

The content of the first issue is rather uneven. John Whale writes sanely about river pollution, accepting the impracticality of complete cleanliness but warning that "once a level of cleanliness has been determined for a particular stretch of water, achieving and maintaining it becomes a proper subject for public spending". He makes the interesting point that local authorities are the worst river polluters in Britain—because of sewage—and also supply the majority of members for the river authorities that are responsible for removing the pollution. Vicious circles of inactivity can thus easily develop, and they are not likely to be alleviated by local government reforms which would in effect put fewer local councils in charge of the same number of river authorities.

There are also, however, seven pages of polemic against fluoridation—nearly a quarter of the magazine—which are admittedly well documented but rest mainly on repeating the obvious argument that because dental decay results from eating too much sugar it is important to encourage people to cut down on sweets. A second campaign, in spite of its title of "Who'll Kill King Car?", remains more level-headed and leads into a discussion of the advantages of banning motor traffic from city centres, measured by the fact that "40 per cent of the traffic displaced from London Street, Norwich [now a pedestrian precinct], simply and immediately disappeared".

The viability of the magazine depends on selling at least 2,000 subscriptions for the first year, but Mr Ross seems confident that the figure will be reached. To reach the bookstalls, *Your Environment* may need more substantial backing, and the editors are looking for industrialists to sponsor individual issues in return for the publicity they would gain.

BIOLOGY

European Research

BIOLOGICAL research in the European Economic Community has its strong points, particularly in some agricultural fields, but in biomedical fields such as virology and biochemistry it falls far behind that in other countries. This, at least, is one of the main conclusions of the European Commission on the basis of a recent survey (*Euro-Spectra*, December 1969). Not surprisingly, the commission's view is that the trouble is the lack of organization and cooperation at community level. The report also comes out for the planning and coordination of research programmes, joint key projects, community scale laboratories and the easier transfer of scientists between different countries.

Research institutes cooperating in the survey agreed on a number of focal points where increased research efforts would find rapid practical application. In radiobiology, for instance, the problems that should be studied include late developing radiation damage, the long term effects of radium-224, radiation damage from minor radiation doses and biochemical radiation protection.

Laboratories were also asked in which fields EEC countries are ahead of or behind non-member countries. Virology was considered to be virtually undeveloped in the community, but research in immunology is held to have progressed satisfactorily even if it still falls short of the standard achieved in the United States. In genetics, the significant fields are thought

to be molecular genetics, experimental evolution and extrachromosomal heredity. The feeling in cancer research seems to be that intensive collaboration between individual research groups is not good enough and that it would be more appropriate to set up a European form of the National Institutes of Health.

It seems also to have been agreed that the EEC leads in important fields of agricultural research such as genetics, zootechnics, plant improvement, parasite control and soil science. Particularly good work in the field of plant diseases has been done in the Netherlands.

ORDNANCE SURVEY

Brave Metric World

THE Ordnance Survey will at least be able to face the metric age with all its 4,600 people under one roof at the new headquarters at Southampton. This is one of the calmer undertones of the annual report for 1968-69, now published (HMSO, 13s). Although the first of the new large scale maps (1:1,250 and 1:2,500) have now been published in metric, the Ordnance Survey says that "it will be a long time" before the whole of Britain is covered by a uniform series of maps at these scales. It remains to be seen what will happen to the small scale maps, particularly the one-inch maps most widely used (and accounting for 7 million of the 40 million maps printed in the year).

The Ordnance Survey is already engaged on a scheme for the readjustment of European geodetic networks, eventually intended to be a good deal more accurate than would be necessary for map-making as such. Although the work so far has consisted simply of triangulation, the survey has been installing and measuring by optical methods a number of distance standards. It has also established a line from Hexham to Hawick as a supplement to the existing levelling framework. As another part of the process of constructing control surveys, the Ordnance Survey is also using satellite observations for triangulation, and has collected close on 500 usable photographs for this purpose.

Map-making continues. The mapping of built-up areas on the scale of 1:1,250 has now been completed, but work still remains on the rural survey at 1:2,500. Aerial photography remains an important source of information, even though the Ordnance Survey's use of it seems to have been reduced by bad weather in 1968. The use of automatic methods of map-making is also being pursued; the report says that one of the objectives of the work now under way is to test the feasibility of a "digital cartographic computer bank". One test of the feasibility of this system, already completed, has been to store in a computer the information corresponding to all point and line data on a single sheet of 1:2,500 map and then to redraw the map automatically. One part of this investigation is the devising of a method for digitizing contours by means of a device attached directly to stereo-plotters—this device may eventually serve as a means of drawing contours on the maps of smaller scale.

Successful though it may be, the Ordnance Survey is nowhere in sight of the Fultonian objective of being able to balance its books without help from the central government. Although it earned more than £1 million in 1968 from the provision of map-making services to

organizations as varied as the national census, the Board of Trade, various city corporations and even the organizers of the Channel Tunnel project, bringing its total earned income to £2.4 million, the Ordnance Survey cost the taxpayer £4.8 million, or two-thirds of its budget. Outsiders will continue to ask whether the Ordnance Survey is making the best of its natural advantages.

RESEARCH SPENDING

US Budget Contracts

EXPENDITURE on research and development in the United States is expected to reach £25,700 million in 1970, according to the latest estimates from the Battelle Memorial Institute. This would represent an increase of less than one per cent over the total estimated for 1969. Taking account of increases in the cost of research and development, this could mean that the real level of expenditure would decrease by as much as seven per cent. The institute forecasts, moreover, that on past trends, industry's share of the research and development bill will increase, while that of the federal government may fall by about \$200 million. In 1964, the federal government funded about 65 per cent of the total research and development in the United States, but this share has been falling gradually, while that of industry has been rising slowly from its 1964 level of 31 per cent. The institute forecasts that in 1970 the federal government and industry will be responsible for 58 per cent and 36 per cent respectively, the rest coming from the universities and non-profit-making institutions (such as the Battelle Memorial Institute itself).

The institute's forecast that £15,000 million will be spent by the federal government on research and development conflicts with the official budget figure of £16,700 million, which represents an increase of about \$300 million over the official estimate for 1969. The Battelle Institute feels, however, that economic pressures will tend to keep down expenditure on research and development, because the Administration and Congress identify such appropriations as "controllable" budget items which can be used to restrain budget increases. It also forecasts that the growth of federal expenditure on research and development will not exceed four per cent a year, without correction for higher costs. Although federal expenditures on research and development, adjusted to 1968 dollar prices, seem to have risen every year since 1953, the Battelle Institute suggests that if increases in research and development costs are taken into account, the real level of expenditure in these fields reached its peak in 1967, then fell by 1.6 per cent in 1967-68 and by 5.6 per cent in 1968-69.

HYDRAULIC ENGINEERING

Disturbances on the Angara

from our Soviet Correspondent

It is reported from Irkutsk (*Priroda*, 12, 97; 1969) that the construction of reservoirs at Irkutsk and Bratsk on the lower Angara—the chief outlet of lake Baikal—has resulted not only in the expected changes in the water level of the river, but also in certain completely unpredicted geological processes in the

banks. Formerly, the banks of the Angara exhibited fully developed slip and karst processes. As the reservoirs filled, the higher water level and greater humidity of the banks caused new regions of slip to be formed and old slips to be reactivated, leading in certain cases to intensive subsidence. In the case of karst processes, especially widely developed in deposits of the lower Cambrian, with frequent subterranean cavities, ground level subsidence became frequent as the water level rose, resulting in potholes often as much as 8-10 m deep and 4-6 m in diameter.

These phenomena seem to be peculiar to the specific geology of the lower Angara region, and have not, apparently, been observed on other "exploited" rivers in the Soviet Union. In view, however, of the current construction of the giant hydroelectric station and reservoir at Ust'-Il'msk on the lower Angara (see *Nature*, 223, 1091; 1969), a thorough study of the geology of this river and the effect on it of these "triumphs of engineering" would appear to be pressing.

ATMOSPHERE

Meteorology at a Distance

by our Astronomy Correspondent

A NEW study of methods for the remote probing of the atmosphere—as distinct from *in situ* observations from balloons and sounding rockets, for example—has been published by the US National Academy of Sciences-National Research Council, which recommends the establishment of what the report calls an atmospheric test range at Wallops Island, Virginia. This is the NASA base which already boasts an enviable collection of five sensitive radars operated by NASA and the Air Force as well as the rocket range. The argument is that there is a need of a place where different remote methods of probing the atmosphere can be compared with each other as well as with rocket measurements. This means that the range must have sensitive radars which are able to measure winds, turbulence and structure in the atmosphere—radars which already exist at Wallops Island. At the same time, the panel responsible for the report, under the chairmanship of Professor David Atlas of the University of Chicago, named other radars which could be pressed into use for atmospheric probing. The Haystack and Millstone Hill radars of the MIT Lincoln Laboratory, for example, are more sensitive than the array at Wallops Island and ought to be available to atmospheric scientists. According to the report, the Haystack equipment in particular, with a 120-foot diameter antenna, is more sensitive by a factor of about thirty-two than the corresponding radar at Wallops Island. It is the Haystack facility which may yet be transferred to the North East Radio Observatory Corporation to become part of the civilian equipment for astronomy.

The report is limited to a review of remote probing of the non-ionized components of the atmosphere below 100 km and might well be subtitled "atmospheric exploration without rockets, balloons and aircraft". The panel contends that it is neither technically nor economically sound to rely on direct observations and that good coverage of the atmosphere must depend on ground-based (and satellite-based) probing. In particular, the report cites the Global Atmosphere Research Program, the chief aim of which is to forecast gross features of the atmospheric