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second-year block-release course will cover O.N.C. (O2) and the T.T.C. "B" year). The idea of combining the O.N.C. and T.T.C. courses may not be unique, but it is not thought to have been widely adopted and is, therefore, considered to be worthy of special report.

The results for the O.N.C. (O1) course showed that at Lancaster nine out of ten Youths-in-Training passed, with seven out of seven passing at Carlisle. The following table gives the results subdivided into subjects.

Subject	Distinction	Credit	Pass	Fail
Mathematics	10	7	—	—
Electrical Engineering Science	4	10	3	—
Mechanical Engineering Science	1	12	3	1
Physics	1	14	2	—
Totals	16	43	8	1

The City and Guilds results for the Lancaster Youths were that seven out of the ten gained the intermediate T.T.C. achieving the following results in individual subjects.

Subject	Passes		Fail
Mathematics A	10		—
Telecommunication Principles A	4 (1st Class)	5 (2nd Class)	1
Selected Subject	4 (1st Class)	3 (2nd Class)	3

Whilst due credit must be given to the students, there is no doubt that the new system is a big improvement on the day-release system. In addition to the advantage of more effective technical education, the block-release courses seem to be developing group friendship and co-operative spirit amongst the youths concerned. Without exception they have been most enthusiastic towards this form of training.

The success of this new pattern of training must depend on having the right student material, and this is partly ensured by the required entry qualifications for the O.N.C. (O1) course. The technical education scheme now being offered is becoming more widely known and is undoubtedly helping to attract suitable youths, mainly those who just miss going on at school to G.C.E. "A" level science studies.

G.C.S.

London Telecommunications Region

DAMAGE TO THE HIGH WYCOMBE–LONDON No. 2 CABLE

Prior to the construction of the M4 motorway in the area where it was due to cut Sipson Road, West Drayton, Middlesex, some diversions and improvements of the existing trunk routes were necessary.

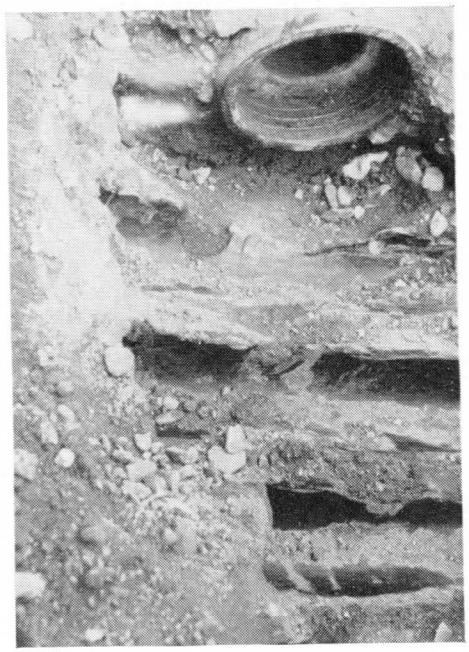
A 36-way pitch-fibre duct route was, therefore, constructed for some 320 yd, with a formation of 6 × 6 ducts in a position and depth thought to be immune from subsequent disturbance when not only the motorway was constructed but also when a pedestrian subway and a new County road were built.

Ten trunk and junction cables were changed over and it was with some surprise that, a year later on 14 April 1964, faults were reported on the 122 pr 40 lb/mile High Wycombe–London No. 2 cable and were located to a point within the pitch-fibre block. A visual inspection of the ground, however, showed no signs of recent disturbance.

Interruption cable was pulled in and the circuits were changed over during the night. Attempts were then made to recover the faulty cable, which was located in a top outside bore. This was achieved with some difficulty and the cable was found to be flattened and partially cut at one point. Subsequent measurements pin-pointed the damaged area to be under the newly laid and bitumen-proofed concrete of the entrance to the new County road.

The road contractors could throw no light on the situation, but it was noticed that the estimated point of damage was directly in line with two drainage gully pots on opposite sides of the road.

Fortunately, the road was of dry lean concrete construction and breaking out was not difficult. The final excavation revealed that the cover concrete of the block and the top row of six pitch-fibre ducts had been completely cut out to lay a 4 in. earthenware drain, the cable, as shown at the bottom of the accompanying photograph, being flattened out in the process.



DAMAGE TO DUCT ROUTE CONTAINING HIGH WYCOMBE–LONDON No. 2 CABLE

Repairs to the duct block were effected by carefully cutting out the remains of each of the six pitch-fibre ducts as far back as a spigot-and-socket joint, the other ends being carefully levelled off. The semi-circular bed of concrete in which each had rested was not disturbed.

Six new lengths of duct were then accurately cut to a length just slightly shorter than the broken out lengths, and these were fitted over the joints and the other ends dropped into line with the cut ends. The joints were then wrapped with Denso tape to prevent ingress of cement and the whole then concreted over to the original thickness above the ducts; after this, tests with mandrel and brushes were satisfactorily carried out.

The cable being located in a top bore at least served as an early warning system for the duct block as a whole. Had no faults been reported, the damaged ducts would not have been discovered until some time in the future when attempts were made to use them.

B.S.T.

Midland Region

BIRMINGHAM NEW TELEVISION NETWORK SWITCHING CENTRE

Since 1949 the equipment associated with television links in Birmingham has been accommodated in an area of

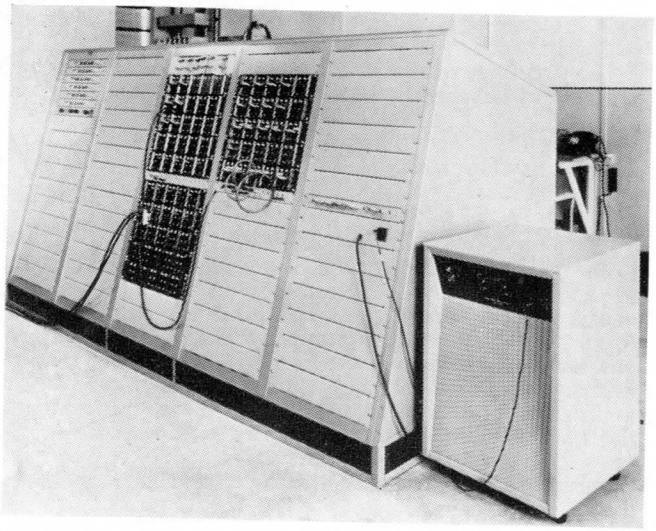
1,100 ft² at the end of the main repeater station in Telephone House, Birmingham. This space became overcrowded, and further development was restricted by the telephone transmission equipment already installed.

A new television network switching centre has therefore been provided in another wing of Telephone House, and has now been brought into service. An area of 4,100 ft² has been allocated and this is expected to cater for 20 years development. This area accommodates the apparatus room of 3,000 ft² and the control room of 1,100 ft².

The control room accommodates the following equipment.

(*a*) The video distribution frame—the main flexibility point where cabling to apparatus room, video distribution rack and switching equipment is terminated.

(*b*) The video distribution rack (V.D.R.), on which test points for all links are provided. Facilities have been provided for the connexion to any link of the standard pulse-and-bar test signal and for the monitoring of waveform or



(*a*) VIDEO DISTRIBUTION RACK AT BIRMINGHAM TELEVISION NETWORK SWITCHING CENTRE

picture. It is at this point that links are interconnected by standard coaxial "U" links. Three units have been provided and each unit will accommodate 50 incoming and 50 outgoing circuits. The video distribution rack is shown in photograph (*a*).

(*c*) The network-switching console, comprising switching panels, 23 db gain video amplifiers and waveform correctors. This equipment will switch any of 10 sources to any of 10 destinations for both sound and vision. It employs a 10-way splitting network on each of the 10 sources. Associated with each destination is a 10-way push-button Yaxley-type switch with a locking bar which permits only one button to be operated at one time. From the splitting networks each source is connected to each destination switch, the video output of which is fed to the high-impedance input of a video amplifier. Each video circuit is provided with a waveform corrector so that when a source is connected to any destination the distortion is less than $\frac{1}{4}$ per cent.

(*b*) SWITCHING AND TEST CONSOLES TOGETHER WITH THE MONITOR SUITE

(*d*) The monitor suite, comprising six video monitors and two monitors for monitoring local transmitters. The monitors are mounted in cubicle-type racks (Racks, Apparatus, No. 52) and can be seen in photograph (*b*).

(*e*) The test console, comprising waveform generators, oscilloscope, picture monitor, noise and linearity measuring equipment, speaker switchboard, and monitor-selection unit. The test console is provided with special low-loss trunks to the V.D.R. The appropriate test equipment is connected to these trunks by low-capacitance relays controlled by push-buttons on the desk of the console.

The monitor selection unit consists of six sets of illuminated push-button switches, one set for each monitor. These switches remotely control the monitor-switching relays fitted on the monitor-selection equipment installed in the apparatus room. To give additional flexibility all monitor points and the inputs to the monitor-selection equipment are cabled to the video monitor distribution frame. The monitor points are jumpered to the inputs of the monitor-selection equipment so that each of the six monitors can be switched to one of nine monitor points. Associated with each monitor is an indicator panel showing the designation of the link being monitored.

The layout of the apparatus room has been arranged on a functional basis, i.e. two suites are devoted to coaxial line terminal equipment, another two suites to frequency-translating equipment, etc. Coaxial cables carrying power for feeding to dependent intermediate stations terminate on the line equipment concerned. All other external cables terminate on a cable terminating-rack (C.T.R.) at the end of the apparatus room remote from the control room.

The installation has been planned by the Midland Region transmission group and the Engineering Department. The whole of the installation work has been carried out by the staff of the Telephone Manager, Birmingham.

The setting up and correcting of links was performed by the Engineering Department.

R.C.M., L.T. and F.C.S