CORRESPONDENCE

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smallest in Scotland. Founded by Professor Ronnie Bell FRS, in 1967, it survived the loss of Professor Willie Parker, to continue as a well-known, well-equipped, highly cost effective unit in one of Britain's modern universities.

Faced with a considerable reduction in resources, we have compared our performance across a broad spectrum of activities with other chemistry departments in Scotland.

(1) We have the smallest number of academic staff.
(2) We have produced, over the last eight years, the largest number of publications per member of staff.
(3) We are ranked second in terms of the value of SRC grants currently in operation per member of staff. At the last round of SRC grant considerations, all five of the department's applications were funded by the Chemistry Committee.
(4) We have a student/staff ratio of 8.6/1 which is the average for Scotland.
(5) Our entrance standards are about average for Scottish universities, and chemistry applications have increased by 37 per cent in 1981 over 1980 (which in turn were higher than previously).

We, therefore, find ourselves questioning the actions of the University Grants Committee which appear to be inconsistent with criteria they themselves have outlined, and which, if put into effect at Stirling, will put our future at risk.

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Academics' year

Sir — G. W. Brindley's suggestion (*Nature* 27 August, p.791) of a 9-month academic year contract as the solution to the financial crisis in UK universities is ludicrous. In the United States, in actual practice, academics are paid as much for a nominal 9-month academic year as for a 12-month year, the only difference being that they are now free to pay themselves an additional salary from their research grant.

The 9-month academic year is thus nothing more than a convenient fiction that enables principal investigators to divert research funds into their own pockets, effectively diminishing total support for research, while enhancing their own standard of living.

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Effluent safety limits

Sir — Day and Cross[1] have recently reported very interesting data on the *in situ* production of ^{241}Am from its parent ^{241}Pu in the Irish Sea which receives radioactive effluents from the Windscale nuclear fuel reprocessing facility. When authorizing the quantities of radioactivity which may be discharged by Windscale, the United Kingdom regulating agencies [Department of the Environment, Ministry of Agriculture, Fisheries and Food (DOE/MAFF)] have published only limited information[2,3] on the environmental ingrowth of the radiotoxic alpha-emitter ^{241}Am from the unrestricted discharges of ^{241}Pu. The publication of much more comprehensive data and calculations by Day and Cross show that the annual *in situ* formation of ^{241}Am has been 480 per cent, 240 per cent and 265 per cent of those quantities of ^{241}Am discharged directly from Windscale in 1977, 1978 and 1979 respectively. Their calculations show further that if the recent rates of ^{241}Pu discharge are maintained, the *in situ* ^{241}Am production will continue to rise from $\sim$ 600 Ci per year at present to achieve a steady state situation of $\sim$ 1,300 Ci per year ingrowth after the turn of the century.

Although the DOE/MAFF-authorized maximum direct discharge limit of alpha activity to the Irish Sea is 6,000 Ci per year (by the Windscale pipeline) it is not clear from what has been published whether the DOE/MAFF limit includes the fact that there is an increasing ingrowth of ^{241}Am which under steady state conditions will generate a further $\sim$ 1,300 Ci of alpha activity per year. In other words, does the radiological assessment lead to the definition of the safe *total* annual input as being 6,000 Ci or 7,300 Ci alpha activity? If the *total* acceptable annual input is thought to be 6,000 Ci, then the pipeline alpha discharge limit should be continuously revised downward to 4,700 Ci per year if similar ^{241}Pu discharges are to be maintained.

The authorized annual alpha discharge limit set for the Windscale pipeline was raised to 6,000 Ci in 1970. Since then some significant data have been reported on the behaviour of plutonium and americium isotopes in this coastal environment. (1) These substances are now known to be accumulated very effectively in local sediments around Windscale[2,4], and their dispersion and dilution by seawater are much less than was previously expected. (2) It has been shown that the transport of these radionuclides within these sediments is slow[5,6]. (3) The ingrowth of ^{241}Am in the sediments is an increasingly substantial proportion of the alpha activity[1].

The result of these effects is that the Windscale alpha activity is not widely diluted but is concentrated in a small portion of the environment. Day and Cross's data and these other observations should thus be taken into account in the regulation of the discharges of alpha activity and ^{241}Pu from Windscale in the future. It is interesting and probably optimistic to note that British Nuclear Fuels Limited reduced the unrestricted discharge of ^{241}Pu from Windscale by 49 per cent in 1980[7].

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1. Day, J.P. & Cross, J.E. *Nature* **292**, 43–45 (1981).
2. Hetherington, J.A., Jefferies, D.F., Mitchell, N.T., Pentreath, R.J. & Woodhead, D.S. *Int. Symp. on Transuranic Nuclides in the Marine Environment* (IAEA, Vienna, 1976).
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4. Livingston, H.D. & Bowen, V.T. *Nature* **269**, 586 (1981).
5. Aston, S.R. & Stanners, D.A. *Nature* **289**, 581 (1981).
6. Aston, S.R. & Stanners, D.A. *Envir. Pollut.* Ser. B (in the press).
7. British Nuclear Fuels Limited *Annual Report on Radioactive Discharges and Monitoring of the Environment 1980* (BNFL, Risley, 1981).

Notes from a Recorder

Sir — All seventeen Recorders must have been flattered by the comment (*Nature* 3 September, p.1,) that they provide "virtually the only intellectual continuity" in the British Association for the Advancement of Science. Indeed, it makes a welcome change from being mistaken for either a member of the judiciary or a musical instrument.

However, some of the problems you outline which face the British Association are being tackled.

To even the most casual observer, the bimodality of the age structure of BA must be apparent. Young people — British Association Young Scientists (BAYS) — attend and so too do scientists of more mature years. But scientists of middle years go to specialist conferences (if they can obtain funding at all). Although this latter group may be persuaded to break into family holidays to give a non-expenses paid paper, they are often unable to stay the whole week. And the meeting is the poorer. Closer links with relevant professional and learned societies and planning of joint lecture sessions might bring back these scientists to the BA. They may, of course, not wish to come. It is often more comfortable to be surrounded by a coterie using familiar, insulating jargon.

If this approach is only partially successful, the BA may yet attract this middle age range group by another means. Provision of nursery school facilities and programmes for the whole family on lines well established at many university summer schools should prove more attractive to scientists with young families. A start on this scheme will be made by the Programme Planning Committee for implementation at Liverpool in 1982; by 1983 at Sussex a whole range of activities for family groups should be available.

All the topics listed in the *Nature* leading article as worthy of BA consideration have been aired in the last four years, one, genetic engineering, in my own Section D (zoology) last year at Salford. I would suggest also that the BA *is* the right forum for popularizing science. It is certainly not easy, especially with the advent of superb scientific documentaries on television; both natural history museums and the BA have learnt this to their cost.

However, to see the light of recognition dawning on the faces of young audiences when excellent speakers are putting across difficult concepts leads one to suppose that the BA can, and does, popularize rather well. Excellent proof of this was available at the Section D session at York this year on predator/prey relationships.

Perhaps where we do need to adjust our sights is in reviving the feeling of excitement generated by the announcement of discoveries and breakthroughs at the annual meeting. These are notoriously difficult to produce to order, but not impossible to stage-manage provided one chooses an innovative and productive section president.

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