

correspondence

The toxicity of plutonium

SIR,—In your editorial "Take your time Mr Benn" published on September 30 you discuss the Report of the Royal Commission on Environmental Pollution. You state that "the report first reviews what is known in radiobiology with particular attention to plutonium", and that "independent consultants were brought in. . . . The consultants' reports have not been published." Two of the signatories of this letter (F.W.S. and J.V.) are acknowledged by name in paragraph 537 of the report. We wish to make it clear that the two other signatories (R.D. and P.L.), who are members of the Commission, take full responsibility for Chapter II on Radioactivity and Radiobiology in the report. This was not seen by the consultants at any time prior to publication. In fact they disagree with several of the statements made in this chapter.

In paragraph 66, for instance, the statement that "plutonium isotopes are retained in the body once they gain admittance" is certainly misleading. Excretion does occur though it is not rapid, while no mention is made in paragraph 55 of the salient fact that the energy deposited in the tissues by the strontium 90 decay process is about 200 times greater than that deposited by tritium.

Further, the greater part of the evidence given to the Commission by the consultants has already been published in their joint paper in *Nature* (February 19, 1976) entitled "Hazards of plutonium with special reference to the skeleton", and in a paper by Janet Vaughan entitled "Plutonium—a possible leukaemic risk", in W. S. S. Jee (Ed.), *Health Effects of Plutonium and Radium*, 691–705, (J. W. Press, Salt Lake City, Utah; 1976). In fact references to these two papers were made by the Commission in Chapter II and in their bibliography.

In their written evidence to the Commission the consultants stated "We are in agreement with the conclusions arrived at by the Medical Research Council¹ and the National Radiological Protection Board² on the risk to the lung and on the question of the hot particle." Reference to both these matters was made in their paper published in February in *Nature*, and in a paper published by Mayneord and Clarke³ on which their discussion was

partly based and which was also published in the same issue of *Nature* under the title "Quantitative assessment of carcinogenic risks associated with hot particles". The substance of the consultants' comments on papers submitted by the National Radiological Protection Board on the numbers of deaths from leukaemia at the Windscale reprocessing plant are contained in paragraphs 74 and 75 of the Report.

Yours faithfully,

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¹ *The Toxicity of Plutonium*, Medical Research Council, HMSO (1975).

² Dolphin, G. W., Smith, H., Popplewell, D. S., Stather, J. W., Adams, N., Spoor, N. L., Brightwell, J., and Bulman, R. A., *Radiological Problems in the Protection of Persons exposed to Plutonium*, NRPB R.29 (1974).

³ Mayneord, W. V., and Clarke, R. H., *Nature*, **259**, 535 (1976).

Genetic manipulation

SIR,—The contribution of John Locke, the Director of the Health and Safety Executive, to the debate on genetic manipulation raises a new and disturbing issue. The Director claims that "the techniques described as 'genetic engineering' should be permitted where they offer prospects of social benefit" subject to safety precautions. So we learn that the safety of experiments is not the only criterion on which they are to be judged; officials are also to pass judgment on the social benefit of genetic experiments.

The ethical problems were not even discussed in the Williams Report, which confined itself solely to safety considerations in genetic manipulation. Clearly the Health and Safety people have no mandate to assess the social benefits of work. Besides the safety aspects of work in genetics, ethical problems could arise and these need very full debate before they have any in-

fluence on executive action.

Yours faithfully,

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Human anatomy

SIR,—The interest in descriptive asymmetry shown in *Nature's* pages indicates that the classic German treatise on the subject¹, reprinted in 1970, deserves recognition by the English-speaking world. Asymmetry of human limbs, and much else, has a large literature but lacks a recent review. There is even a more recent paper² devoted to a positive correlation between handedness and scrotal asymmetry. There are also by now several dozen analytical treatments^{3–8}; fluctuating asymmetry (but not other kinds) is a measure of the imprecision of development.

Yours faithfully,

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¹ Ludwig, W., *Das Rechts-Links Problem im Tierreich und beim Menschen* (Berlin, Springer; 1932).

² Chang, K. S. F., Hsu, F. K., Chan, S. T., and Chan, U. B., *J. Anat.*, **94**, 543–548; 1960.

³ Van Valen, L., *Evolution*, **16**, 125–142; 1960.

⁴ Whitten, M., *Genetics*, **54**, 465–483; 1966.

⁵ Bailit, H. L., Workman, P. L., Niswander, J. D., and Maclean, C. J., *Human Biol.*, **42**, 626–638; 1970.

⁶ Jackson, J. F., *Syst. Zool.*, **22**, 166–170; 1973.

⁷ Salzano, F. M., and Benevides, F. R., *Amer. J. Phys. Anth.*, **40**, 325–328; 1974.

⁸ Siegel, M. I., and Doyle, W. J., *J. Exper. Zool.*, **191**, 211–214; 1975.

Careers in science

SIR,—There has been a great deal of discussion recently about possible short term cutbacks in 'big science' projects. Nowhere have the effects on the careers of scores of research students been discussed. Simultaneously there are complaints about the lack of prospective students for university science courses. Is it not possible that these two sets of circumstances are directly related?

(Name and address supplied)

To be or not to be

SIR,—Isn't isn't isn't! (October 7, page i).

Yours faithfully,

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