

IN BRIEF

EEC uranium scheme

Last week's announcement by the EEC Energy Directorate of a £400,000 scheme to support uranium prospecting within the EEC member countries came just two months after the report from Euratom forecasting a shortfall in uranium supplies for Europe from the end of the decade. Euratom expressed concern that there was no coverage either by long term contracts or from known reserves of Community producers, and urged an acceleration in exploration and development. The

Energy Directorate says it hopes the new project will discover new uranium sources to secure the EEC's long term supply.

No postgraduate change

The UK Department of Education and Science has declared in a White Paper (Cmnd 6611, HMSO, 28p) that it does not intend to restructure the arrangements for supporting postgraduate education in Britain. It was responding, after a delay of 2½ years, to strident criticisms of the system

voiced by the House of Commons Expenditure Committee. The committee's main contention was that postgraduate education should be shaped chiefly by the needs of the country rather than by the demands of potential students. The DES, while agreeing in broad principle, says that bodies like the research councils are already sufficiently responsive to these needs. The DES also rejects the idea that postgraduate grants should be replaced by any kind of loan, because the short term savings in government expenditure would not be sufficient.

In theory, the more data a scientist is able to collect, the more accurate his work should become. On the other hand, a great deal of information is expensively collected and then never properly used. Sometimes this is a symptom of oversupported research; a scientist who has to do his own field or laboratory work is generally careful how he uses his time, but if he can deploy a squad of assistants he may ask them to make many more observations just in case these may, eventually, prove valuable. And very occasionally they do. But most of the results of even the best planned research remain untouched in dusty archives or even end up in the waste paper basket, although some work is written up and submitted for publication before sufficient information has been collected. It is not easy to decide when is the right time to stop.

An even more difficult task for the research worker is to decide just what data should be collected. If, to obtain a grant or a fellowship, he has to draw up a detailed programme in advance, he is unlikely to make the same decisions as he would have made after he had become immersed in his problem, particularly if he were personally involved in the details of the work and did not delegate to assistants. It is therefore essential that all research projects should have some provision for review and redeployment at frequent intervals.

But where a team of investigators is involved, such changes of direction may be difficult, as all members may not agree on just what changes are desirable. Even the lone worker may be inhibited from modifying his programme when he realises that this is necessary, in case he upsets the members of some committee to which he reports. Committee members react in this way, and castigate those who suggest that their original submission was faulty, perhaps because they themselves feel guilty for not spotting

the faults earlier.

We may collect too many or too few data, and we may also amass figures which do not provide the information that was intended. This is unfortunately too common an occurrence, and one which may long

Testing rainwater**KENNETH MELLANBY**

go unrecognised, as has recently been demonstrated in work on air pollution. Many people are studying problems which involve the contributions to plants and the soil made by the various chemicals contained in rain. Perhaps the best known is that of "acid rain" in Scandinavia, allegedly caused by pollutants, particularly SO₂, released into the air by British and European industry and carried north by the prevailing winds. Other work concerns the growth of crops and trees in polluted and clean localities. Unfortunately few of those involved are making systematic analyses showing exactly what substances are being brought down in the rain.

To many, including some of the investigators, this will appear to be a surprising statement, for numerous

people in many countries are analysing rainwater samples by the thousand, with increasingly accurate methods and more and more sophisticated equipment. There is little reason to doubt the accuracy of their measurements. Unfortunately they are not, for the most part, studying rain, but the liquid which they collect in their rain-gauges. This is something quite different, for it contains not only the chemicals which took part in the formation of raindrops, and those which were collected by the drops as they fell through the air, but also those which had been deposited, since the last shower, on the collecting funnel of the rain-gauge. The dry deposition on the gauge is generally greater, sometimes many times greater, than the quantity of the same chemical in the rain. If this is not realised, and measured, errors of a magnitude seldom experienced in research may arise.

Yet there is no excuse for this possible error. There is a little published information, available for some years, showing how much rainwater may differ from rain-gauge water. We cannot yet say exactly what the dry deposition of materials on any field, crop or forest will be, but there is much elegant work attempting these evaluations, and it is already clear that it greatly exceeds that in the rain, or even that in the already-enriched rain-gauge water.

Those who have spent time and effort analysing rain-gauge water, thinking they were analysing rain, need not despair. Their data are far from useless—they only fail to give the information expected. But this is a common phenomenon in science, and is one of the reasons to be suspicious of too highly organised investigations, particularly those commissioned by customers who think they can guarantee that the new information they seek can always be provided if only the cash is made available.