probably ingested less vitamin C than did those from the low-risk areas. Hence the high-risk subjects could have produced more intra-gastric NOC, despite their lower salivary nitrite levels. The relevant property of each vegetable may be the ratio of vitamin C to nitrate content, and not nitrate content alone[4]. The intake of fresh fruits and vegetables is negatively correlated with gastric cancer incidence[2], suggesting that the critical components here are vitamin C and other nitrosation inhibitors.

(2) The same argument applies to socio-economic class, since the "lower" classes have relatively high incidences of gastric cancer[2] and showed lower salivary nitrate and nitrite levels in the reported study[1], but would be expected to consume less vitamin C in fresh fruits and vegetables.

(3) Forman *et al.* reported lower salivary nitrate and nitrite levels in cigarette smokers than in nonsmokers, as did Ladd *et al.*[5]. Both groups attributed this finding to the high level of salivary thiocyanate in smokers. Smokers have raised incidences of various types of cancer, possibly including gastric cancer[1,2]. Some of these cancers are likely to be induced by NOC in tobacco smoke or produced *in vivo* from smoke constituents[6]. These findings in smokers do not, as suggested[1], discredit the NOC theory because thiocyanate is a powerful catalyst of nitrosation[7] and we might therefore expect smokers to show an increased NOC formation, despite their lower levels of salivary nitrite.

In 1981 Ohshima and Bartsch[8] developed a method of measuring the potential for *in vivo* (probably intragastric) nitrosation. They fed nitrate and the amino acid L-proline to volunteers, and detected microgram amounts of the noncarcinogenic nitrosamine, *N*-nitrosoproline, in the 24-hour urines. Using this test, Ladd *et al.*[5] reported that smokers given nitrate and proline indeed had a greater urinary excretion of nitrosoproline than did non-smokers, despite the smokers' lower salivary nitrate and nitrite levels. Similar nitrosoproline data were reported by Hoffmann and Brunnemann[9]. These findings prove that salivary nitrite levels cannot be used to predict the potential for intragastric NOC formation.

In conclusion, it is interesting that salivary nitrate and nitrite levels follow the opposite trend to that expected from the NOC theory. However, *in vivo* nitrosoproline formation[5,8,9] offers a more valid test for potential *in vivo* NOC formation and the exposure to nitrosation inhibitors, such as vitamin C, and catalysts, such as thiocyanate, must be taken into account. (The role of vitamin C was addressed in ref. 1, but with a different emphasis.)

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FORMAN *ET AL.* REPLY — In our study, we did not set out to disprove the theory "that the intragastric formulation of carcinogenic *N*-nitroso compounds (NOC) from nitrite is involved in the aetiology of gastric cancer", but rather to test the hypothesis "that an increase in nitrate exposure may represent an increased cancer risk". We agree with Mirvish that the negative relationship we observed between salivary nitrates and nitrites and gastric cancer could be due to an association between the consumption of vitamin C (or other protective factors in vegetables) and the consumption of nitrates and suggested this in our paper. We agree, too, that the increased secretion of thiocyanates by smokers might account for the increased risk of gastric cancer in cigarette smokers that has been reported in several series. We clearly stated in the paper that our results do no more than "weigh against the idea that environmental nitrates and nitrites play a major role in determining the risk of gastric cancer in Britain" and we emphasised that this should not "be taken to imply that nitrate-related *N*-nitroso compound carcinogenesis has no role in the development of gastric tumours". Our conclusion is supported by the recently published results of Beresford showing that in Britain the risk of gastric cancer is negatively correlated with the nitrate content of the water supply in over 200 urban areas (*Int. J. Epidemiol.* **14**, 57-63; 1985) and by our observations on men producing nitrate fertilizers, who are certainly exposed to unusually large amounts of nitrates, and whose mortality from gastric cancer is almost identical with that experienced by other men in the same part of Britain (our work, in preparation).

It is clear that whatever the role of NOC in human carcinogenesis may be, direct exposure to nitrate *per se*, does not appear to be a critical risk factor in the United Kingdom. We agree that *in vivo* nitrosoproline formation has the potential for a useful test of *in vivo* NOC formation and are ourselves conducting more research in this area.

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Spreading rate of an Arctic ice shelf

SIR — In connection with problems of creep and *à propos* the work of Doake and Wolff[1] on the flow law for polar ice sheets, Weertman[2] calls for measurements of the spreading rate of the Ward Hunt Ice Shelf, Ellesmere Island, Arctic Canada. This was an oversight on Weertman's part because, when I was in charge of field operations in the area for the Canadian Defence Research Board, I arranged for such measurements to be made under the supervision of Dr G. Konecny, then of the Univeristy of New Brunswick.

The work was performed with a geodimeter during the field seasons 1964, 1965 and 1968, and the data were analysed in detail by Dorrer[3], who derived a value of 1.17×10^{-4} yr^{-1} for the spreading rate where the mean thickness of the ice shelf was 38 m. Weertman now agrees that both Doake and Wolff's ice shelf data and Dorrer's ice shelf data appear to go against a linear creep law.

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Powers of ten *correctly* expressed

SIR — Claude Liébecq (*Nature* **314**, 586; 1985) thinks that an ordinate with figures ranging from 0 to 10 and labelled "Radioactivity (c.p.m. $\times 10^{-3}$)" is labelled incorrectly if, for example, one of the values included is 5,000 c.p.m. It is indeed labelled incorrectly if one thinks of the label as an equation in the form "Radioactivity = 5,000 × c.p.m.". But if, with more logic, one thinks of the words written vertically simply as a label describing what the figures are, then "c.p.m. $\times 10^{-3}$" is correct.

In other words, instead of substituting "5" for the "c.p.m." in the expression "c.p.m. $\times 10^{-3}$" (giving the incorrect "Radioactivity = 5×10^{-3}"), one may understand the ordinate to mean "c.p.m. $\times 10^{-3} = 5$", or "c.p.m. $= 5 \times 10^{3}$".

Clearly, the meaning of the ordinate can be read in different ways, and there ought to be agreement on how to read it. I suggest that the words on the ordinate be viewed, as I believe they already are by a majority of my colleagues, simply as a label describing the figures, and not as part of an equation.

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