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POST OFFICE

tele **communications**

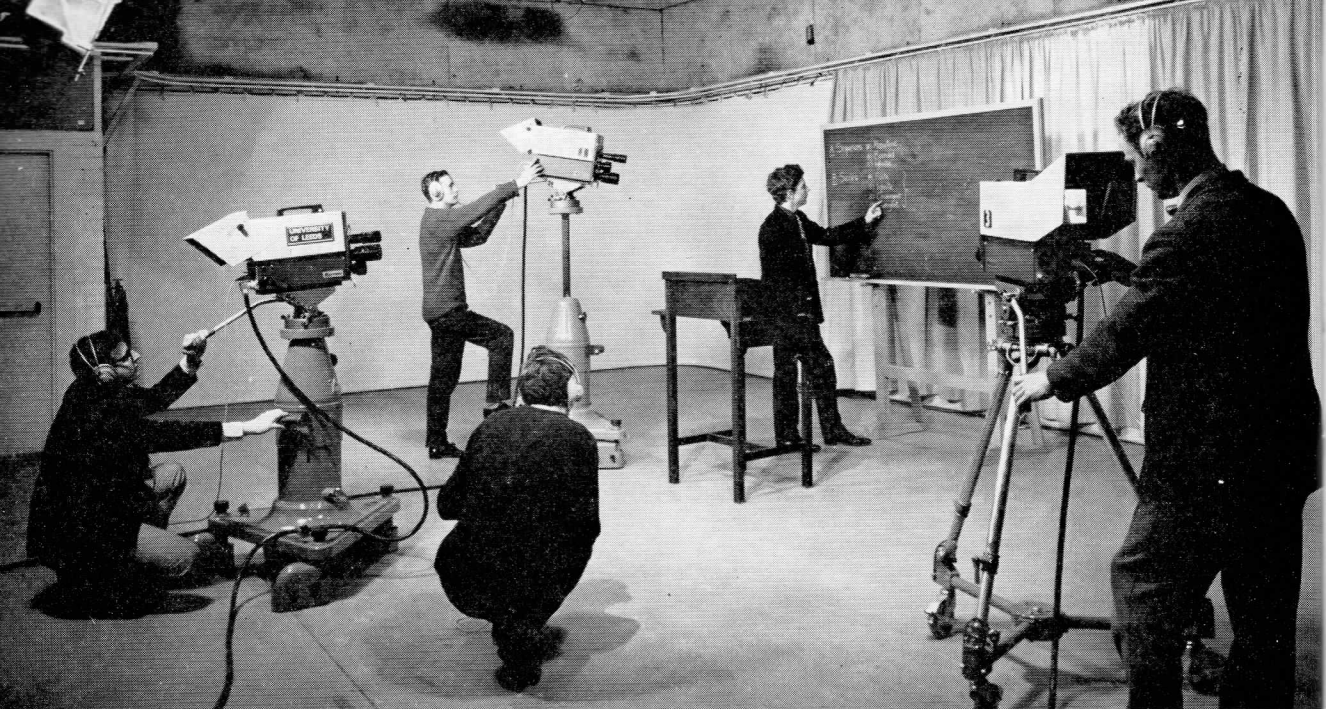
JOURNAL

ONE SHILLING

AND

SIXPENCE

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The scene in the Leeds University TV studio during a "take." Vidicon cameras are being used.

University sets up closed circuit TV system

By H. HUDSON

THE Post Office has provided and installed the interconnecting line systems for the University of Leeds Television Service, one of the first fully-operational closed circuit television systems to be set up at any British university.

The service, which has a full-time staff of about 20, is being used by more than 30 departments to transmit programme material to lecture theatres throughout the 100-acre campus and to supplement live lectures. It is also being used to investigate the application of television to all aspects of the University's educational work, in order to plan a regular service of teaching programmes.

Leeds University is already one of the chief centres in Britain for research into the use of TV for educational purposes—it has its own centre for

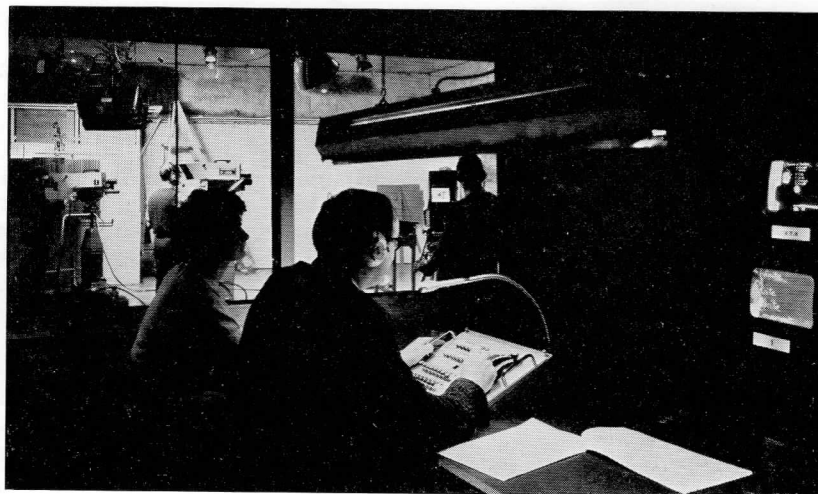
television research with a staff of seven. Apart from its teaching role, the service is also being used to provide training courses in TV production.

Discussions on the setting up of the service began in 1963. Later, backed by a £50,000 grant for capital equipment and a further £6,000 a year for three years from the University Grants Committee, plus its own resources, the University converted an old warehouse into a TV studio and equipped it with three industrial vidicon cameras.

This studio building has since been internally reconstructed and now includes a design office, observation room, a film cutting room and a sound and vision control room. Telecine and videotape equipment has been installed.

The VHF distribution system—the first stage came into operation early in 1967—feeds about

View of the studio at the Leeds University television centre from the control room. On the right are two of the seven monitor screens.



40 lecture theatres. Specially designed 25-in. receivers are installed in selected viewing rooms and the network at present feeds about 60 "master" and 45 "slave" monitors.

In addition, there is a contribution system feeding the studio from 20 selected locations or injection points in the University. Both systems have extension telephone facilities to the studio.

The distribution system is a co-axial cable VHF network giving nine channels spaced at intervals of 10.5 MHz (as an expedient until modulators developed to Post Office requirements are available, three channels have been provided using commercially-built modulators). The vision and sound carriers are 6.0 MHz apart, the sound being the higher in frequency. The vision is vestigial sideband, amplitude modulated to a depth of 67 per cent, and is negative in sense, that is, it gives maximum power to line when the carrier is unmodulated. The bandwidth is adequate for standard 625-line channels.

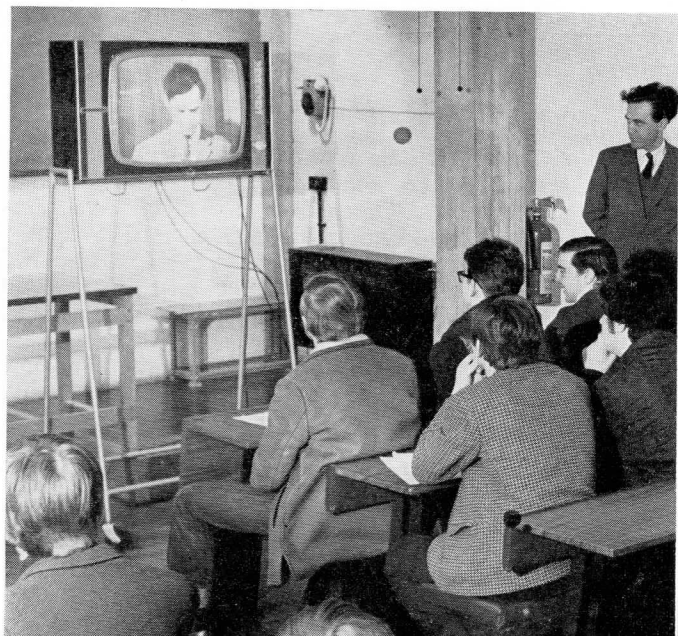
The sound is frequency-modulated with a deviation of plus or minus 50 kHz and the unmodulated carrier is transmitted to line 12 decibels down on the unmodulated vision carrier. The line amplifiers give a maximum gain of 22 decibels and have cable equalisation gain adjustments. The amplifiers may be powered, locally or remotely, from a unit giving 12V d.c. and operating from a 240V 50 Hz supply.

Complementary to the distribution system, internal wiring is provided for transmitting video and sound signals between the "master" monitor

and any number of "slave" monitors within a lecture room. The "master" connected to the VHF system selects the required channel and provides video and sound outputs to feed the "slaves." Seating capacities range from 20 in the smaller lecture rooms to 300 in the larger lecture theatres and halls. The 25-in. screen monitors are

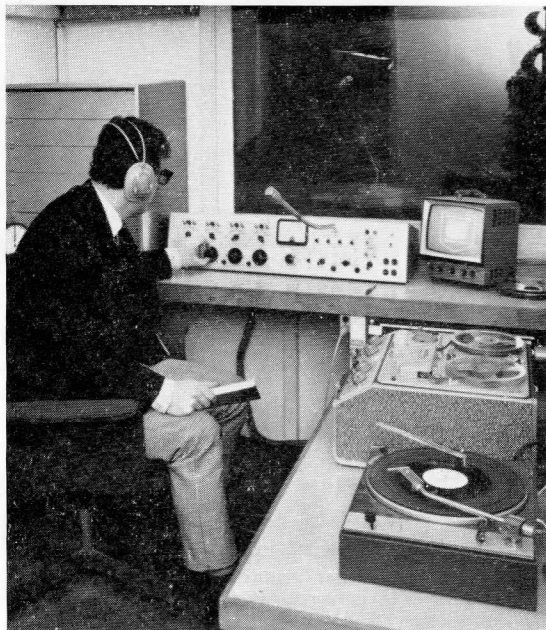
OVER

Students at Leeds University watch and listen to a lecture on a "master" monitor screen in one of the smaller lecture rooms. Large screen projection may be used in the new lecture theatre block now being built.



connected by way of fly leads to the permanent complementary wiring.

The contribution cable system is an unamplified network designed for one video and one sound transmission to the studio centre from any one of a number of contribution point locations by way of balanced quad cables. At the contribution point the video signal is injected via a fixed flat gain amplifier to match the unbalanced 75 ohm impedance of the mobile unit camera feeders to



The sound control room at Leeds is equipped with a record player, tape recorder, monitor screen and control console.

the balanced 140 ohm impedance of the quad cable.

At the studio centre variable gain equalising amplifiers are adjusted for that particular point of injection. The circuits are set up periodically using pulse and bar equipment to have "K" ratings better than 44 per cent. The amplifier control settings are recorded so that subsequently the circuits can be set up quickly and without test equipment.

The sound pair has low attenuation, and impedance matching problems do not arise because the impedance seen at the studio centre will be

substantially that connected at the injection point.

The present system is only a beginning. Work began at Leeds last year on a new lecture theatre block which will incorporate a highly-sophisticated permanent television centre for the University. This will include two studios—one of 1,700 sq. ft. and the other of 1,000 sq. ft.—with associated control rooms, equipment maintenance and technical stores. There will also be materials workshops, design and graphics studios, film and videotape recording rooms, offices, viewing and scripts rooms and film cutting rooms. All 25 of the lecture theatres in the block will be equipped to receive TV through monitors or by large screen projection.

THE AUTHOR

Mr. H. Hudson, C.Eng. MIERE, was development engineer for the Leeds University television systems described in this article. At that time he was an Executive Engineer in the Line and Radio Branch. He is now a Senior Executive Engineer in the Test and Inspections Branch of GPO Telecommunications Headquarters.

TV SERVICE FOR LONDON SCHOOLS

As the Journal went to press, Post Office engineers were busy testing the wiring and co-axial cable circuits which have been installed for the Greater London Council's schools television service due to open in September to serve initially 300 schools in Greater London.

The London schools TV system is the biggest closed circuit scheme in Britain and one of the largest in the world. Up to nine 625-line channels are being provided from the schools TV centre in Laycock Street, N.1, all of them passing over Post Office cables and amplifiers to television sets in the schools.

Seven channels will provide simultaneous programmes produced by the Inner London Education Authority in its own TV studios as well as BBC and ITA programmes. The Post Office is setting up a special maintenance and repair centre to assist the scheme.

Eventually the London schools TV scheme will be extended to serve some 1,300 schools.