

in primary and secondary schools, universities and industrial training establishments as well as the printing and publishing industries. Again, some of the work is done already. The Federation of Master Printers, for example, has produced a booklet on going metric with the printing industry.

Dr F. Lincoln Ralphs of the Metrication Board will chair this committee. His colleagues will be Professor M. L. McGlashan of the University of Exeter; Sir William Alexander, Secretary of the Association of Education Committees; Miss E. E. Biggs, HM Inspector; Mr J. Brosgall, Training Adviser of Unilever, Ltd; Mr G. B. R. Feilden of the British Standards Institution; Mr F. W. Kellaway, Principal of Letchworth Training College; Mr S. McClure, editor of the *Times Educational Supplement*; Miss Rosemary Part of the Construction Industry Training Board; Mr R. Sibson, HM Inspector; Dame Muriel Stewart, headmistress of a girls' secondary school; and Mr M. Moss of the Metrication Board. While at work, both committees are ready to consider observations or memoranda from organizations or individuals concerned with the work for which they are responsible.

ACOUSTICS

No More Echo

SPLENDID sounds echo no more around the heights of London's Royal Albert Hall, but go straight to each listener clearly and unambiguously—and just once. Since the installation of glass fibre diffusers at the beginning of the year (see *Nature*, 221, 7; 1969), audiences and performers have been impressed by the great improvement in its acoustics, and further modifications completed by June 14 have at last made the hall into a setting fit for the wide variety of music presented in the summer season of promenade concerts.

Investigations by Mr Kenneth Shearer of Acoustical Investigation and Research Organization Ltd, had revealed three separate troubles. There was the notorious echo, caused by the shape of the dome; the sound produced by an orchestra was too reverberant; and some areas of the hall suffered particularly from a bad distribution of sound from the concert platform in front of the organ. The diffusers, hanging from the dome, eliminated the echo almost completely, and also gave a better sound perspective to the gallery by projecting grazing incidence reflexions from the orchestra beneath in the right direction. 2,000 square feet of glass wool arranged on top of the diffusers absorbed enough sound to reduce the reverberation time to an acceptable value. What remained was poor projection of the music to the rear of the arena, opposite the platform.

A reflector above the orchestra apparently did little but throw sound straight down again—this is invaluable for the players to hear what is going on, but the need was for a new reflector which combined this property with a better outward projection. This has been achieved with an installation which looks like a surrealist distortion of the rear seat of a car but has in fact succeeded in lifting an acoustic image of the orchestra to a height from which those at the back of the hall can "see" it. It was made from a four foot segment of the mould used to build the twelve foot diameter diffusers. These elements were bolted together

side by side to form three reflectors about sixty feet in length, and the resulting triple assembly was suspended from the roof. Because it is made from the same material as the diffusers, it is much lighter than the old wooden reflector (just over a ton instead of nearly two, in spite of its much greater size) and so has the further advantage that it can easily be winched up to roof level when the hall is used for conferences.

At the same time, further diffusers were put in, including eleven at the opposite end to the orchestra purely for the purpose of capturing the sound of the bass drum, which from its usual place in the orchestra was lost to all but the back two rows. One slight difficulty has not yet been overcome, and this concerns the trombones. At the moment the "raspberry" element of their sound is reflected from the front of the boxes, while the note itself comes direct to the listener, giving a slightly schizoid effect in some seats at the rear. It seems, however, that any alteration to the box fronts would entail an undesirable deadening of the overall sound, and this—not to mention the possible outcry from addicts of Victoriana—justifies leaving things the way they are. Perhaps the best thing now would be to invite designs for a trombone with a built-in diffuser.

BUILDING

Information Service Fails

THE attempt to set up an information agency for the whole of the British construction industry through the Construction Industry Research and Information Association (CIRIA) came to an end last Thursday, July 31, when the annual general meeting of the association agreed to hive off its information services to the Building Research Station. This follows from a recommendation on July 25 by the National Consultative Council of the Ministry of Public Building and Works, which runs the Building Research Station and which—together with the Ministry of Technology—lays out much of the financial support for CIRIA. Precisely how the Building Research Station will administer the service is still being decided, but it is expected that a start will be made early next year with a regional advisory service centred in Birmingham. A full scale service should be in operation by June next year. What will happen to the sixteen people at CIRIA involved in information work has not been settled. The obstacle to a transfer to the Building Research Station is that the salaries of the information staff at CIRIA are generally higher than comparable people at the Building Research Station, who are on Civil Service scales.

The Building Research Station is already running an information service, chiefly to protect the staff of the station from interruptions to their normal work which enquiries had been causing. At present, the information section has a staff of eight, handling 13,000 enquiries by telephone and 7,000 by letter each year. Unless the enquiry requires more than half a day's work, or a visit by a staff member, the service is free. This week, the Building Research Station was uncertain how much the service is costing, but it seems to be considerably less than the £100,000 a year which CIRIA is spending to handle a smaller rate of enquiries, about eighty each week, most of which are said to be rather mundane.

That CIRIA is not making a success of its information service, set up in 1967 when the association changed its name from the Civil Engineering Research Association, has been known for some time. But it is understood that the association will retain the wide range of research interests implied by its current title. The suggestion that the construction industry should pay a levy to keep the information service going, considered by the National Consultative Council, seems to have met with the advice that only those who want information should have to pay for it. That the industry is already paying a levy of 1 per cent of its payroll probably also had something to do with the decision.

How the Building Research Station will finance the new information service is not yet known, but one possibility being considered is to run it along the lines of the Automobile Association, with a large number of subscribers who might need help paying a small annual fee. On the other hand, CIRIA with its 260 member firms and 180 local authorities feels let down by the industry. One reason given this week for CIRIA's lack of success is that too much money has been spent developing sophisticated information retrieval techniques, when what is needed is some way for advice to percolate to the grass roots of the industry—the "back-street" operators employing five men or less which make up the majority of the 80,000 building firms in Britain. The Building Research Station hopes eventually to adopt a more aggressive policy for the information service, with advertising (at present the station's service is not publicized) and possibly even advisers visiting the building firms.

TECHNOLOGY

Machining Stubborn Alloys

THE versatile International Research and Development Company at Newcastle upon Tyne is expanding its materials technology programme with a contract for £20,000 from the Ministry of Technology to develop a cheaper technique for electrochemical machining. The aim is to use alternating current instead of the conventional direct current. Electrochemical machining is chiefly used in the aircraft industry to form components with complicated shapes from the newer high strength alloys which are otherwise difficult to machine. It involves the removal of metal by electrolysis. The rate of removal, which can be up to one cubic inch per minute, is independent of the hardness of the metal but proportional to the current density. With direct current, something like 40,000 amps is required and the cost of equipment to control currents of this magnitude can exceed £40,000; if alternating current can be used the cheaper power supplies should reduce these costs by about two-thirds while the operating costs should be much the same. Mr D. J. Brown, who leads the research team dealing with e.c.m. at IRD, hopes that this will mean that the technique will become competitive in industries where the high capital costs are at present prohibitive.

IRD plans to divide the work into two stages—first it will try to define the basic problems using small scale experimental equipment. The technique at present is to pass the direct current through an electrolyte pumped through a gap between the component

and a shaped cathode, generally copper. The current densities are highest opposite high spots on the cathode, so that the workpiece gradually assumes the shape of the cathode, which is moved forward to keep the mean gap constant. With alternating current, the electrode has to be inert at this stage or it would be eroded on the reverse half cycle, and graphite seems a suitable material to use. The wasted reverse cycle reduces the efficiency of the process, but Mr Brown hopes that most of the problems will be ironed out within the next six months and that efficiencies close to the theoretical maximum of 50 per cent will be achieved. The next step will be to build a large machine to study the feasibility of using the technique on an industrial scale, and it is hoped that this will be completed within a year.

PUBLICATIONS

Welcome New Journal

from our Geophysics Correspondent

So many new journals appear each year that scientists are annoyed and librarians infuriated by the growing proliferation. The editorial boards may contain a star-spangled list of names, but often these boards never meet and their members are only mildly in favour of the new journal—and that sometimes because they get a free copy. The view that journals are licences to print money, with a compulsory library subscription list, is prevalent and not without justification. It is pleasing therefore to record a new arrival which is highly welcome.

Journal of Geophysical Research has by its size mirrored the enormous growth in the earth sciences in the past twenty years. The International Geophysical Year, the Upper Mantle Project, nuclear tests and their influence on the environment, rockets to the upper atmosphere, weather satellites, the lunar programme, oceanography as an economic prospect and in its defensive role—all have led to an investment in the Earth and its environment of staggering proportions. *Journal of Geophysical Research* has dominated and shows every sign of doing so for years to come. Some figures illustrate this. In 1950 it was a quarterly, chiefly devoted to terrestrial magnetism and the ionosphere; 550 pages appeared that year. The figure had only risen to 650 by 1957, but the IGY, among other things, ensured that by 1959 it was a monthly and the number of pages per annum had quadrupled. In another year it was up to 4,200 pages, by 1963 it was coming out semi-monthly with 6,500 pages and in 1968 it was up to 7,700 pages. By this stage subscribers opted for the twelve monthly issues reflecting their interests—outer atmosphere and inner space or inner atmosphere and solid earth, a sensible option which took some of the weight off their bookshelves. And plaintive editorial pleas for brevity were issued as pages became more tightly packed.

Now another fission has been necessary, and meteorology and physical oceanography have their own monthly issue with a three way option open to readers. The emergence of the new issue, maintaining the high standards of its parents, seems sensible. Financial difficulties obviously dictated it, but the division is reasonable. For all that an awareness of neighbouring disciplines is very desirable, it is dubious whether this