

CORRESPONDENCE

Princeton in Trouble

SIR,—I think that your editorial "Princeton in Trouble" (*Nature*, 242, 217; 1973) is highly damaging to the Institute of Advanced Study and the world of science in general.

First, I would point out the absurdity of the notion of social science. Science, as we all should know, consists foremost, of the application of the scientific method to the observation of natural phenomena. One of the essential requirements of scientific analysis is that it be possible to construct controlled experiments. In social studies of human beings, there is no possibility of constructing controlled experiments. Those who consider such a possibility should be strongly opposed. The second important requirement is that the experiments be repeatable. Since social situations are unique and cannot be repeated, social studies fail to meet the requirements of science on both counts. I would like to bring to your attention an excellent description of science in *Science is God*, by David F. Horrobin.

Next your suggestion "that there should be a better sense of moderation in this kind of scientific community" is immoral. If the standards of excellence and intellectual integrity are not maintained in such an academic community, then it is hard to conceive of any other place in the world where they would survive.

Your comment that "it is absurd for anybody at Princeton to suggest that a single appointment can entirely change the character of the faculty" is unfortunate and disputable. It is only single individuals that have been responsible for the course of human intellectual endeavour, to wit Socrates, Newton and Einstein.

Your comment that the dissident members' arguments are pernicious (the dictionary meaning of pernicious: extremely hurtful; wicked or mischievous) is slanderous. The faculty at Princeton does not possess such low qualities as you seem to do. It is editorials such as yours, and not their faculties that damage renowned institutions like the Institute of Advanced Study.

Yours faithfully,

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β -Carotene

SIR,—In response to McDonagh's answer (*Nature*, 241, 151; 1973) to our earlier communication (*Nature*, 240, 59; 1972), we offer the following comments.

In the interests of brevity, we did not belabour the distinction between topical and systemic administration of carotene. Since the scope of the discussion has now been broadened, it should be noted that Kesten made the logical progression from validating the efficacy of topical carotene, to oral administration of the compound, and that although exposure of the untreated patient's skin to a 'Mazda' projection bulb produced a wheal, the response could not be elicited after two weeks of oral therapy.

Admittedly, Kesten did not have the benefit of our present knowledge of the aetiology of erythropoietic protoporphyria (EPP), the *in vitro* photosensitizing action of protoporphyrin via singlet oxygen, and the quenching ability of β -carotene. But, despite convincing "test tube" evidence, there appears to be no experimental data relating to the *in vivo* state in humans¹. McDonagh cited no evidence in support of his statement that the protective effect of β -carotene is enhanced when taken internally, and that the compound probably acts as an *in vivo* quencher of singlet oxygen as well as a light shield. On the contrary, the meagre information available suggests that oral β -carotene acts mainly (if not solely) as a screen to absorb harmful rays of the Sun, in a manner analogous to that of topically applied material. Thus, oral carotene does not provide photoprotection in EPP patients until serum concentrations reach massive levels² and the skin displays visible evidence of the presence of the carotenoid¹, which suggests to us that its mechanism of action is primarily that of a physical sunscreen. This conclusion is strengthened by the well-known observations that internally-administered carotene accumulates in the stratum corneum³.

It is unfortunate that the *in vivo* protective action of β -carotene is not strongly enhanced by quenching; the EPP patient whose situation is desperate enough to require massive carotene loading must pay the penalty of an unesthetic yellow colour in his skin. We have successfully treated EPP⁴ and other types of photosensitivity⁵ with topical application of dihydroxyacetone and

lawsone (2-hydroxy-1,4-naphthoquinone). This combination exhibits the property, shared by no other sunscreen, of binding chemically to the skin, and therefore does not require renewal during the patient's normal daily activities. The colour imparted to the skin is pleasing to the patients, and far more esthetic than the yellow hue of β -carotene.

Yours faithfully,

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¹ Mathews-Roth, M. M., Pathak, M. A., Fitzpatrick, T. B., Harber, L. C., and Kass, E. H., *New Eng. J. Med.*, 282, 1231 (1970).

² Fitzpatrick, T. B., Pathak, M. A., Parrish, J. A., and Mathews-Roth, M., *Proc. Roy. Soc. Med.*, 64, 861 (1971).

³ Ormsby, O. S., and Montgomery, H., *Diseases of the Skin*, 716 (Lea and Febiger, Philadelphia, 1954).

⁴ Fusaro, R. M., and Runge, W. J., *Brit. Med. J.*, 1, 730 (1970).

⁵ Fusaro, R. M., Runge, W. J., and Johnson, J. A., *Intern. J. Dermatol.*, 11, 67 (1972).

Ancient Egypt

SIR,—With regard to the recent paper by K. H. Hsu *et al.* (*Nature*, 242, 240; 1973), I would like to point out that this theory has to some extent been anticipated by Herodotus (*circa* 485–425 BC) (Book II).

"They proved the truth of most of these assertions, and went on to tell me that the first man to rule Egypt was Min, in whose time the whole country, except the district around Thebes, was marsh, none of the land below Lake Moeris—seven days' voyage up river from the sea—then showing above the water. I have little doubt that they were right in this; for it is clear to any intelligent observer, even if he has no previous information on the subject, that the Egypt to which we sail nowadays is, as it were, the gift of the river and has come only recently into the possession of its inhabitants. The same is true of the country above the lake for the distance of a three days' voyage; the priests said nothing to me about it, but it is precisely the same type of country.

"Now, it is my belief that Egypt itself was originally some such arm of the sea—there were two gulfs, that is, one running from the Mediterranean southwards towards Ethiopia, and the other