

cost of college tuition is now so high that only business executives and university presidents can afford it?

Slaughter denies that being a Democratic appointee in the midst of the Republican Administration has caused problems, or that there is some particular disagreement behind his decision to leave. (The resignation is effective from 31 December.) This denial must be taken with a pinch of salt: the Administration has slashed NSF's science education programmes, particularly close to Slaughter's heart. But it is also true that he worked closely with the incoming Republican team to prevent NSF from being the target of serious cuts in the hard sciences. Is this why NSF has not been the butt of the broadsides of Dr Jay Keyworth, the President's science adviser, against the uselessness of the national laboratories or of planetary science?

In his brief term at NSF, Slaughter has made some important changes, along the lines of his early much publicized call to have NSF sponsor more applied research. He established a directorate of engineering, co-equal with the other directorates that run NSF's basic research. The new directorate, a combination of scattered programmes and some new things, now commands some 10 per cent of NSF's annual budget of approximately \$1,000 million. Slaughter has and the National Science Board had a hard job persuading the basic research community to support the engineering directorate. At first, he says, they were "agnostic" about it (read "unenthusiastic"). Basic researchers in the hard sciences tend to regard NSF as their exclusive patron and historically have resisted its forays into public policy, engineering, social sciences and other matters. It is unfortunate, therefore, that Slaughter will not be around to follow through on the move. Past attempts to integrate engineering into the basic research agency have been conspicuously unsuccessful. Unless vigorously and carefully promoted, Slaughter's new directorate could yet founder. Presumably the job of promoting the engineering directorate will fall to Donald N. Langenberg, NSF deputy director, who had the job before Slaughter arrived.

Slaughter has also, with the help of the National Academy of Sciences, established a commission to develop a national policy on science and engineering education, especially urgent in the present crisis in technical education in US elementary and secondary schools (see *Nature* 6 May, p.9). Congress may yet give the commission funds to develop and implement a national plan. Slaughter says that the establishment of the commission is his single most important act as director of NSF. One of his merits is that these changes have been undertaken carefully, in consultation with NSF's traditional constituency, basic researchers in the hard sciences.

Mr X, the highly political candidate whom President Reagan might appoint to succeed Slaughter, could be a very different animal. Reagan is midway through his term of office, and is under fire from his original supporters, the extreme conservatives. If, to placate them, he appoints somebody (probably an industrialist) with fixed and preconceived views about the absolute merits of private enterprise, the result could be disaster. Mr X might well urge that NSF should get out of education policy and social sciences (both hotbeds of liberalism in the extreme conservative view) and no longer give seed money to small businesses doing basic research. NSF could finish up by being stripped down to its core mission — sponsoring basic research in universities — while its other more tentative but important roles, such as its recent brokerage in university-industry partnerships, vanish.

The effect of such a Mr X on the academic science community in the United States is easy to foretell. As a group, academic scientists tend to be paranoid about Washington's designs on their grant monies, and Mr X would strengthen their fears. The community would then pull back from its tentative experiments with industry, its unwilling acceptance, as Slaughter says, that "engineering is also important to the nation", and retreat to its ideological trenches. So it is to be hoped that Mr X will remain just what he is, a figment of the imagination, a hypothetical second-rater, whose *curriculum vitae* may be pressed on the President but whom the President will wisely decide not to appoint to the job Slaughter is vacating.

Nuclear plant and prices

The new chairman of the British electricity industry has a chance to make sense of the nuclear industry.

Dr Walter Marshall, chairman of the United Kingdom Atomic Energy Authority for the past year, is clearly once again the British government's favourite scientist. Last weekend he was made a knight, that peculiarly British public honour which requires that those whom he hardly knows should address him by his first name. A week before that, he was appointed chairman of the Central Electricity Generating Board, the principal owner of commercial nuclear power stations in the United Kingdom and the most likely source of further orders for nuclear plant. Much has plainly changed since 1978, when Marshall as chief scientist at the Department of Energy was for all practical purposes fired by his minister, Mr Tony Benn.

The most obvious change is the change of government (in 1979). But it is also clear that Marshall, whose reputation was previously that of a talented theoretical physicist who had succeeded by deftness and ebullience in carrying the Harwell establishment through hard times in the early 1970s, has used the interval to good effect. His most conspicuous success in the past year has been to persuade the engineers who will be working for



him from 1 July that it is possible to build pressurized-water reactors in Britain at less than twice the cost that obtains elsewhere. The absorbing question now is what Marshall's arrival at the generating board will mean for the British nuclear industry.

The precedents are not uniformly encouraging. Sir Christopher (now Lord) Hinton, who built the first dozen or so nuclear reactors in Britain as well as the separation plant at Windscale (now called Sellafield) maddened his ex-colleagues when, as chairman of the generating board, he insisted that the only significant difference between nuclear electricity and other kinds of electricity is the relative cost. Logically, that view is unshakeable, but it does not thereby follow that the customers (especially monopoly customers) for nuclear plant are without influence on the costs that they must pay. For too much of the past two decades, the generating board has been too passive a customer for nuclear plant, looking to the government to be told when to build reactors, putting up compliantly with the publicly created suppliers' monopoly (called the National Nuclear Corporation) and, more generally, behaving limply.

Marshall, fortunately, is far from limp. The most likely immediate consequence of his translation to the generating board is that this huge nationalized industry will become less dull. The chance of putting the British nuclear industry on a sound commercial footing — or at least of telling conclusively whether such a goal is feasible — is higher now than ever. But in the end what matters is that there should be an assured supply of electricity at the lowest possible cost. Nuclear power undoubtedly has an important part to play, but so too does the elimination of high cost (oil-fired) and excess capacity from the board's network of generating plant. Pure reason, alas, is not sufficient. Marshall's imaginativeness will help. So too will his capacity to make even those whom he has talked down think well of him.