences

Languages used in discussion have naturally always been a problem at international conferences. In the earlier days conference work in the I.T.U. was conducted in French. At later stages English and then Spanish were introduced as alternative

A Committee meeting in the Senado at the Madrid Plenipotentiary Conference, 1932

languages in which delegates might speak in discussion and for working documents, but French still remains the 'reference' language in the event of discrepancies between texts.

Additional languages called, of course, for interpreters. A speech in one language was translated into the other two in turn by interpreters at meetings. This proved cumbersome and not very efficient for long verbal statements and at large meetings, and telecommunication equipment was introduced to help. Earphone reception and microphones now enable each delegate to select his preferred language of the three for listening, and to pass his actual words when speaking to special interpreting booths. Here interpreters listen to him in whichever of the three languages he uses and convey his words, almost simultaneously, through their own microphones to listeners in the other two languages. Each can adjust the level of received speech to suit his hearing and hear distinctly—a big help in a large meeting. Interpreters in I.T.U. conferences are highly skilled in both simultaneous interpretation and the correct rendering of technical terms—no mean feat in itself. One golden rule is that speakers should speak slowly and not get carried away by their own words, in order to help interpreters to do their remarks justice.

Reflections on past international conferences tend to smooth out the major crises without which no conference is complete and to bring into prominence the pleasure and advantages of personal meetings and discussion. These become impressed more firmly by the interest attaching to foreign travel and personal contact with telecommunication methods and installations in various parts of the world, and with local difficulties. Each country has its own particular problems, better appreciated if seen at first hand. Relaxations, usually planned by a country when inviting a conference to meet within its borders, provide unique opportunities for this and offer a most welcome relief from strenuous conference work. Also, suitably timed, they may well overcome crises by offering opportunities for informal discussion, and expedite work by helping opponents to arrive at agreement. In after years remain the personal contacts, recollections, and pictorial records formed at, say, The Hague, Copenhagen, Lisbon, Bucharest, Madrid, Cairo, Atlantic City, Buenos Aires, Arnhem; each of them the scene of an I.T.U. conference, not forgetting, of course, the seat of the Union, Geneva. And one problem remains perpetually unsolved for each delegate—how best to acknowledge a home welcome of an almost stereotyped form: "Had a good holiday?"

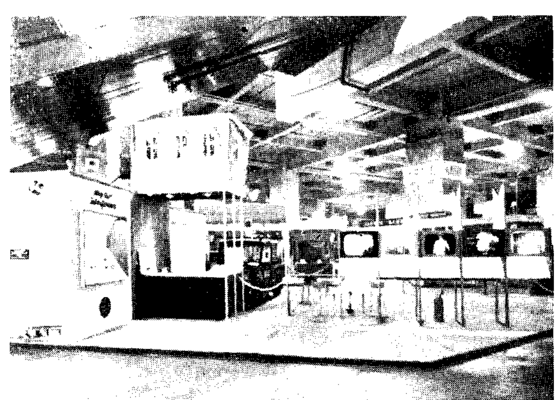
Twentieth National Radio and Television Exhibition, 1953

THE POST OFFICE STAND AT THIS YEAR'S RADIO Show at Earls Court was designed for a dual purpose.

On one side there was a simple demonstration of the television detector van. Here the method of tracing unlicensed television sets was effectively shown by means of linking the equipment in the van to an illuminated diagram which could be seen by a large number of people. At the same time the process was explained over loudspeakers. The public was allowed to use the hand detector set so that they could find for themselves a hidden television set.

On the other side of the stand was a display showing the effect of interference to television and sound broadcasting sets from car ignition and domestic appliances. The methods of preventing this interference were explained by Post Office engineers, who also answered a large number of enquiries.

On various days during the show certain prominent personalities of the stage, screen and radio world visited the stand and drew large crowds.



K. F. A. McMinn, Public Relations Department

"BOOKS THAT YOU MAY CARRY . . AND HOLD readily in your hand, are the most useful after all." The Post Office has long realized the wisdom of these words of Dr. Johnson and for some time past has been considering the ever-growing problem of the London telephone directories.

At present there are four volumes, weighing almost 17 lb., containing the names of over one million subscribers. The directory is issued in four parts, A-D, E-K, L-R and S-Z, covering all the subscribers in the London Telecommunications Region, which, in addition to London itself, includes parts of the neighbouring counties of Essex, Hertfordshire, Middlesex, Surrey and Kent, and with the rapid development of the telephone service the present directories have become cumbersome and unwieldy. Each part is a substantial volume of 1,000 pages. At the present rate of expansion, a fifth volume would soon be necessary, but this would be an expedient, not a solution to the problem.

In the first issue of the *Journal*, November, 1948, it was recorded that "Telephone subscribers appear almost wilfully to refrain from consulting the telephone directory." Could the answer be that the directories were so bulky and formidable that they daunted all except the Herculean and the brave?

Reprinting the directory in its present form presents the Stationery Office with serious difficulties. Allowing for additional copies for business firms, call office requirements and so on, it means printing some 5,000,000 books every year and using about 9,000 tons of paper.

There was a single directory for London until 1931, when there were some 416,000 exchange lines in London. It was then decided, as the directory had reached 1,580 pages, to issue it in two parts. By the end of the war the number of exchange lines had risen to 680,000; by 1947 there were 835,000 subscribers' lines, and the total number of pages in the two volumes had reached over 2,800. In that year the directory was divided into the present four alphabetical sections. There are now over 1,100,000 exchange lines and the complete directory contains 4,188 pages.

Proposed changes

On April 29, 1953, the Postmaster General, Earl De La Warr, announced in the House of Lords important changes in the arrangement and the distribution of telephone directories in London. These changes are to be introduced on January 1, 1954.

The directory provides an essential service to telephone subscribers, and the basis of any directory scheme is to enable subscribers to have directory information, which they need, easily and readily available. The difficulty under the current arrangement is that the information available to all the million or so subscribers is too voluminous for many individual subscribers. The new plan will segregate the directory information on a basis which ensures that the areas to be covered by the new sectional directories are readily understandable by the public; it is on this alone that a system based on sectional distribution can hope to achieve general acceptance. With this in view, directory sections related to postal addresses, which consist of letters and numbers representing a postal district, or, outside the London Postal Area, include the name of a county, are considered to be the most suitable. This will result in some exchange and Telephone Managers' areas being served by more than one directory, but this feature had to be accepted in the interests of obtaining a line of demarcation which will be clear to the public.

New scheme

Under the new scheme there will be one directory, divided into four parts, for the London Postal Area, and separate directories for the individual county areas which are also within the London Telecommunications Region. The title of the inner area directory will be the "London Directory (London Postal Area)" and it will be about three-fifths of the size of the current publication; it will be published in four parts (A-D-E-K, L-R and S-Z) with covers of different colours like the present directory. In its new size it could be reduced to three parts, but a fourth would be necessary in five years if the books are to be restricted to their present size. It was decided, therefore, not to put subscribers to the inconvenience of becoming used to a new alphabetical division for such a short time.

The directories for the outer London areas will be provided with covers which will enable them to be readily distinguished from the other directories and will be as follows:—

Title of Directory	*Colour of cover*
Outer London (West Middlesex)	Old Gold
Outer London (Herts. and North Middlesex)	Dark Grey
Outer London (Essex) ...	Orange
Outer London (Kent)... ...	Light Grey
Outer London (Surrey) ...	Green Grey

North Middlesex is combined with Hertfordshire because it is cut off from West Middlesex by part of the London Postal Area (see map).

Each of the new Outer London directories will cover the entire range of names from A-Z and will go into a single volume and, with the smaller number of entries, reference should be much simpler. For example, there will not be more than five pages of "Smiths" in any of these directories as compared with nearly 40 pages in the present London directory.

Distribution

Distribution presents a problem in itself. If all parts of the new sectional directory were to be distributed to each telephone subscriber in the London region the number of volumes held by each would be even greater than at present. Such a distribution would not only be as inconvenient (or perhaps more so) to the individual subscriber, but would also be even more expensive than the present arrangement.

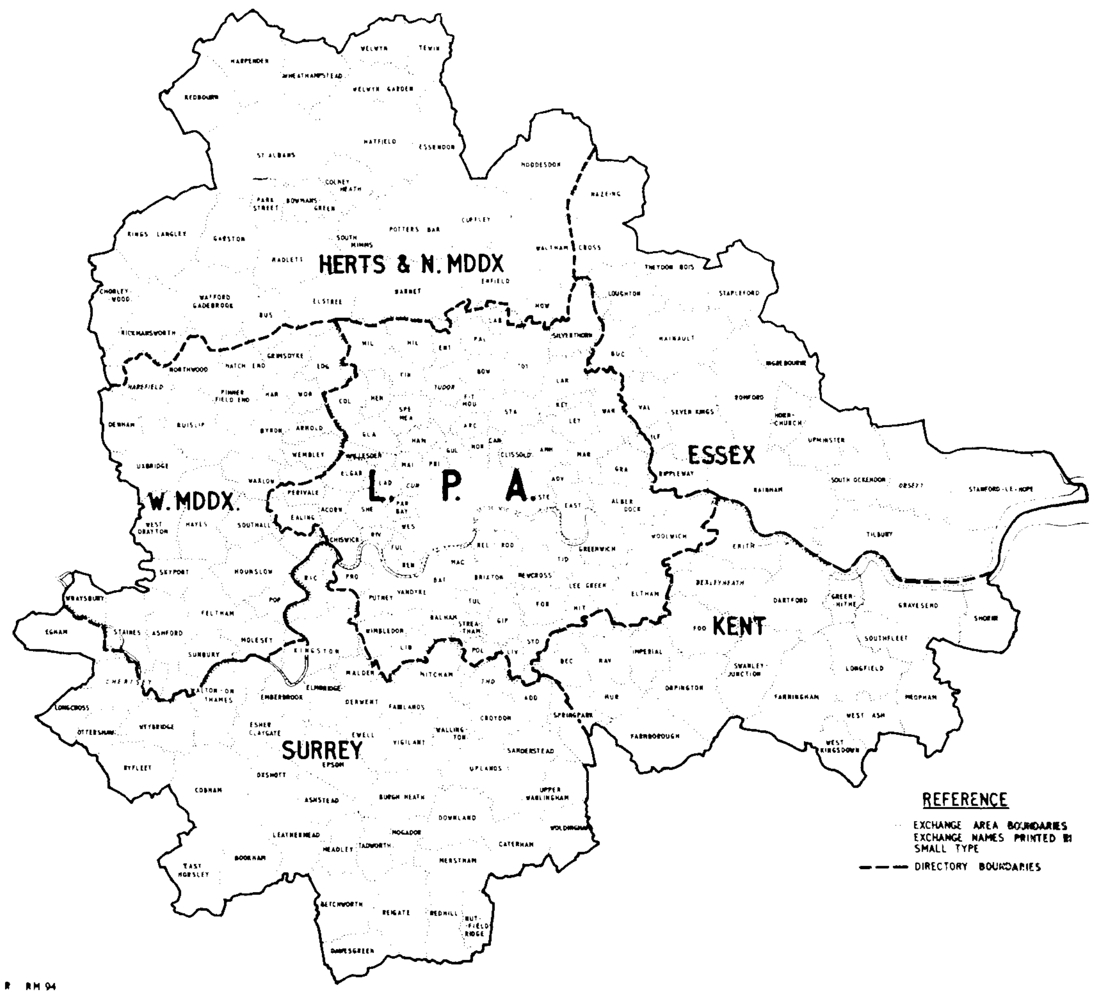
Individual subscribers will, therefore, be given the directory covering their own area. In addition, business subscribers in the outer London areas will also be given the Postal Area Directory. Any subscriber who needs a sectional directory, other than that for his own area, will be supplied with it on request.

Subscribers will not be charged for additional directories, but it is hoped that they will ask for them only if they are likely to use them considerably, or if their additional needs are not met by a "local" directory where one is published, or by the Classified Directory of Trades and Professions which will continue to cover the Greater London Area and be distributed to all business subscribers.

The London Postal Area and county boundaries will split some exchange areas. In these cases there will be a "local" directory which will include the exchange area as a whole. Wherever a boundary is drawn there will be subscribers living near it with many interests on the other side of the line and, therefore, in a different area. To meet this point the area covered by some of the "local" directories which serve the outer London districts will be extended to overlap the main directory boundaries.

Most call offices in the London Postal Area will be provided with all nine volumes of the new directories, and those beyond will have the directories which are most frequently required.

MAP SHOWING NEW DIRECTORY BOUNDARIES FOR LONDON



The net effect of all these changes will be to reduce the number of directory books which are produced and distributed by 600,000, and will cut by one half the amount of printing that the Stationery Office has to do for London directories.

Directory Enquiry Arrangements

Concurrently with the introduction of the new directories, the Directory Enquiry service, which is already overloaded, is being completely reorganised. It is hoped that the new and smaller directories will be so much more convenient to handle that more Londoners will readily use them and that fewer will dial "DIR." On the other hand, some subscribers will be given rather less information than now and an efficient Directory Enquiry service will obviously, therefore, be required if a demand for "additional" directories is to be prevented.

At present, up-to-date directory information for the whole of the London Telecommunications Region is maintained at one central bureau in 2,000 loose-leaf binders. This record is necessarily bulky and only a small fraction can be available to any one operator; other operators have to be employed to receive enquiries and distribute them to those who can reach the appropriate part of the alphabet. The system becomes less efficient as the number of subscribers grows and the volume of enquiries increases. There are several relief centres, but they frequently have to put enquiries through to the central bureau for the latest information.

Under the new system, each operator will have a printed directory of all London Postal Area subscribers arranged in address order, which will be brought up-to-date and reprinted monthly. This "street" directory will provide quick reference in tracing entries such as "Smith of 125, Lordship Lane" when search in a "name" directory would take a longer time.

In addition, operators will be provided with monthly supplements and daily lists to the six directories. The supplements will contain all new and changed entries and will be compiled from the daily printed lists. A new number will be shown in these lists within 48 hours. Both supplements and lists will be printed by a new and economical photo-lithographic process from master copies made of typed slips held on a panel. This method has so far been adopted by only one other telephone administration, the Cuban Telephone Company. Many large cities in the United States make use of the frequently reprinted record system for directory supplements, but their records are still produced by conventional letterpress printing, with linotype composition.

Because each operator will have complete and up-to-date information about subscribers, the new system, unlike the old, will be very flexible, and it will be possible to cater for growth of enquiries simply by opening additional centres. In January 1954, the volume of enquiries handled at the present central bureau will be reduced by diverting some of the existing traffic to four other bureaux and there will eventually be one bureau in each Telephone Manager's Area.

Another feature of the new arrangement is that enquiries relating to the London toll area will also be handled at the new bureaux. This will be more convenient for callers, who will be able to dial "DIR" for information concerning anywhere within the boundary of the toll area.

The new system is expected to be more efficient and economical than the present one and it should provide a much improved service to callers.

Summing-up

The Postmaster General said in the House of Lords, "On the whole, I believe that this arrangement will be generally welcomed by subscribers, but in a matter which concerns so many people some may well feel that they would have liked something different. I feel sure, however, that we shall receive their help and understanding when they realise the problems we have had to face, and the very real endeavour we have made to formulate a scheme that will be to the advantage of the service as a whole ".

Engineering Directory.—The annual *Engineering Directory*, issued by the Bristol Engineering Manufacturers' Association, Ltd., (B.E.M.A.) is a model of its kind. It is pocket-size, bound in stiff paper boards and with a map of Bristol showing the main roads leading out of the city inside the front cover. It lists not only the full names and addresses of members, with particulars of their goods, but has a large section listing them also under a classified index of trades from Abattoir Equipment to Zinc Stockholders—including, of course, cables. A 16-page pictorial section adds to the attractiveness.

From National to International Telex

Lt.-Col. D. T. Gibbs, O.B.E., T.D.,

External Telecommunications Executive

An extract from the first telex directory issued in the United Kingdom gives the following definition :—

> "Telex service is afforded by means of a teleprinter—a special kind of telegraph instrument fitted with a key-board which closely resembles that of an ordinary commercial typewriter. It can be operated without difficulty by the average typist after a little practice. When two teleprinters are connected together over a switching system, a message typed on either machine is reproduced by both the home and distant teleprinter simultaneously. Messages can be sent from each end alternately if desired, on the same connection, but not from both ends simultaneously".

The telex service was first introduced in the United Kingdom in August, 1932. All telex subscribers were provided with teleprinters which were connected with either their normal telephone lines, or telephone lines specially rented for the purpose. Calls were first set up as ordinary telephone connections and then both parties agreed to switch over from the telephone to the teleprinter; the operator, by typing, now caused teleprinter signals to be transmitted by pulses of alternating current in the voice frequency range and as a result the characters were reproduced on both machines.

At first this service was restricted to inland use, but in 1936 it was extended to Holland and, later to Belgium, whose telex systems were designed on similar lines to that of the United Kingdom. Calls to these countries were routed via special positions in the International Telephone Exchange in Faraday Building and were limited to connections between the main towns. In April, 1937, a service was opened to Germany, but as the German telex system was based on an exclusive, automatically switched, telegraph network, calls were circulated via a special telex converter switchboard in Amsterdam where facilities were available to convert from A.C. to D.C. methods of signalling, with dialling access direct to the German telex subscribers. This arrangement, however, deprived users of the alternative speech facility on calls to Germany.

Immediately before World War II, plans were made to extend the service to other continental countries and also to install special converter positions in London. The outbreak of war stopped work on this project.

Standardisation in Europe

It had become apparent that, to provide for the efficient inter-working of telex systems between European countries, it would be desirable to standardise as far as possible the design and facilities in each country, so that the fullest possible integration could be achieved on a basic, European switched network. This problem was considered by the International Telegraph Consultative Committee (C.C.I.T.) and recommendations for a "Subscribers' Telegraph Service by start-stop apparatus in the European system" were issued in 1948.

These recommendations covered both the operating procedure and technical facilities required and envisaged an international telex network consisting of direct telegraph circuits between European countries, adequate to enable a demand service to be given. It was recommended that each country should consider providing a national automatic switching scheme so that a controlling switchboard operator in any one country could obtain the required subscriber of a distant country by direct dialling.

Post-War Re-opening

In 1947 it was decided to re-open international telex service to and from the United Kingdom using an exclusive telegraph network, separate for the time being from the inland telex service which continued to operate over the telephone network. Since an 18-channel voice frequency system can be set up on a single telephone circuit liberal provision of telegraph circuits for telex use should be possible.

The schedule shows the rapid development since the service was reintroduced to Holland in March, 1947. Access is now available to 16 countries and in seven of these the distant European subscriber can be obtained by direct dialling by the London operator.

The Subscriber's Station

As the subscriber's station equipment used on the present inland telex system is unsuitable for the international service, a separate terminal teleprinter installation, connected to the London International Telex Exchange, is provided.

The equipment normally consists of a metal table which accommodates a Creed's No. 7 Page Teleprinter, a signalling unit and certain subsidiary items. The unit has two press button keys labelled "call" and "clear", a green engaged lamp and a red alarm lamp (Fig. 1).

To originate a call, the subscriber presses the "call" key and this causes the teleprinter motor to start and the calling lamp on the switchboard to glow. As soon as the switchboard operator answers, the green lamp on the signalling unit glows and the subscriber then advises the operator, by teleprinter, of the country, exchange and telex number required. The call is set up and the operator signals "G" ("You may transmit"). When the teleprinter message or conversation has been completed, the caller breaks down the connection by operating the clear key, the green engaged lamp goes out and the teleprinter motor stops.

The arrival of an incoming call is apparent from the starting of the teleprinter motor and the glowing of the green lamp as soon as the exchange operator plugs into the switchboard

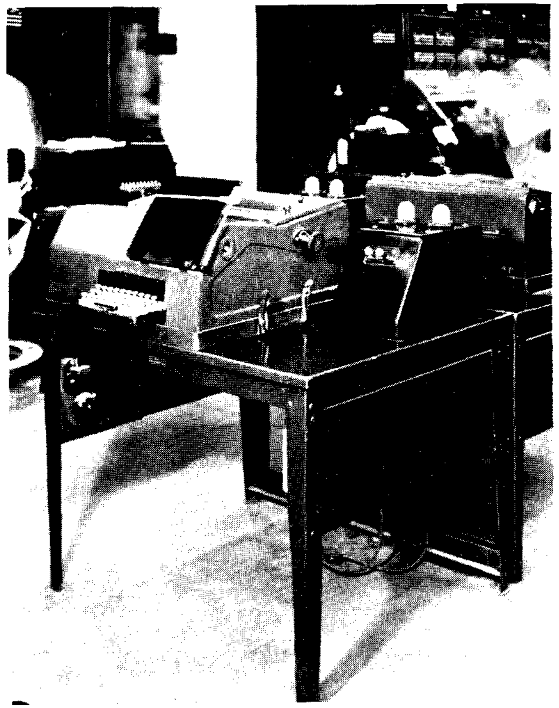


Fig. 1: Subscriber's Station Telex equipment

jack of the subscriber's line. The motor stops and the green light is extinguished at the end of the call.

International Exchange

The present exchange consists of 20 operating positions in the Central Telegraph Office, London. The general layout of the switchboard, as will be seen from Fig. 2, is somewhat similar to that used in the telephone service, although of course, no speech facilities are available and all "conversations" are conducted by means of the teleprinter placed at each operating position.

Each switchboard position has two operating panels and the complete subscriber's and trunk multiples are repeated over every two positions. The answering signals and jacks have a multipled appearance every 12 panels. The need to have the teleprinter on the switchboard position has resulted in a special design of the keyshelf layout (Fig. 3). The answering and calling plugs with supervisory lamps and keys have been arranged to leave a clear space in the centre of the keyshelf for tickets and so on. Chargeable-

SERVICE TO	DATE OF OPENING OF SERVICE	ROUTE	METHOD OF OPERATING
Holland	March 24, 1947	Via Amsterdam / Rotterdam	Manual
France	May 5, 1947	,, Paris	Manual
Belgium	May 5, 1947	,, Brussels	Automatic
Saar	May 5, 1947	,, Paris	Manual
Switzerland	January 26, 1948	,, Zurich / Geneva	Automatic
Czechoslovakia	March 8, 1948	,, Prague	Automatic
Denmark	June 28, 1948	,, Copenhagen	Automatic
Norway	June 28, 1948	,, Oslo / Bergen	Manual
Sweden	July 5, 1948	,, Stockholm	Automatic
Germany	May 9, 1949	,, Hamburg / Dusseldorf / Frankfurt	Automatic
Berlin	July 1, 1949		
Luxemburg	January 1, 1951	,, Brussels	Manual
Finland	August 20, 1951	,, Helsinki	Manual
Austria	September 1, 1951	,, Vienna	Automatic
U.S.A. (New York and Washington) ...	February 1, 1952	,, New York	Manual
Hungary	January 26, 1953	,, Nuremburg / Prague / Vienna	Manual
Belgian Congo (Leopoldville)	April 13, 1953	,, Brussels	Manual

Countries to which Telex Service is available from the United Kingdom

time clocks are associated with all cord circuits and in front of each clock is a slot placed diagonally to hold tickets in respect of calls actually in progress.

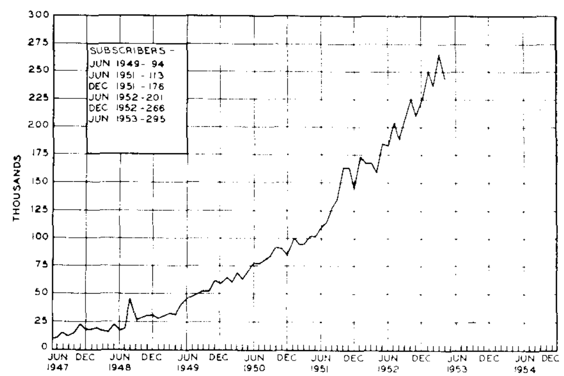
The keys, in conjunction with the cord circuits, enable an operator to :—

(*a*) answer or call a subscriber or another exchange,
(*b*) dial a distant subscriber,
(*c*) obtain the answer-back of either subscriber,
(*d*) converse by teleprinter with either subscriber,
(*e*) monitor a connection,
(*f*) time the duration of a call.

Two other facilities are the engaged test and the follow-on call trap. The engaged test requires a new technique since the operator wears no headset to hear the engaged click; it is arranged therefore that, if the bush of the engaged multiple jack is tapped with the tip of the calling plug, a special position pilot lamp will glow; should the plug be inadvertently fully inserted, the lamp will glow continuously and the teleprinter motor will race. No double connection is set up, however, and there is no interference with the call already in progress.

The facility of the follow-on call trap is provided to avoid possible delay in setting up one call shortly after another incoming or outgoing call is finished. At the end of a call the subscriber depresses the clearing key and this gives a signal to the operators to indicate that the call should be disconnected. If, however, the subscriber should call before the connection has been taken down by the operator, the calling signal will glow again and the call can be answered in the normal way. Also, as soon as the clear is given by the calling

Graph showing the United Kingdom total International Telex traffic paid minutes (monthly)



subscriber, the international circuit used is immediately freed for further traffic.

Answer-back Codes

Each subscriber's teleprinter contains an answer-back unit which incorporates the identification of its station; when two machines are connected, the unit on one machine can be operated by the depression of the "Who are you?" key on the keyboard of the other machine and this causes the identification to be printed by both machines. Further, it is part of the function of the switchboard operator when the call is first set up to obtain the answer-back codes of the calling and called subscribers, and both of these identifications will also be received at each of the two stations.

There will therefore always be, at the beginning of each message, a typed record of the two subscribers connected. There is no need for a subscriber to be present to receive a message, but the calling party can ring the alarm bell by depressing the teleprinter "Bell" key if a manual acknowledgment or reply is required.

It has been the practice for the number allocated to a subscriber on the London switchboard to be the identification used for the answer-back code. For example:—

External Telecommunications Executive, General Post Office, London	Telex No. 8000 Answer-back GB LN 8000 (GB Great Britain, LN London)

This arrangement had certain advantages in switchboard operating, but, from the subscriber's viewpoint an answer-back code giving his name, trade name, or code is no doubt better, as it enables a caller to identify positively that connection has been made to the right subscriber; that is, in the above example, the answer-back could be PO ETE LDN. It has been decided therefore to use "name" answer-back codes and this will line up with the practice already followed in other European countries.

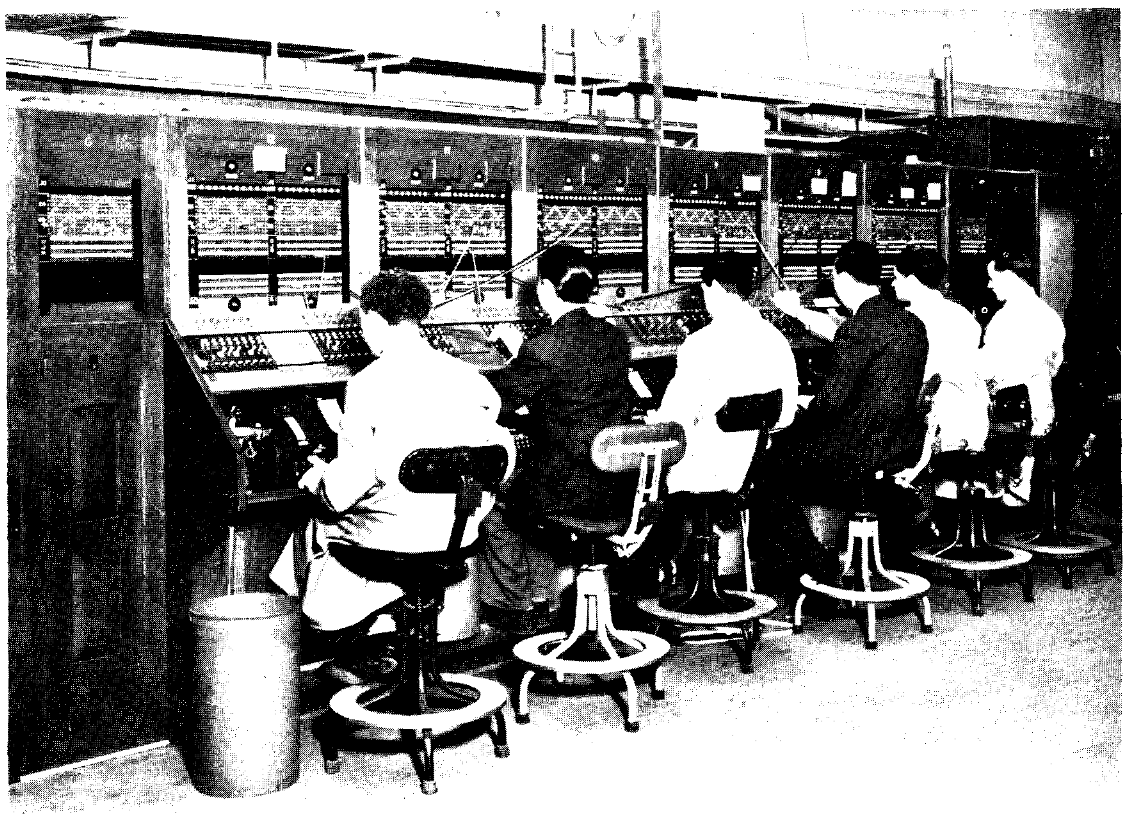


Fig. 2: London International Telex switchboard in the Central Telegraph Office

Service to U.S.A.

On February 1, 1952, the telex service entered the inter-continental sphere when service by transatlantic radio links was opened to the United States of America. At present it is restricted to subscribers of the Radio Corporation of America in New York and Washington.

This service gave rise to some interesting problems. The radio links are liable to interference by atmospheric disturbances which, although they may be of very short duration, are enough to cause the printing of incorrect characters on the received copy. Unless the error is apparent from the text, a recipient will be unaware either that an error has occurred or what correction should be made.

To overcome this difficulty error detection and correction equipment is provided at the radio terminals. This equipment enables the receiving terminal to detect the most common types of error and prevents them from being signalled forward; at the same time a signal which is automatically sent over the return signalling path, will cause the outgoing signal to be transmitted again. Thus in normal conditions no mutilated signals are released from the incoming equipment and a clear and correct copy is received. The duration of a call is assessed for charging purposes automatically, allowances being made for the ineffective time taken to obtain corrections.

This service also has several other special features. For example, a sending operator is unaware that correction is taking place over the radio link; also, the teleprinters of the American subscribers are somewhat slower in operation than those in this country. The signals are therefore temporarily stored at the transmitting station to the extent required by American reception. On this account there may be some slight delay in the receipt of acknowledgments.

Future Development

Shortage of equipment and suitable accommodation have prevented the rapid expansion of international telex in the United Kingdom. By June, 1953, 295 subscribers were connected, and owing to the absence of suitable switching centres in the provinces, these subscribers were all in the neighbourhood of London so that direct circuits could be given to the London switchboard. It is hoped to connect some 100 additional subscribers before the end of the current year and many of these will be in the provinces.

Unfortunately this will still leave a very considerable number of waiting applicants and to cater for these the first suite of 34 positions of a completely new London exchange is now being installed. Further large scale extensions of the switchboard have been planned to provide adequately for future developments.

As has been mentioned, the existing subscribers' inland telex network has had to be kept separate from the international service, but it is proposed to replace the former by a system also operated over exclusive telegraph channels: this would permit the integration of the two systems and any telex subscriber would have service both nationally and internationally. It is a little early yet to forecast the completion of this development but there are good prospects that it can be achieved in the not too distant future.

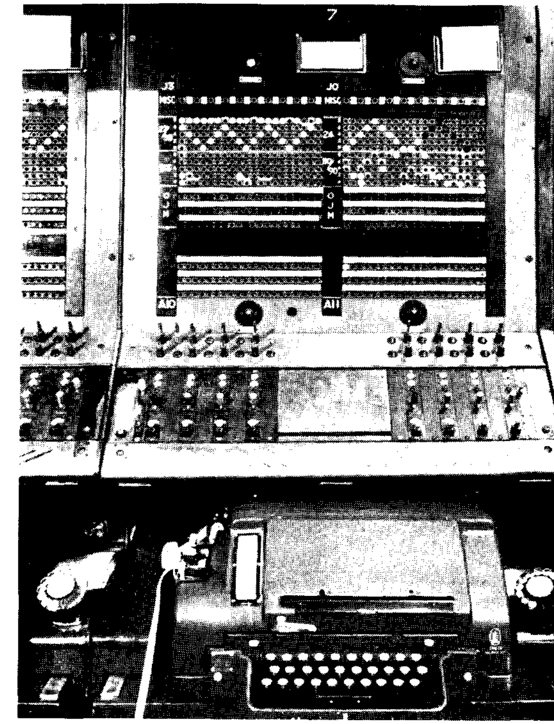
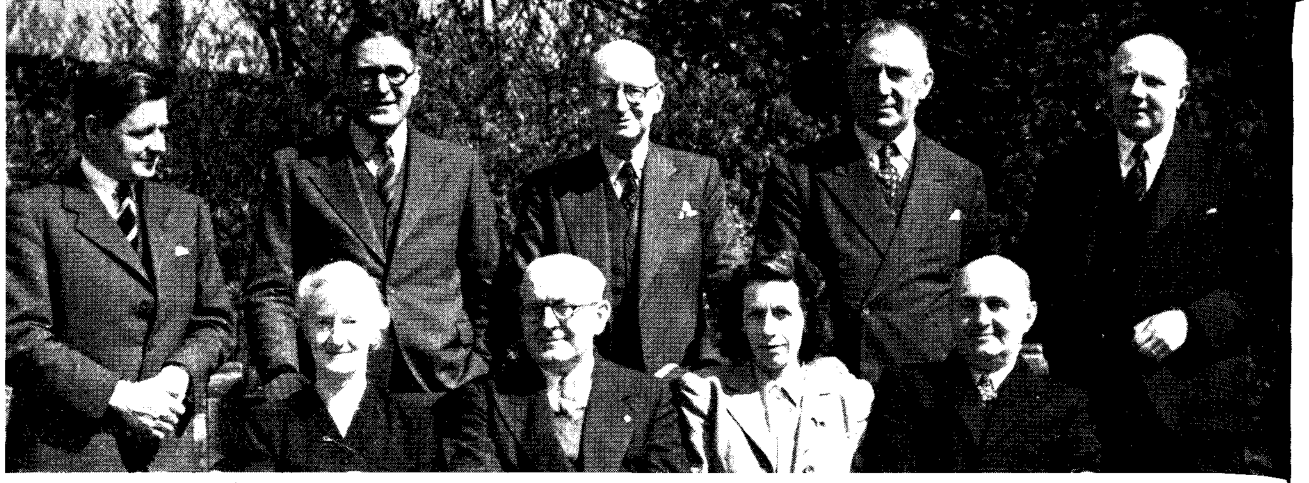


Figure 3: Operating position of International Telex switchboard



Back Row, Left to Right: W. F. HICKOX, M.I.E.E., Deputy Telephone Manager; F. W. J. WEBBER, B.Sc.(Eng.), A.M.I.E.E., Area Engineer, Ext. Development; F. W. BALDRY, Chief Traffic Supt.; T. C. LOVEDAY, Area Engineer, Intnl. Constn. & Installation; A. E. HAYWARD, M.B.E., A.M.I.E.E., Area Engineer, Maintenance.
Front Row, Left to Right: MISS N. KENDAL, Chief Clerk; J. WALMSLEY, Telephone Manager; MISS E. D. C. BROOKS, Personal Clerk; H. A. BISHOP, Chief Sales Superintendent.

London Telecommunications Region

EAST TELEPHONE AREA

The East Telephone Area, reaching from the edge of the City of London in an easterly direction along the north bank of the Thames beyond Tilbury, and northwards into Epping Forest, is an Area of sharp contrasts.

Along the Thames it covers the dock areas of the East India Group and Royal Group of Docks: the Ford Works at Dagenham, Tilbury Docks and the oil depots of Thames Haven. It contains the bomb devastated areas of East London, north of the river, and large and rapidly developing residential areas in the County of Essex. It also serves a busy industrial area, embracing light and heavy industry of all kinds.

There are 117,000 connections on 30 Exchanges, and 3,200 staff. The Area covers 200 square miles.

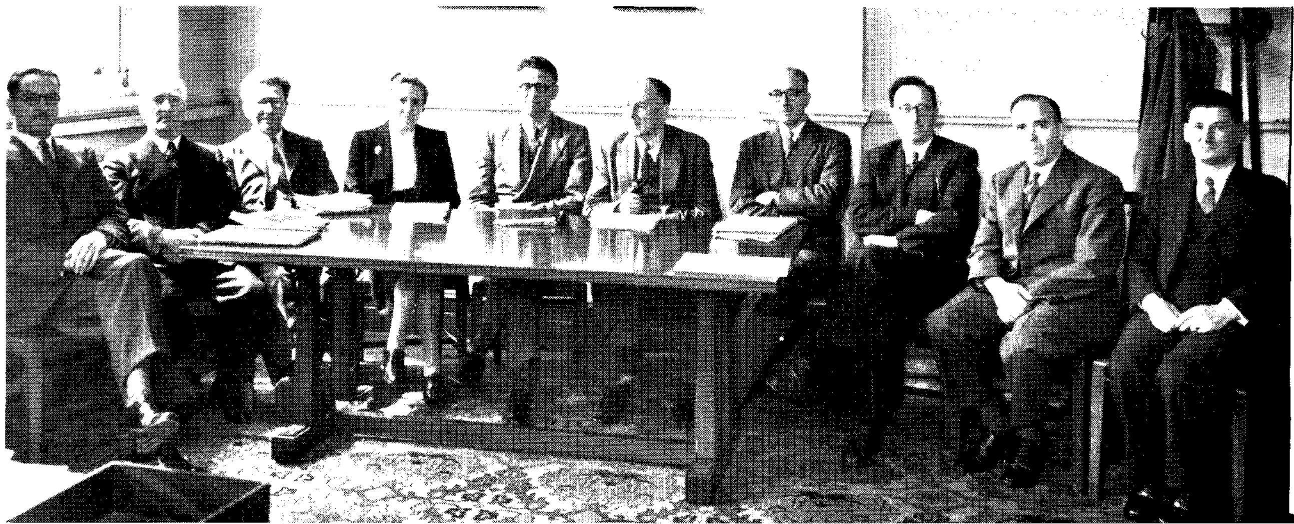
SOUTH EAST TELEPHONE AREA

The South East Area, London Telecommunications Region, stretches along the south bank of the Thames from Battersea to Lambeth and from Deptford to beyond Gravesend. Its southern limits reach the Kentish slopes of the North Downs. The territory is rich in historical associations: here Sir Walter Raleigh spread his cloak for the first Queen Elizabeth; here, at Deptford, were laid the foundations of Britain's modern naval strength; here Wat Tyler made his early bid for democracy.

The Area comprises stretches of industrial, residential and agricultural territory and its features include the Greenwich Naval College, the National Maritime Museum, Kennington Oval and Woolwich Arsenal. Its products are many and varied, ranging from portland cement, telecommunications equipment and dustbins to hops, beer and silk from the silkworm farm at Lullingstone Castle.

The Area covers about 228 square miles. Its 39 exchanges have 160,000 exchange connections and 220,000 stations. It is growing at the rate of 8,500 exchange connections per year. The staff numbers about 4,000.

Left to Right: C. H. WRIGHT, A.M.I.E.E., Area Engineer (Installation); E. R. ADAMS, Chief Sales Superintendent; W. H. OWENS, A.M.I.E.E., Area Engineer (Maintenance); MISS D. STOKES, Chief Clerk; H. S. M. HALL, Telephone Manager; C. G. BROOKS, Deputy Telephone Manager; A. BLIGHT, B.Sc.(Eng.), Area Engineer (Planning & Development); J. A. T. CORDEREY, Chief Traffic Superintendent; G. E. SMITH, A.C.G.I., A.M.I.E.E., Area Engineer (Construction); E. C. HOUGHTON, Executive Officer (Secretary).



Integrating the Commonwealth Communication Services

Second General Report of the C.T.B.

TWELVE MONTHS AGO THE COMMONWEALTH Telecommunications Board, in its first General Report, covering the year 1951, laid down its main objective: the achievement of a "balanced integrated" overseas cable and wireless network. In its second Report, for 1952, the Board makes the "modest claim" that "the system as a whole is now in better shape to meet current requirements and to cope with emergencies than it was a year ago".

The origin and functions of the Commonwealth Telecommunications Board, which was established in accordance with the Commonwealth Telegraphs Agreement, 1948, were outlined in the August, 1952, issue of the *Journal*, in which Col. W. W. Shaw-Zambra, Secretary-General, stated that "the basic concept is that the respective National Bodies are common users of the Commonwealth and Empire cable and wireless systems".

New Operating Bodies

The "National Bodies" are the organisations, either existing telegraph or telecommunications departments, or specially created, which acquired the assets in their countries taken over between 1947 and 1951. They represent the "Partner Governments", which are those of the United Kingdom, Canada, Australia, New Zealand, South Africa, India, Ceylon and Southern Rhodesia; Pakistan is not yet a Partner Government but she has an observer on the Board. The Post Office is the National Body for the United Kingdom and is represented by Mr. W. A. Wolverson, the Director of the External Telecommunications Executive and a director of Cable and Wireless Ltd.; the Company is represented on the Traffic and Technical Study Groups.

In the introduction to the Second General Report it is emphasised that "the Board has always to bear in mind that it is not an executive body and that it must be vigilant not to trespass into the managerial field proper to the National Bodies".

The Board's "Conclusions and Prospects" are summarised in paragraphs which, because of their warning against over-optimism about radio circuits, deserve wide publicity.

" Of long-term prospects for promoting the general efficiency of the service, the Five Year Development Plans of Canada and India in particular, and various steps already taken by other countries, show that on the radio side development is already extensively planned and will proceed at a steady pace for some years.

"But there is a limitation, not widely understood by the public, on the extent to which new radio circuits can be set up and profitably exploited. Bad radio propagation conditions and the difficulty of finding appropriate and unoccupied frequencies free from interference may render impossible the establishment of a desired circuit capable of being operated throughout the 24 hours, or even a substantial period thereof, all the year round.

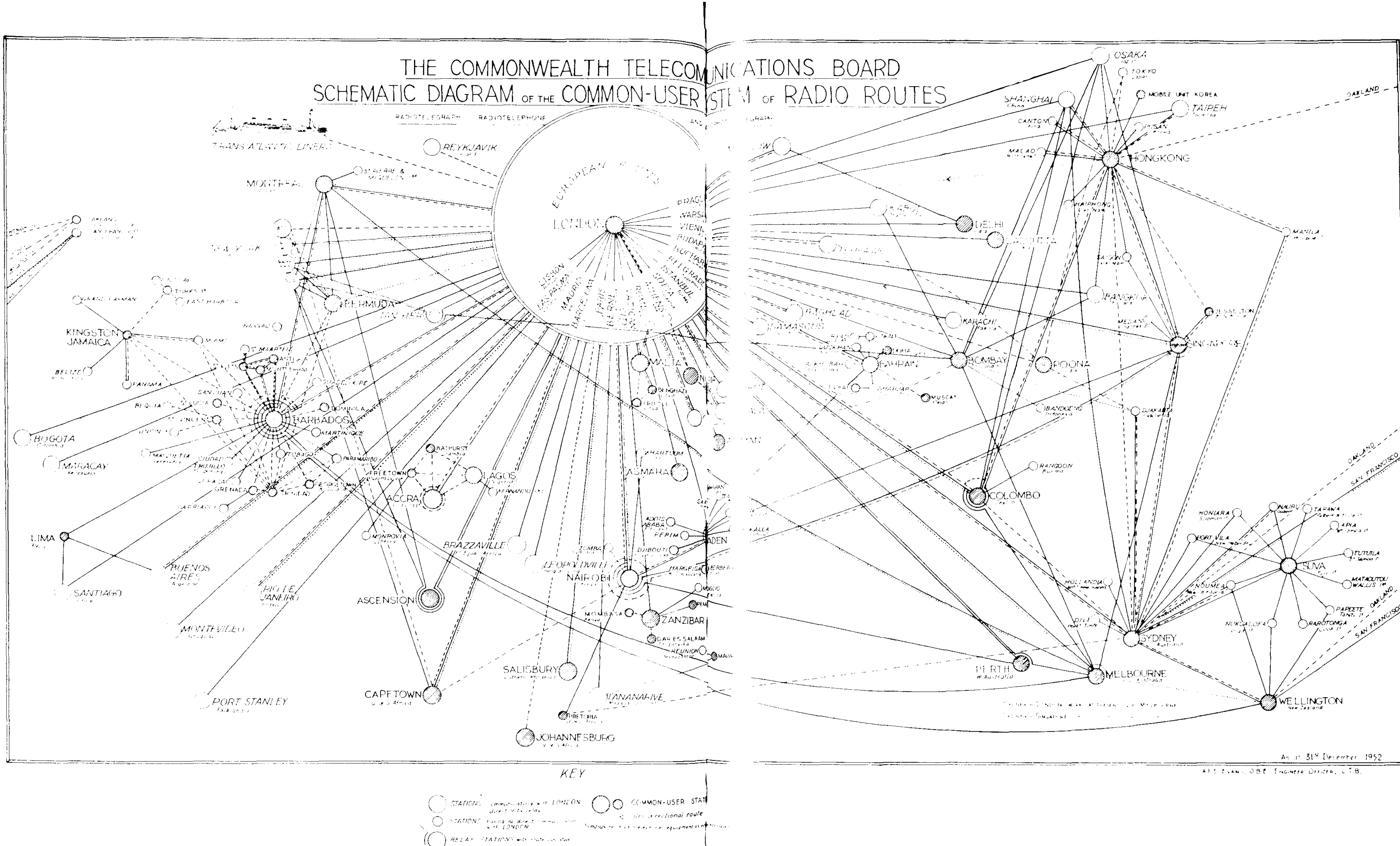
"In such circumstances if heavy expenditure is incurred on equipment with the possibility of only limited use, the law of diminishing returns is very often rapid in its application. These considerations must not however preclude the adoption of the most modern method to improve radio transmission and reception.

"On the cable side, it seems likely that a new era is opening. The practicability of submerged repeaters in deep sea has been successfully demonstrated. The Commonwealth is fortunately well placed to derive the fullest advantage from this technique, as it is in the happy position of having at its disposal the largest cable system in the world".

Cable-Radio Co-operation

The Second General Report includes contributions from the various National Bodies.

The integration of cable and radio is exemplified throughout the report. An example is the London-Aden Wireless telegraph circuit which has been integrated with the Aden-Bombay No. 4 cable, a development which has enabled peak traffic to be handled with considerable ease when radio condi-



The Commonwealth Telecommunication Board: Schematic Diagram of the Common-User System of Radio Routes tions between Aden and London are favourable.

The New Zealand National Body (Post and Telegraph Department) reports a striking instance of the complementary use of the cable and wireless systems in a record of activity following interruptions to the Pacific cables after a hurricane in Fiji in January, 1952:—

"For a time there was no cable communication from Fiji northward to Canada, or westward to Australia; while the cable between Auckland and Suva could be operated only at hand-speed.

"A team was sent by air to Suva on January 31 and the cable repair operation was completed on February 9, when all communications to and from Suva were again normal.

"To assist in the handling of New Zealand's overseas telegraph traffic during the interruption, a radio-telegraph circuit was established between Wellington and London on January 29 and was continued until February 9. With the ready co-operation of the Australian National Body some traffic for the United Kingdom and beyond was routed over the Tasman cable to Australia for disposal by radio and alternative routes".

Pursuing the plan to integrate cable and wireless services the Board's Technical Study Group has examined the results of radio teletype circuit tests between Vancouver and Melbourne and has concluded that such circuits would provide valuable additional channels to supplement the Pacific cables and to act as reserve against cable interruption. The Canadian National Body (Canadian Overseas Telecommunication Corporation) has surveyed sites for radio stations in the Vancouver area and has made transmission tests with Australia. Subject to satisfactory findings on circuits with both Australia and New Zealand, it is intended to proceed with plans. Also, to ease the load on the Pacific cables and the Commonwealth circuits and to expedite transmission, a radio-telegraph circuit was opened between Wellington and London, relayed at Barbados.

The Cable Network

The common-user cable system consists of some 149,000 nautical miles of cables under the north and south Atlantic, the Pacific and Indian oceans, and the Mediterranean and Red seas, operated by Cable and Wireless Ltd., and some 1,500 nautical miles under the English Channel and North Sea operated from England by the Post Office. The several Partner Governments operate the cable stations in their own territories, Cable and Wireless Ltd. operating the remainder.

The renewal of 1,200 miles of cable of the Porthcurno - Harbour Grace - Halifax route was recorded in the February, 1953, issue of the *Journal*. This year the renewal is being completed with a further 1,450 nautical miles, thereby substantially increasing the speed of the cable. During 1952 Cable and Wireless Ltd. used about 1,000 nautical miles of cable in repairing routes, in addition to the 1,200 used for the transatlantic cable.

The Post Office Research Branch is developing an experimental telegraph repeater for trial in the Company's Porthcurno-Gibraltar cable and is carrying on development work with deep sea telephone repeaters. The Post Office also records that "the design of submerged repeaters for telephone cables in shallow waters is firmly established and their use has provided additional telephone and voice frequency telegraph capacity in the United Kingdom-Continental network".

Radiotelephony

Among many radiotelephone developments the United Kingdom-India double side band (D.S.B.) circuit has been converted to single side band (S.S.B.) operation, and only eight of the 48 radiotelephone circuits operated from the United Kingdom still use D.S.B. transmission. Overseas radiotelephone services operated with the United Kingdom have been extended by cable to various European countries.

The South African National Body (Department of Posts and Telegraphs) reports negotiations for providing the islanders of Tristan da Cunha—the isolated archipelago in the South Atlantic, some 1,500 miles west of Capetown—with their first public radiotelegraph service; hitherto the only telecommunications on the island has been a South African meteorological wireless station. The primary aim of the new service is to assist the Tristan da Cunha Development Company, which is exploiting the fisheries. The South African Ministry of Transport, working to Capetown Radio, will operate the new service.

A review of traffic shows that during the years 1947-1951 the average annual increase over the whole system was of the order of 2.5 per cent., but in certain directions recession appeared to be setting in during 1952. The Traffic Study Group has embarked on research with a view to suggesting a long-term programme for progressively improving the network with maximum integration of the cable and radio. For this purpose the common-user network has been divided into 24 well-defined areas whose telegraph traffic streams are considered big enough to affect available capacity.

In 1951 the National Bodies took, and Cable & Wireless Ltd. collated, a comprehensive statistical record which is being studied. The main criterion used for assessing the present adequacy of circuits was the actual transmission times, having regard to the type of traffic, time differentials, cross traffic streams, and special requirements on highly competitive routes. The examination covered a period when traffic was at its peak.

These few extracts from the Report outline the activities of the Commonwealth Telecommunications Board, and its constituent members, in dealing with day-by-day problems and pursuing its long-term objectives. The Report notes that "by the end of its second full year's activity the Board had become firmly established as part of the machinery for consultation, co-operation and exchange of information within the Commonwealth at the practical working level". It had taken the measure of some of the fundamental problems that have to be solved. It had advised the Partner Governments on a large number of matters, and its advice had usually been accepted. The Report is followed by a Statement of Accounts for the year 1951-1952, a complete outline of the common-user system, showing the operators of each station, and a large outline map of the system.

The VIIth Plenary Assembly of the International Radio Consultative Committee

H. Stanesby, C.G.I.A., M.I.E.E., Engineer-in-Chief's Office

THE INTERNATIONAL RADIO CONSULTATIVE Committee is more usually referred to by the initials of its French title, namely, C.C.I.R., and is an organ of the International Telecommunication Union (I.T.U.). It has the task of studying technical radio questions and also those operating questions that are closely connected with technical matters, and of issuing recommendations upon them. The C.C.I.R. draws its members from the administrations of Members of the International Telecommunication Union and from various private agencies that operate public radio services and which are recognised by an administration; for example, the B.B.C. Plenary Assemblies of the C.C.I.R. are normally held every two or three years, and since the war meetings have been held in Stockholm, fifth Plenary Assembly in 1948; and Geneva, sixth Plenary Assembly in 1951.

The seventh Plenary Assembly, which was held in London at Church House, Westminster, was opened by the Postmaster General, the Earl De La Warr, on September 3, after Mr. H. Faulkner, C.M.G., Deputy Engineer-in-Chief of the Post Office, had been invited to become Chairman of the Conference. In his opening speech the Postmaster General referred to the contributions of British engineers and scientists to the development of radio and television, and touched on the problems that still confront radio engineers in their attempts to overcome the vagaries of radio transmission that are due to sunspots. He mentioned also that this year saw the 50th anniversary of the first international radio conference, held in Berlin in 1903, and referred to the value of the co-operative and orderly sharing of knowledge that now takes place in the meetings of the C.C.I.R.

The work of the C.C.I.R. is divided between 14 international Study Groups, each of which deals with a particular aspect of radio communication. The Study Groups met during the period September 4 to 25 to consider reports describing the work carried out in various countries since the

Left to right: Sir Ben Barnett, Earl De La Warr, Mr. H. Faulkner and Dr. B. van der Pol at the opening ceremony of the VIIth Plenary Assembly of the C.C.I.R. at Church House, Westminster, London, on September 3, 1953

last Plenary Assembly. The Study Groups' aim was to draft recommendations and reports, or to indicate by setting new questions for study, what work remained to be done. These recommendations, reports and questions then came before the final plenary meetings for acceptance.

Some indication of the magnitude of the task that confronted the Conference can perhaps be gained from the facts, given by the Director of the C.C.I.R., Professor van der Pol, that some 50 different nations and organisations took part, and that, before the meeting, the secretariat distributed about one and a quarter million sheets of preparatory documents. The range of the work is illustrated by the following list of Study Groups, with their international chairmen:—

I	Transmitters	Dr. E. Metzler (Switzerland)
II	Receivers	M. P. David (France)
III	Complete Radio Systems	Dr. H. C. A. van Duuren (Netherlands)
IV	Ground Wave Propagation	Prof. L. Sacco (Italy)
V	Tropospheric Propagation	Dr. R. L. Smith-Rose (United Kingdom)
VI	Ionospheric Propagation	Dr. J. H. Dellinger (U.S.A.)
VII	Radio Time Signals and Standard Frequencies	M. B. Decaux (France)
VIII	International Monitoring	Mr. A. H. Cannon (Australia)
IX	General Technical Questions	Mr. H. Stanesby (United Kingdom)
X	Broadcasting	Mr. N. McNaughten (U.S.A.)
XI	Television	Mr. E. Esping (Sweden)
XII	Tropical Broadcasting	Mr. B. V. Baliga (India)
XIII	Operation Questions	Mr. J. D. H. van der Toorn (Netherlands)
XIV	Vocabulary	Prof. T. Gorio (Italy)

As well as the official programme of work a series of entertainments and visits was arranged.

The Civil Aviation Communications Centre, Croydon Airport

W. A. Stripp, Inland Telecommunications Department

THE MINISTRY OF CIVIL AVIATION (M.C.A.) operates telecommunication services, radio aids and air traffic control to ensure the safety and regularity of civil flying. While the various operating companies run the air services, the Ministry's Air Control Staff is responsible for controlling civil aircraft flying within this country, or approaching or leaving its shores.

To carry out these functions the Ministry requires an extensive telegraph and telephone network both within this country and to the many places overseas where similar functions are performed by corresponding administrations. There are two main components in the communications field: air to ground services and the fixed service network, known as the Aeronautical Fixed Telecommunications Network (A.F.T.N.). This article describes the arrangements made to provide the telegraph component of the latter.

Many aspects of air operating, particularly the telecommunication services, are governed by international agreement through the International Civil Aviation Organisation (I.C.A.O.). In the field of aeronautical traffic the transit time of messages must necessarily be related to the transit time of aircraft and it is a requirement of I.C.A.O. that the maximum transit time of an operational message of lowest priority shall not exceed 20 per cent. of the direct flight time. To meet this condition the time to handle messages in the offices must be reduced to the minimum and transmission must be at the highest practicable speed. Furthermore long telegraph lines (especially overseas circuits) are costly and, in the interests of economy, the circuits must be used to their maximum, as well as with the minimum of delay.

The basis of the system adopted by the M.C.A. and most other aeronautical administrations is the tape relay. Under tape relay working a small number of relay centres is established, to which local lines in the area or region and circuits to distant stations and other relay centres are connected. A message is manually transmitted from the originating point and this transmission produces a perforated tape at the relay centre. By means of automatic transmitters and reperforators fresh tapes are produced at each relay centre in turn and the message is transmitted at 66 words per minute over all the circuits concerned to the receiving teleprinter at the distant terminal.

Telegraph Organisation

The M.C.A. have recently replanned their telegraph organisation on an all-tape basis and have sought to establish a system which would (1) reduce transmission time by the use of auto transmitters (2) eliminate manual re-transmission by the use of printing reperforators (3) keep the number of re-transmissions to an economical minimum by judicious selection of relay centres. As part of this re-organisation, the M.C.A. opened a new Civil Aviation Communications Centre (C.A.C.C.) at Croydon Airport in January, 1953, and the majority of M.C.A. circuits are now controlled from this Centre. There are to be subsidiary relay centres at Preston and Prestwick.

The complete organisation comprises three main components: the operating terminal at Croydon, a radio receiving station at Birdlip, and the radio transmitting station at nearby Winstone. All operational traffic originated in the United Kingdom is handled through the Croydon

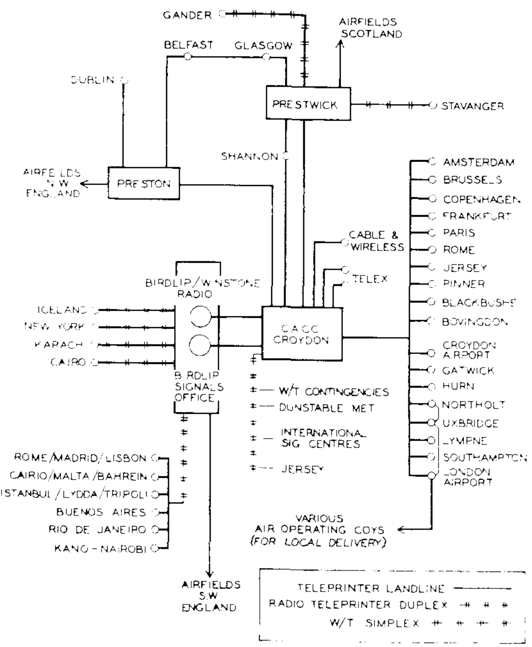


Figure 1: M.C.A. Telegraph network

terminal. Traffic routed out of the United Kingdom is transmitted by either landline or radio teleprinter circuits, except for certain lightly loaded radio routes which are worked by hand operated morse. The radio teleprinter circuits are at present operated from Birdlip, with the addition of two circuits working from Prestwick, but arrangements are in hand to work them on a remote control basis direct from Croydon, and thus save a re-transmission. There are also certain stand-by wireless telegraph facilities at Croydon for use in the event of landline failures.

Figure 1 shows the network diagram and it will be seen that there are also local delivery facilities to air operating companies at London Airport, as much of the information received by M.C.A. air control staff—for example, aircraft departures, loads and arrivals—must be passed also to these companies.

Lay-out of Terminal

The Croydon terminal is solely a relay centre and originates no messages. The main components, therefore, are receiving and transmitting equipment, tape multiplication facilities and a routing and circulation organisation. All the receiving and transmitting equipment is housed in multi-position cabinets specially designed by the Ministry to conform to their station lay-out and message handling system, and also to incorporate the engineering requirements of the Post Office.

All incoming circuits terminate in three main bays which are sub-divided into ten sub-bays each with six printing reperforators in a cabinet, one of the six usually being kept as a stand-by. The printing reperforators are mounted in drawers so arranged as to be accessible for maintenance from the rear of the cabinets. Red and green lamps are fitted on top of each cabinet; the lighting of the red lamp indicates that a high priority message is about to be received, while a green lamp is the tape exhaustion alarm. The complete receiving installation is so arranged that in off peak hours one operator can deal with a large number of circuits.

The transmitting equipment consists of automatic transmitters mounted in two tiers, in cabinets of six, with the bays parallel to the receiving bays so that operators can work between the two. Above the transmitters there is a framework of slots through which tapes awaiting transmission are suspended; these are called "washboards".

Figure 2: Lay-out of Telegraph Operating Room

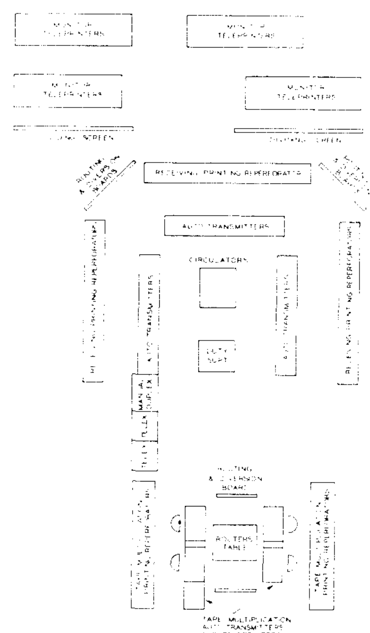


Figure 3: General view of C.A.C.C. Croydon

The tape multiplication equipment or tape-copying pool is provided to produce the additional tapes needed for multi-address messages and consists of four bays each of six printing reperforators, one automatic transmitter and one page teleprinter. A key switching system enables the operator to obtain up to six copies of any message passed through the automatic transmitter, while the teleprinter provides a means of monitoring the transaction, and of preparing any pilot tapes that may be needed.

Traffic is circulated internally by a pneumatic tape tube system that is unique in the United Kingdom. The tubes, which are about one inch in diameter, are of transparent plastic material and each tube terminates in a delivery box. The tape messages are clipped to felt plugs, like corks, which are inserted into the vertical aperature of the tube and then, looking rather like elongated tadpoles, drawn through the tube to the distant point.

All messages are serially numbered for transmission by automatic number transmitting equipment. This equipment, which is housed in a separate room, consists of triple-headed automatic transmitters loaded with pre-cut tapes bearing a continuous sequence of numbers each preceded by the station 4-letter code. The tapes are reset to zero at midnight.

A number transmitter is associated with each out-going circuit. Adjacent to each message transmitter in the main transmitting bays are a push button switch, a Veeder counter and an indicator lamp. The operator feeds the message tape into the transmitter and presses the button switch. This causes the associated numbering transmitter to send the circuit code and message number to line and then automatically switches in the message transmitter which immediately starts sending out the message. At the same time the Veeder counter steps to the next number and provides the operator with a check on transmission.

Message Procedure

Message procedure has been carefully studied with the object of simplifying the functions of individual operators and thus reducing delays and errors. Single address messages are sent by tape tube from the receiving positions to the circulators. Multiple address messages for re-transmission over several circuits are sent by tape tube to the routing and tape multiplication pool for routing action and the preparation of copies. The copies are then sent by another tape tube to the circulators. Routing action consists either of indicating the number of copies required and the circuits over which they are to be transmitted, or, in certain cases, the preparation of a pilot message to give the necessary instructions to the next relay station. The circulators transfer the messages by hand to the "washboards" over the transmitting positions.

The procedure can best be illustrated by following the progress of a typical message: *for*

Figure 4: Printing reperforator cabinets (left) and automatic transmitters (right)

example, a signal about the departure of an aircraft from London Airport to Prestwick. The message originates at Air Traffic Control, London Airport, and is passed to a teleprinter operator who transmits it to Croydon C.A.C.C., where it appears in tape form at a receiving bay. Here an operator tears off the tape, records the message on a form mounted on the cabinet, attaches it to a felt plug and sends it by tape tube to the circulator's position. There a clerk ascertains the routing, by reference to a "routing and diversions" board suspended in the office, and feeds the tape into the "washboard" at the appropriate transmitting position—which will be only a few feet away. An operator then withdraws the tape, inserts it into the message transmitter and starts the transmission as already described. The finished tapes feed into containers, which are cleared at intervals, in the lower part of the cabinets. The staff in the receiving and transmitting bays work as teams and are not allocated to particular circuits. Priority messages are indicated by the lighting of a red lamp over a receiving bay. Difficult cases are immediately taken over by a supervisor.

The Centre is designed to handle up to about 30,000 messages per day and is already, six months after the opening, handling about 6,000 messages a day incoming and about 8,500 outgoing, the difference being accounted for by multi-addressed traffic. The average length of a message is about 40 words. The operating staff totals 134, including 20 supervisors, and the Centre rightly take pride in the fact that, for the majority of traffic, the time from completion of reception to start of re-transmission is within one minute.

The planning and installation of a project of the size and complexity of the M.C.A. network was a considerable task for all those concerned, particularly as the time available was limited, and the success of the enterprise was, without doubt, due largely to the very close co-operation that was maintained between the Post Office and the Ministry of Civil Aviation. It would be no exaggeration to say that the officers concerned in both Departments worked throughout as one team; a partnership that happily continues in the developments still taking place.

Inland Telecommunication Statistics

In the three months ending 30th June, 1953, there were 91,000 new demands for telephone service (compared with 83,000 in the corresponding period of the previous year) and 89,000 new subscribers' exchange connections were installed. The number of shared service connections at 30th June was 625,000 compared with 592,000 at 31st March.

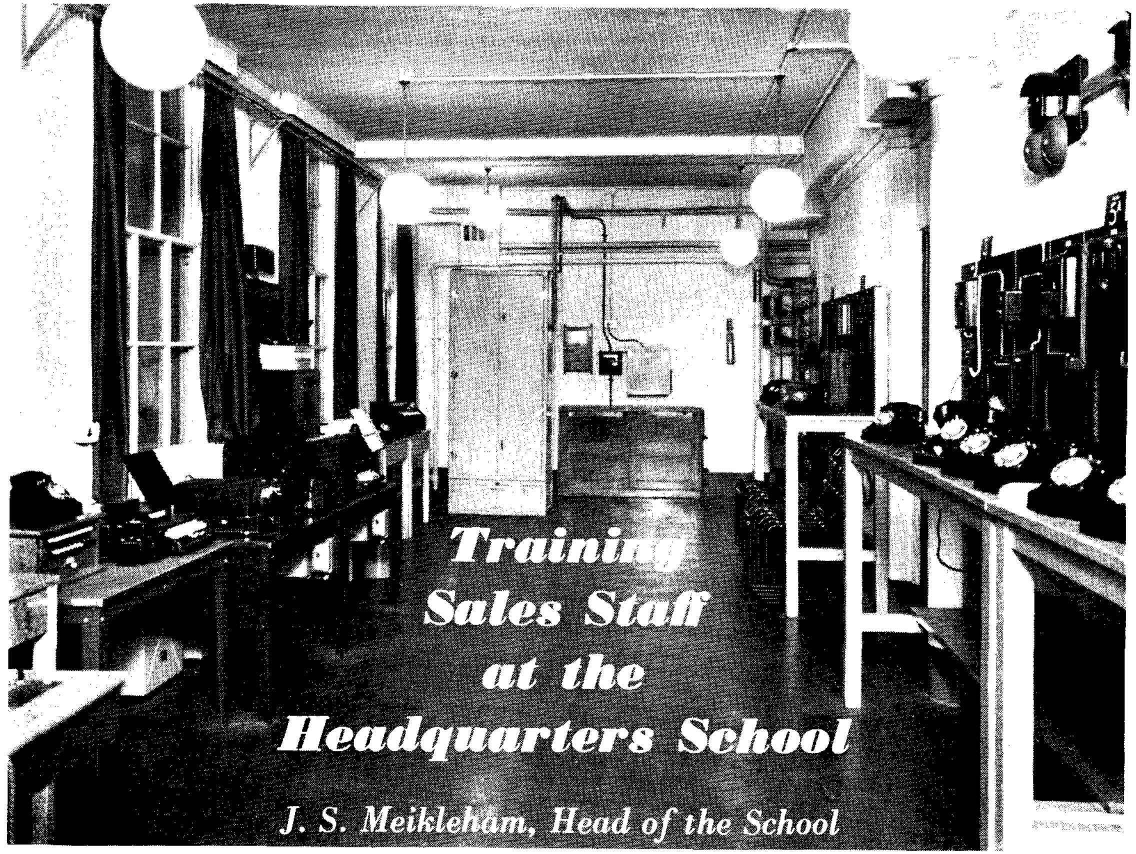
The number of telephones in service at the end of the period was 5,988,000, a net increase during the quarter of 61,000 (including an increase of some 790 public call offices). The number of outstanding applications was 408,000, representing a decline in the quarter of some 19,000.

67,921,000 inland trunk calls were made of which 17,340,000 (some 26 per cent.) were at the cheap rate. In the corresponding quarter of the previous year the figures were 65,277,000 and 16,338,000 (some 25 per cent.) respectively.

The number of inland telegrams (excluding Railway and Press) amounted to 8,759,000 including 1,598,000 (18 per cent.) greetings telegrams. In the same quarter of 1952 the figures were 9,043,000 and 1,483,000 (16 per cent.).

At the end of June, 1953, there were 48,546 telephonists, 9,172 telegraphists and 54,289 engineering workmen employed. The corresponding figures for June, 1952, were 49,355, 9,833 and 54,213.

The 6,000,000th Telephone in the United Kingdom.—Another milestone in telecommunications progress was passed last August. Early this year it was known that this number would be reached in the second week of August. As it was impossible to single out the precise station, it was decided to mark the occasion by a ceremonial opening on the 15th of August of the installation of the new radio link connecting the Island of Stroma to the telephone network of Great Britain. The ceremony was held in the Council Chamber, Wick, Caithness, under the chairmanship of Colonel Gardiner and the link was opened and the service first used by the Secretary of State for Scotland, the Rt. Hon. James Stuart. The full story of this event has been told in the October issue of the *Post Office Magazine*.



Training Sales Staff at the Headquarters School

J. S. Meikleham, Head of the School

THERE WAS LITTLE PUBLIC AWARENESS OF the real value of job training until the middle of the late war when, by sheer necessity, large numbers of people were required to achieve, in a very short time, efficiency in work of which they had no previous knowledge. Training of this kind was largely limited to the factory and workshop, but the benefits achieved have greatly influenced the post-war attitude to training in all fields of industry and commerce. The existence of the many Engineering, Traffic and Regional training schools provides ample evidence that the Post Office has not lagged in the realistic present-day approach to training.

Progress of Sales Training

The post-war changes in Sales staff training are more marked than for almost all other grades. In the Sales field the overriding preoccupation of Sales staff in pre-war years was to obtain new business and the technique of salesmanship was the only aspect of the work which was considered to need any extensive formal training. To this end, a short correspondence course in salesmanship, conducted by an independent firm of business efficiency consultants, coupled with a few weeks of office and field instruction, was regarded as fulfilling the essential needs of the new entrant Sales Representative.

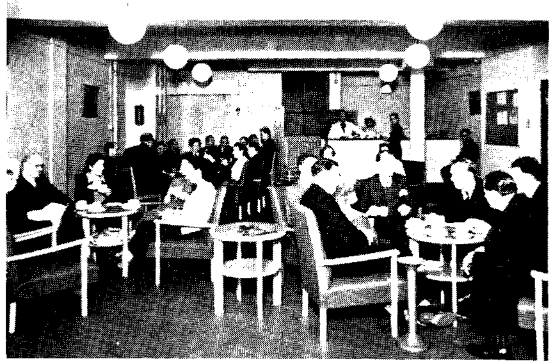
The war-time changes, which resulted in shortage of plant and equipment with consequent "rationing" of the available resources to meet a greatly increased public demand for telephone service, had the effect of changing the Sales Representative's role from one of positive selling to one of operating a complicated system of allocation and, at the same time, trying to preserve

(*Above*) **Demonstration Room: perforator, re-perforator, automatic transmitter, telex station, manual switchboard (5 × 20), P.A.B.X. No. 1 and some of the plan extensions and extension bells** public goodwill towards the Post Office.

Recognising earlier deficiencies and the changed conditions under which Sales Divisions would operate in the post-war period, the Sales Reorganisation Study Group, which met in 1945 under the Chairmanship of Mr. B. L. Barnett (now Sir Ben Barnett, Deputy Director General), after considering the recruitment of new Sales staff, said "we wish to stress that Sales Representatives should not only receive a full basic training, both background and detailed, to prepare them for their functional duties but should also be given, during their training period, a thorough knowledge of the clerical processes carried out in the Sales Section". Soon after the end of the war a three weeks' rehabilitation course was started for Sales Representatives returning to the Post Office from service with the Armed Forces or in other Government Departments. The scope and character of the courses were limited but they established the Sales Training School as a going concern and the experience gained provided the foundation on which the present new entrant training course was planned, following the lines of the Study Group recommendations.

New Entrant Training

As with Assistant Traffic Superintendents, recruitment to the Sales Representative grade is from a very wide field and previous experience seldom covers more than one or two aspects of the work. The Sales Representative in making arrangements for the provision, alteration or cessation of all types of subscribers' telecommunication services, is responsible for reconciling the views and wishes of the subscriber or would-be subscriber with the often conflicting technical and administrative needs of the Post Office. In this important respect his job is the same as it was before the war. It does not require a particularly vivid imagination to appreciate the problems which confront him and the kind of situations in which he often finds himself, particularly in dealing with large and complicated installations. He must be able to explain technical services, in simple language, to a generally non-technical public, to discuss subscribers' problems with them, to advise about facilities to meet their needs (bearing in mind the availability of supplies) and to express these in appropriate departmental form to the Engineering and Traffic Divisions. In discussion with the public he must be able to spot the technical or operating aspects of problems in the early stages and, after appropriate



"Break-time" in the Assembly Room

consultation, to give the correct guidance or information to the subscriber.

A new entrant Sales Representative first attends at the Headquarters Sales Training School for two weeks in which the normal background training, with particular emphasis on sales organisation, is given, followed by an introduction to some of the simpler facilities and services. At the end of this first stage of training the recruit reports to his Telephone Area and there receives five weeks of practical desk and field tuition, the aim being to introduce him to the work and atmosphere of the Sales Division and to give him an opportunity to study the impact of sales work on the other divisions of the Telephone Manager's Office. Towards the end of the period he is allowed to handle a few simple cases on his own. Returning to the Headquarters School he begins a four-week concentrated course of study of relevant Telephone Service Instructions, practice in using the various items of subscribers' equipment and instruction in the technique of negotiation with the public. A four-day course of instruction at the London Telecommunications Region Engineering School is also incorporated at this stage.

Early Duties

On returning to his Telephone Area the recruit is regarded as being capable of doing normal duties, but under close supervision in the beginning and with detailed guidance from his Superintendent in handling complicated cases. After 20 weeks on his duty and before the end of his first year, which is a probationary period, the trainee returns to the Headquarters School for a final three-week advanced training course which includes instruction in planning and negotiating of large installations and networks, and an outline of the less frequently encountered services; for example, long distance private wires, police and fire alarm systems. He finishes with a two-day course in traffic work.

Specialised Training

In addition to his normal visiting duties a Sales Representative may be assigned for a tour of duty on special services or development survey, for both of these training courses are given at the Headquarters School. On special services he is concerned with the provision of teleprinter and telex services, long distance private wires, civil and military defence needs and police and fire communication systems. This special services course of training is concentrated into two weeks and is conducted mainly by discussion to obtain the maximum benefit from interchange of individual views and comparison of varying Area practices. The Communications Officer of a large subscriber, speakers from the Engineering Department, Headquarters Divisions, and the Home Office address the classes.

On development work the Sales Representative is responsible for providing forecasts of future subscribers' development on which the economic planning of local line plant distribution and of exchange equipment is based. Development courses occupy three weeks and, in addition to work on the complete theory and procedure for demand forecasting, some days are allowed for field practice in the work, in a nearby exchange area.

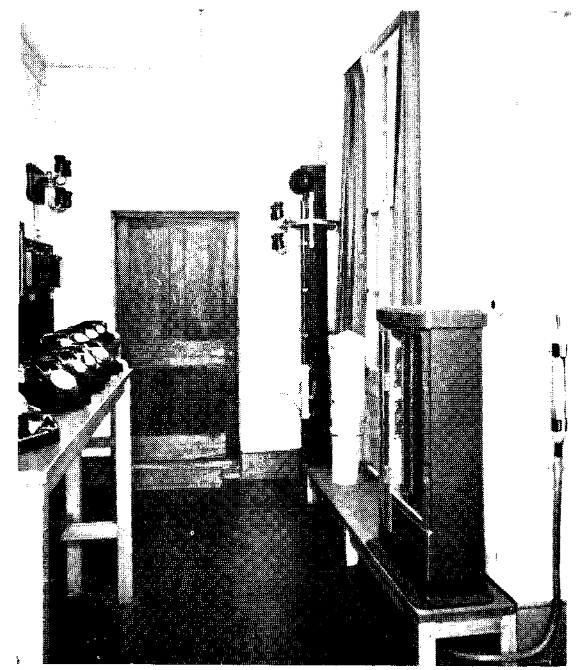
Refresher Training

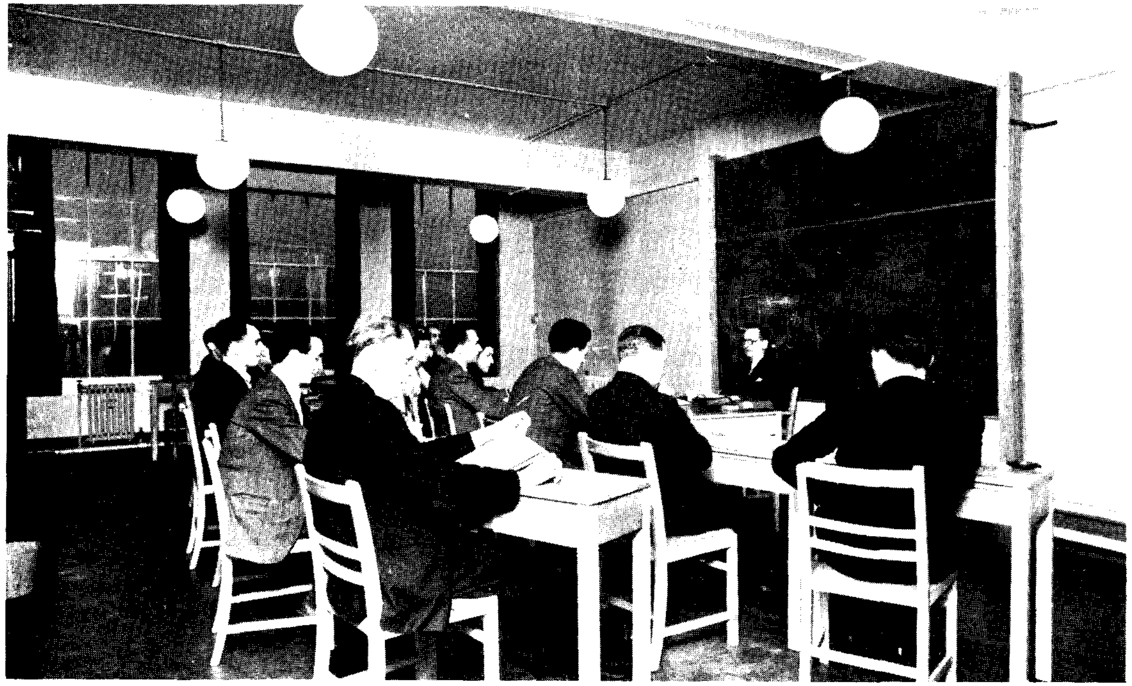
A two-week advanced course has been started recently to give the more senior Sales Representatives an opportunity to bring themselves up-to-date in the more complex aspects of the job, including the most recent developments in provision of service and in handling the latest types of subscribers' equipment. The training given is based on the last stage of the course given to new entrants, but, having regard for the greater experience of the students, covers a somewhat wider and more varied field.

The temporary accommodation occupied by the Sales Training School during the early years of its existence (first, at Wren House, then at Wardrobe Court and finally at Ibex House ; all in the City of London) had many unsatisfactory features from a training point of view. At the beginning of 1952 the Post Office Buildings and Supplies Branch responded to an appeal for permanent and improved quarters and, in February, invited the Headquarters Sales Division to view the shell of a blitzed building at 14-15 Bridgewater Square, London, E.C.1. First impressions were not encouraging, but the Ministry of Works' offer to rebuild and lay-out the premises as a training school merited serious and detailed consideration. Apart from the design of the building to serve the purpose for which it was to be used, other advantages could be foreseen. It was within seven minutes' walk of Headquarters Building and convenient for the many Headquarters' officers who visit regularly to speak to training classes; it was situated in a pleasant and quiet locality where noise disturbance to students would be at a minimum and, with windows on both sides of the building, the natural lighting of the class rooms would be exceptionally good. Proximity to an underground station (Aldersgate) was a further favourable factor.

With this stimulating prospect, the school

External distribution plant in the Demonstration Room. A cabinet, pillar, D.P. and "window joints" in the underground cables can be seen





requirements were reassessed and translated into floor plans of the building. Very soon the plans were approved with only minor modifications, a long lease was negotiated by the Buildings and Supplies Branch, in co-operation with the Ministry of Works, and the builders got down to work before the end of May. The builders' and the Ministry of Works' surveyors estimated completion by October and a firm opening date was fixed for November 18. The Supplies Division of the Ministry of Works and the Telephone Manager, City Area, co-operated wholeheartedly in providing furniture, fittings and equipment for the school to produce what is undoubtedly one of the finest and best equipped Post Office Training Schools in the country.

The school comprises five lecture rooms, demonstration room, assembly room, staff room and the usual offices. The scheme of decoration follows the latest approved choices of the Colour Division of the Ministry of Works, using contrasting pastel shades and having regard for the natural lighting of each room. Windows are picked out in white enamel and doors are of polished Iroko wood. Roller blackboards are fitted in all lecture rooms and have square sections for graphical work and white for film or slide projections. Desks and chairs are of light oak, the chairs having rust coloured upholstered seats. Electric lift, central heating, plastic tiled floors and dark green curtains on all windows complete the picture. The Assembly Room is the reporting centre for students arriving at the School and is also designed to accommodate fairly large gatherings of students or Sales staff for meetings, film shows, lectures or even occasional social functions. As will be seen from the photograph taken during "break-time", it also caters for the comfort of students in their leisure moments; the "tea bar" is extremely popular and when radio, table tennis, library and one or two other amenities have been added the Assembly Room should rival club standards. Two of the lecture rooms are designed to accommodate classes of up to 20 students each, one up to 14 students and a small one limited to 10. One lecture room is specially equipped for development training and training classes of the discussion type. It is furnished with development planning tables instead of the small individual type.

The Demonstration Room on the top floor of the building—shown in two other photographs—should meet with the approval of all Sales staff. The aim has been to include every type of subscribers' equipment frequently met with and most of the items which are more rarely encountered, and that all should be working models. External cables are led into the Demonstration Room via a cabinet and pillar, and "window joints" in the cables provide a visual aid to the explanation of underground jointing and distribution. From the pillar a 10-pair cable is taken to a "breast-high" D.P. where two working shared-service instruments are teed. A second 10-pair cable from the pillar carries the remainder of the external circuits to a combined distribution frame from which the rest of the Demonstration Room equipment is served.

In providing the demonstration equipment the full range of standard extension arrangements has been included, with the three manual switchboards and a House Exchange System connected as a subsidiary of the switchboard $\frac{10 + 30}{65}$. Various types of extension bells are connected to the keyboard and can be associated, as appropriate, with an extension from the switchboard $\frac{5 + 20}{25}$ to demonstrate switch-hook control. Subsidiary apparatus includes a valve amplifier (Repeater telephone No. 17A) pre- and post-payment coin boxes, fire-proof and pendant type telephones and other items.

The Private Automatic Branch Exchange No. 1 installation has been designed to serve several purposes. It is primarily for training but it is also the official demonstration set for subscribers who may be interested in having a P.A.B.X. installation and may wish to see one in operation. Finally, it is used to serve the daily communication needs of the school.

This P.A.B.X. No. 1 has two inter-switchboard extensions with full facilities to the $\frac{10 + 30}{65}$ switchboard. These circuits are accessible from the P.A.B.X. extensions by dialling "7" and may be used for dialling into the P.A.B.X. from the $\frac{10 + 30}{65}$ switchboard, and its extensions. An inter-switchboard private wire is also provided from the P.A.B.X. to the $\frac{5 + 20}{25}$ switchboard, connected as an automatic extension at the P.A.B.X. Exchange facilities are, of course, barred.

The telegraph equipment consists of an inland telex station connected to the telex switchboard at the Central Telegraph Office. In association with the telex station an automatic transmitter (No. 2A) perforator (No. 44) and a re-perforator (No. 2) have been provided. A unit (TG 3078) is being installed to enable the telegraph apparatus to be worked "in loco" for training practice.

Progress in sales training has been substantial in the last few years but it is only now reaching the stage of maturity already enjoyed by many of the Department's other training establishments. There is still room for improvement and expansion of the school's activities and the next new venture planned is the introduction of a course in organisation and supervision for the Sales Superintendent grade. The need for such a course has long been recognised and now that basic vocational training has consolidated its position as an integral part of the sales machine, the way is clear to break new ground on the next higher level and in a field where scope exists for a valuable contribution from the sales training organisation.

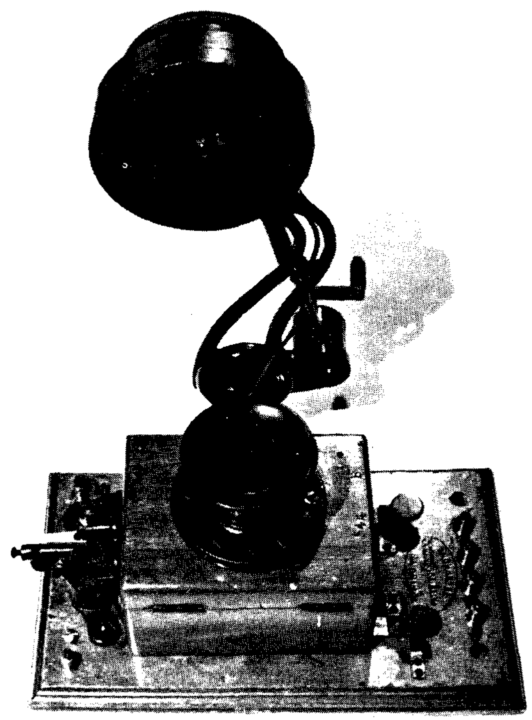
The Shouting Telephone

C. T. M. Farmer
Inland Telecommunications Department

While Alexander Graham Bell is credited with the invention of the first practical telephone, his instrument—which was used for both transmission and reception—was the same in principle as the electro-magnetic receiver used on telephones all over the world today. The carbon microphone was invented by Thomas Alva Edison and was first patented in this country in 1879.

By the time Edison arrived here—in 1879—Bell's company, known as "The Telephone Company", was well established in London and the provinces. Edison was, naturally, jealous of his invention and sought to establish it on a commercial basis. Unlike Bell's, however, his instrument could be used only for transmission and he found that Bell's receiver was so circumscribed by patent rights that he was quite unable to use the principle of direct electro-magnetic attraction on a diaphragm to produce a receiver to accompany his transmitter.

Perhaps the stalwarts of those pioneering days



Edison's telephone chalk cylinder receiver, 1879

had a quality of initiative which is not found today —or perhaps that same quality cannot, nowadays, shine so brightly in the complex interstices of the vast modern telecommunications machine. Be that as it may, Edison, when presented with that apparent impasse, reacted by inventing within a matter of months a receiver based on an entirely new principle. This consisted of a cylinder of chalk impregnated with potassium iodide on which rested the free end of a small metallic strip, the other end of which was attached to the centre of a diaphragm. On rotating the cylinder, the friction between it and the strip caused the diaphragm to bow inwards. The passage of a varying electric current between the cylinder and the strip caused the friction to vary in proportion—and this variation was reproduced at the diaphragm. The output from Edison's transmitter caused sufficient friction variations for the whole assembly to be used as an effective receiver.

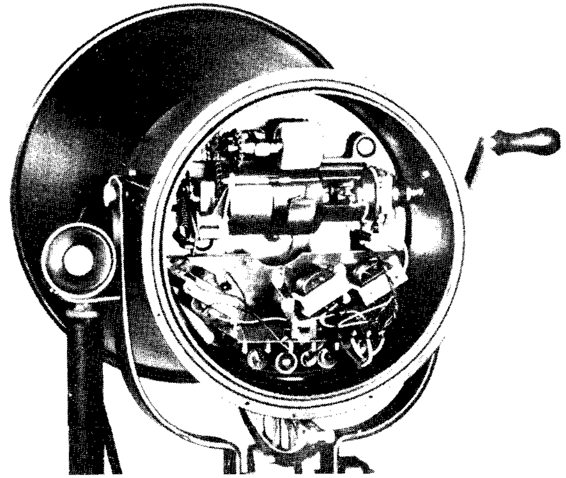
The obvious snag was the need for continually rotating the chalk cylinder while listening and as this was done by a handle mounted on the side of the instrument one can easily imagine the type and origin of complaints.

The receiver was, however, a remarkably efficient instrument and the volume of sound reproduced was so considerable that it rapidly gained the name of "The Shouting Telephone". There are reports that it was used to address a large crowd at a theatre and that both speech and music from it were heard clearly throughout the auditorium.

The Edison Company was successfully set up in 1879, but shortly afterwards the Bell Company secured the patent rights of Hughes' carbon transmitter and thus forced Edison into amalgamation. The United Telephone Company, which was formed from the amalgamation, combined a carbon transmitter with Bell's receiver to produce an instrument fundamentally the same as that in use today, and Edison's ingenious "shouting telephone" receded into undeserved obscurity.

In the *Wireless World* of January, 1953, an article was published describing the latest device in public address equipment—a friction driven loudspeaker which requires no valve amplification. A rotating cylinder, coated with a partially conducting medium, is employed in precisely the same way as Edison used his cylinder of chalk—and the result is a power output comparable with an amplifier-driven loudspeaker of similar size.

The manufacturers of this new loudspeaker are the Great Northern Telegraph Co., of Denmark.



Great Northern Telegraph public address loudspeaker, 1953
By courtesy of "Wireless World"

NOTES and NEWS

New Poster — Television Pioneer — New London Exchange — Fourth Test Match — P.O.T. & T. Society — H.M.T.S. Alert

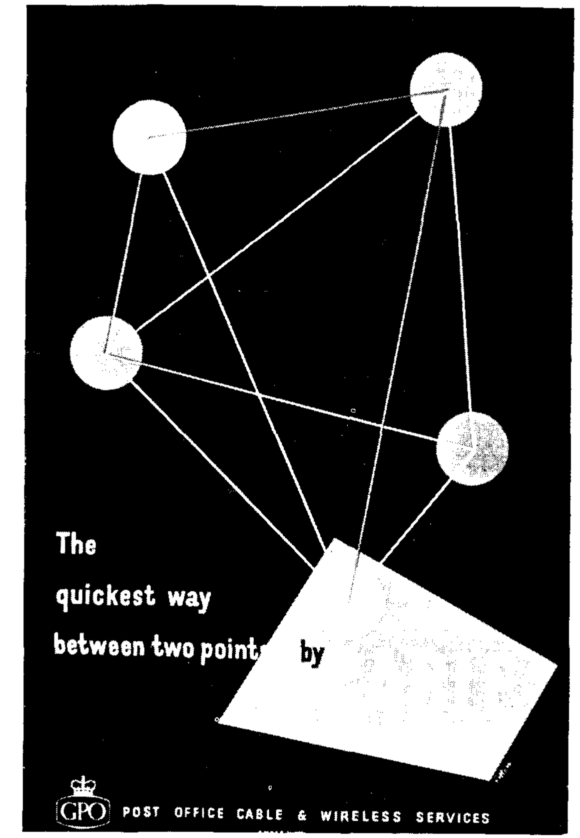
European Television Conference.—As a result of the successful relay of Coronation television broadcasts to France, Holland and Western Germany, a conference was held at Broadcasting House recently to consider future developments. The principal subjects discussed were a proposal for the exchange of television programmes during the Christmas season and plans for setting up permanent links between the countries concerned. A number of technical matters was also dealt with.

* * *

Police Call Boxes.—A new type of call box from which police and public can telephone the local police station will be seen on the streets of England and Wales soon. Looking rather like a lighthouse, the box will be seven feet high, about 18 inches wide and, like existing boxes, on top it will have a light to call the police constable on the beat to the telephone.

* * *

Long Distance Calls.—Some of the leading deep sea trawlers operating from the Humber have fine performances of long distance telephone. Two of them, *St. Britwin* and *St. Keverne* often work telegraphy and telephony between Humber and Greenland, over 2,000 miles, while *Princess Anne* regularly puts through link calls from the White Sea, 1,400 miles from home, to her superintendent's home in Hull.



Our photograph shows a new poster that is being displayed in all Post Offices and in Post Office Cable & Wireless offices in the autumn. It has been designed by James Fitton, A.R.A. The background of the poster is black, and the lines and points are in strong colours. Mr. Fitton describes his design as follows :—

" 'A straight line is the quickest way between two points'. It would be difficult to conceive a statement made with greater clarity. In paraphrasing this to give it its new implication it was only necessary for inspiration to go back 2,000 years to Euclid as an example of that simplicity that is an essential quality of the best in contemporary design. In presenting this in poster form it must of course be sufficiently provocative to be visually arresting and an equal directness in form and colour was inescapable. In fact once the idea was clearly established the poster almost designed itself".

Television Pioneer.—At the unveiling of a plaque to the memory of John Logie Baird the Assistant Postmaster General spoke of the many handicaps, including years of poverty, which the great inventor overcame. Baird's first television set consisted of an old tea chest as a base for the motor with mountings made from darning needles and scraps of wood. The scanning discs were of cardboard, the lenses were extracted from cycle lamps and the whole contraption—in effect, the first television set in the world—was stuck together with glue and sealing wax. He transmitted his first picture in 1928. Three years later the Derby was televised.

* * *

New London Exchange.—The New Cross Telephone Exchange (South East Area, London Telecommunications Region) was converted to automatic working in March.

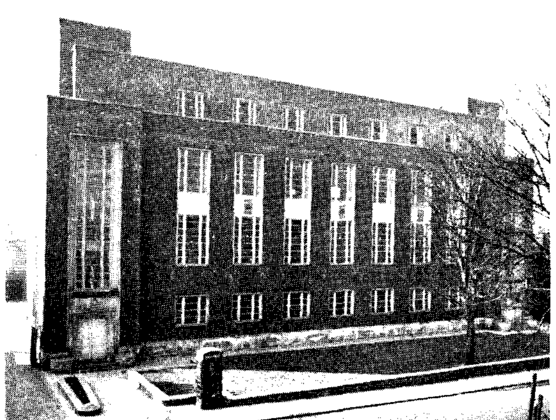
The manual exchange at New Cross was opened in 1909 and had 4,900 lines for service to subscribers.

The new automatic exchange has a capacity of 7,000 exchange connections, and the new equipment made it possible to connect 400 of the 1,320 waiting applicants for service in the Area.

It is hoped to provide service for the remainder within about twelve months, when new line plant is available.

The Assistant Postmaster General, Mr. L. D. Gammans, M.P., was present at the opening, which was attended by the Mayors of Camberwell and Greenwich.

The photograph shows the new automatic exchange building in St. Mary's Road, New Cross.



Fourth Test Match at Headingley.—A letter has been received from the Regional Director commenting on the splendid results recorded at Electra House, London, in respect of the fourth Test Match at Headingley on 23rd-28th July. Colonel Somerville expresses his thanks to all the staff of this Area who attended at the Headingley ground for their contribution to this achievement. During the five days, nearly 200,000 words were handled and on the last day urgent traffic reached Australian editors within 5.8 minutes from handing in.—*Bradford Telephone Area Monthly Bulletin.*

* * *

Radio in the Mines.—Through the medium of a new type of "walkie talkie", using a very low frequency, miners working at the coal-face far below the surface may soon be able to keep in constant touch with the pit-head. Experiments are now proceeding, but various problems have yet to be solved. Other tests are going on with loud-speaker systems which could be used to give warning in case of emergency. At the moment miners working in some places underground have little or no contact with the pit-head.

* * *

Dialling Dublin. — Telephone operators in London can now dial the number of any subscriber in Dublin and, similarly, Dublin operators can dial London subscribers. This has been achieved by the installation of modern equipment. Hitherto, calls on these routes required the services of an operator at the distant centre, and the new system which eliminates this requirement will enable calls to be connected more speedily.

* * *

P.O.T. & T. Society Programme, 1953-54.—The Post Office Telephone and Telegraph Society of London opened its autumn programme on October 5 with an address on " Television—How it Works" by Mr. A. H. Mumford, Assistant Engineer-in-Chief of the Post Office.

On November 9 Mr. R. S. Phillips, Chief Regional Engineer of the London Postal Region, spoke on "Mechanical Aids in the Postal Services".

Members will visit Mount Pleasant Sorting Office and the Post Office Railway, London, on November 16, and will see a short programme of selected sound films on December 7 at the Institution of Electrical Engineers.

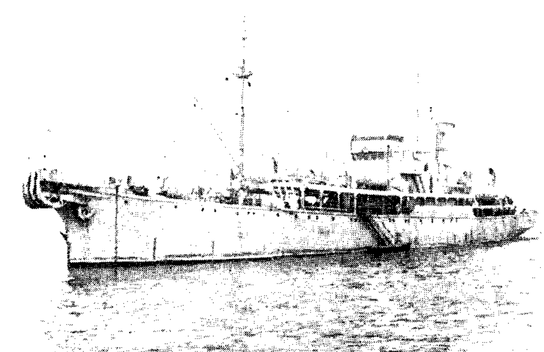
In the New Year, January 4, Captain F. J. Wylie, R.N. (Retired), will talk on "Radio Navigational Aids". Mr. W. H. Maddison, Assistant Controller of the Post Office Factories Department, will discuss the activities of his Department on February 8, and on March 15 Mr. N. O. Johnson, of the Central Organisation and Methods Branch, will read a paper on "Punched Card Machinery in the Post Office". The Annual General Meeting will be held before the paper on March 15.

All meetings are held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London. Mr. G. R. Clayton of the London Telecommunications Region, Telephone Branch, Waterloo Bridge House, Waterloo Road, London, is the Hon. Secretary of the Society.

* * *

H.M.T.S. Alert has just completed the first stage of laying trials to establish the practicability of a power link between the national electricity systems of Great Britain and France.

The project comprises four cables to carry three-phase current at 132 kilovolts, one cable being for emergency use, but, meanwhile, it would serve for experiments with D.C. transmission.



H.M.T.S. " Alert "

The object of the recent tests was to gain experience in the handling and jointing of the proposed heavy type of cable, which is approximately 3½-inch diameter and weighs about 30 tons to the mile. Special care had to be exercised to ensure that the cable was not subjected to a smaller bending radius than 3 ft. 6 in.

The *Alert* anchored close off shore between Dover and Folkestone and landed the end of the first ½-mile section of the trial cable, which was hauled up the beach to the terminal testing station. It was the intention to join-on another ½-mile length of British cable and a shorter length of

" Alert " landing the shore end of the Sweden-Gotland power cable at Vasterrat

French manufactured cable, but bad weather conditions set in and the work had to be suspended. When the weather improved work was resumed and jointing operations were completed.

A series of high voltage tests were made on the cable, which has now been recovered and landed at Dover Cable Depot, where it will be drummed for dispatch to the manufacturers for further examination.

The *Alert* recently went to the Baltic to lay a power cable between Sweden and the Island of Gotland on behalf of the Swedish State Power Board.

The cable, for 100 kilovolt D.C. transmission, was approximately 50 miles long and was laid for the greater part in depths of 50-60 fathoms.

The Power Board and the Swedish manufacturer of the cable were highly gratified at the successful completion of a very difficult laying operation.

Village Names in Kiosks.—Following a Question in the House of Commons the Assistant Postmaster General agreed that it was a very attractive suggestion to put name plates on the 19,000 rural kiosks, but hastened to add that the only reason why he could not accept it was because of the estimated cost of 50s. for each name panel. The decision whether it was worth while advertising the name of their village on an illuminated telephone kiosk primarily concerned the local authorities.

Correspondence

"Phonevision" in the U.S.A.

From Major-General D. A. L. Wade, Telecommunications Attaché, British Embassy, Washington

Dear Sir,

On page 166 of your August-October 1953 issue under the heading "See as you talk" telephones, you state that "In Chicago 'phonevision' was demonstrated to the public in January, 1951", thus implying that these demonstrations were of a system comparable to the "television-telephone" shown at the National Radio Exhibition last year in London. I venture to suggest that such comparison may be somewhat misleading.

In the Chicago demonstration the Zenith Radio Corporation applied the term "phonevision" to their system of subscription television. Subscription television, according to American usage of the expression, has no place under the present system of nationalized broadcasting in the United Kingdom. It has not yet been licensed for public showing, except on an experimental basis, by the Federal Communications Commission in the U.S.A. The object of subscription television in the U.S.A. is to provide a system of television broadcasting which will make available to those viewers, who are prepared to pay for them, programmes of a type and appeal (for example, national sporting events, operas, full-length films and so on) which are unlikely to be available under the present system of commercial television.

The principle so far applied to subscription television is the transmission of a visual programme in "scrambled" form—the means of "unscrambling" at the receiver being made available only to subscribers to the system. In the Zenith "phonevision" system the "unscrambling" signal is sent from the transmitter to the subs ribers by telephone circuits rented from the local telephone company. Thus the Zenith conception of "phonevision" is essentially a broadcasting system, whereas the British conception, as I understand it, is the provision of vision as well as speech over a telephone system.

(Letters on subjects of general interest would be welcomed. They should be as brief as possible)

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Contributions. The Editorial Board will be glad to consider articles of general interest within the telecommunication field. No guarantee of publication can be given. The ideal length of such articles would be 750, 1,500 or 2,000 words. The views of contributors are not necessarily those of the Board or of the Department.

Communications. Communications should be addressed to the Editor, Post Office Telecommunications Journal, Public Relations Department, Headquarters G.P.O., London, E.C.1. Telephone: HEAdquarters 4345. Remittances should be made payable to "The Postmaster General" and should be crossed "& Co."

GPO