

## Tribology Catches On

IN March 1966 a committee of the Department of Education published a report on "Tribology", which is the name it coined for the science of lubrication. The committee estimated that £500 million is being wasted each year by industry through lack of knowledge of the problems of lubrication in the design of machinery, and recommended the setting up of institutes of tribology to provide a "specialist tribological service to industry". The project was widely criticized: there seemed little point in setting up grandiose and specialized institutions when the need was to spread an awareness of the problems of lubrication through industry. Even so, Britain is to get its first Centre of Tribology, according to the Ministry of Technology. The site will be announced in September.

A more immediate effect of the committee's report was to stimulate interest in lubrication science at universities and colleges. Imperial College, which last year began one week courses in lubrication, was one of the first institutions off the mark. The lecturers came from industrial companies particularly concerned with lubricants and bearings; their students have been designer draughtsmen, production engineers and technical representatives, as well as more senior staff. So diverse were the problems, from the lubrication of zoom lenses to tin dredgers, that the Department of Mechanical Engineering has decided to introduce four specialized courses into its programme for next year. These will deal with the problems of lubrication in steadily loaded, and reciprocating bearings, in car, train, ship and aircraft machinery and in machinery working in hostile environments. The courses, which are open to thirty-two people at a time, are too short for experimental work. Demonstrations do, however, follow the lectures, and the department has a flourishing mortuary of failed ball bearings. There will be two courses next term, five at Easter and three the following summer. The cost is twenty-five guineas.

Bradford College of Technology also began courses in lubrication after the committee issued its report. The college at present offers two sets of courses, one as an optional part of the examination for mechanical engineering technicians. The other is intended for semi-skilled workers, and lasts for three weeks. The college is planning to introduce a third course, to make designers and managers aware of the problems of lubrication.

The forthcoming journal *Tribology* (Iliffe Science and Technology Publications) will fulfil the most valuable of the functions of the proposed institutes, that of disseminating knowledge without arrogating a special importance to tribology. And not even the most ardent well-wishers of the new science can be altogether happy at what it has been christened. For *tribos* means "rub off", not "rub". Not "friction", but "deletion".

## Television on Tape

ICI Ltd, Ciba Ltd of Switzerland and the Columbia Broadcasting System of America have announced the formation of a partnership to manufacture and market in Great Britain and Europe a new audio-visual system known as Electronic Video Recording and Reproduction, EVR for short, which has been described as a

momentous technological achievement and an entirely new medium of communication likely to cause a revolution in the educational use of television. It is claimed that EVR will be the long playing record of television. Indeed the research and development that has led to it was done under the direction of Dr P. C. Goldmark of CBS, who earlier developed the long playing record.

The outstanding feature of EVR is that it allows for the first time the showing of pre-recorded programmes on conventional television sets. Pre-recorded film in small cassettes, only seven inches in diameter and half an inch wide, is placed in a reproduction unit, a player, which in turn is linked up to a commercial television set. Each cassette has enough film for an hour long programme in black-and-white and half an hour in colour. Furthermore, each frame can be held on the screen, and this flexibility is one of the great classroom advantages of the EVR system. A teacher can stop a programme at any time to emphasize a point.

Perhaps the most notable technological advance of the entire EVR system is the film used for pre-recording. It was developed by CBS and Ilford Ltd, a jointly owned subsidiary of ICI and Ciba, to overcome the two major problems of miniaturization, namely, the difficulty of projecting sufficient light through a very small frame to give a readable image on a viewing screen, and preventing the seemingly inevitable flickering and shakiness that occur when small frames are quickly passed through a projector. Their success in solving the problems can be judged from the fact that the film, unperforated and 8.75 mm wide, in each seven-inch cassette contains no fewer than 180,000 frames, and when projected it moves at the rate of five inches a second.

There seem to be endless possibilities for the EVR system. At present there are 20,000 television sets in English schools, not to mention the universities and technical colleges, and these could be much more efficiently used if teachers were freed from the restrictions of national programmes. Moreover, EVR may find an immediate market in libraries, relieving them of some of the problems of storage and retrieval of information. There is also home entertainment.

No doubt the manufacturers look forward to the day when every school and every home has its library of cassettes. They predict a sale of one million cassettes a year by 1971, and since the system is cheap they will probably achieve this. They estimate that the player will cost £100 and each cassette £5, which seems good value, given that the whole *Encyclopaedia Britannica* would only occupy one and a half cassettes.

EVR will bring comfort to the officials of NASA, who have long been predicting the values of spin off from the American space programme. The work of Dr Goldmark and his collaborators at CBS was initiated under a contract from NASA to develop the miniaturization of television for space research.

## Development and Aid

IN the annual report of the Overseas Development Institute, the director, Mr William Clark, describes 1967 as a difficult year for those who care about development. The economic difficulties that caused Britain to cut the aid budget also affected the institute's