

enhanced O_3 - H_2O surface chemistry in the presence of unsaturated hydrocarbons was not observed. No change in the stoichiometry (terpene/ozone) was observed on varying the water vapour, terpene and ozone concentrations.

In conclusion, it should now be clear that all the points mentioned by Ross *et al.* concerning the heterogeneous formation of H_2O_2 and the experimental conditions are irrelevant for our work. Our aim was to report the occurrence of a new type of reaction that results in the formation of H_2O_2 , also under conditions prevailing in forest air. Ross *et al.*'s estimation of the H_2O_2 budget in forest air due to the reaction of the Criegee biradicals with water vapour has not been correctly evaluated and may lead to wrong results.

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Beneficial ghee?

SIR — Aneja and Murthi's Scientific Correspondence¹ may encourage people, especially Asian Indians, to eat more ghee (anhydrous milk fats of cow and buffalo). But the authors show only that ghee contains 2–3% of conjugated linoleic acid (CLA), a chemical that may have anti-carcinogenic properties.

CLA in isolated (pure) form may indeed be anti-cancerous, but solid evidence is necessary to show that this property is retained when it is mixed with a large excess of saturated milk fats. The evidence for the anti-carcinogenic property of CLA is based upon inhibition of the initiation of mouse epidermal tumours (on shaved dorsal skin area) promoted by DMBA (7,12-dimethylbenz[a]anthracene)². It is not known whether CLA would exhibit this property in mice, let alone in humans, if administered orally and especially when combined with a large dose of saturated fat.

It also remains to be seen whether the beneficial effects of CLA (if proven) outweigh the known hazards of a 49-fold excess of saturated fat in ghee. Unless these concerns are adequately investigated, an unsagacious consumption of ghee might turn out to be a fat mistake.

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1. Aneja, R.P. & Murthi, T.N. *Nature* 350 280 (1991).
2. Ha, Y.L., Grimm, N.K. & Pariza, M.W. *Carcinogenesis* 8, 1881–1887 (1987).

Spatial maps

SIR — Halligan and Marshall¹ describe a patient (T.M.) who, following a lesion in the right hemisphere of the brain, exhibited left neglect in near (peripersonal) but not far (extrapersonal) space. As this dissociation has also been demonstrated in animal studies², it seems to establish an important link between human models of attention and those derived from neurophysiology. But there are some important caveats.

The problem of relating physiological data to those obtained from human studies is that it is rarely possible to control the locus and extent of lesions in humans. Halligan and Marshall suggest that the dissociation exhibited by T.M. may have occurred because the (hypothesized) structure controlling attention in extrapersonal space (area 8) was spared. However, as a consequence of damage to another part of the same anatomical circuit, the posterior parietal lobe, we believe reciprocal connections between these areas were almost certainly disrupted. Thus, the nature of T.M.'s lesion precludes extrapolation from behavioural observation to neuroanatomy.

This leaves the problem of explaining the apparent dissociation of symptoms in T.M.. One could assume that dissociation of neglect in near and far space might occur in other patients tested under similar conditions. As the paradigm Halligan and Marshall used in extrapersonal space has not been applied to other patients (or normal controls), this issue remains unresolved. But given the previous failure to demonstrate a dissociation using another paradigm³, we believe the observations may be biased by methodological inconsistencies.

The kind of response required of T.M. in peripersonal space was different from that required in extrapersonal space. In the latter, "T.M. was asked to make a single movement to the centre of the line" (page 499 of ref. 1) using a light pen, before indicating his judgement. This is clearly a different response to that required in peripersonal space, where T.M. was apparently free to approach the subjective midpoint from any position and make adjustments until satisfied. It is important to consider the extent to which postural abnormalities induced by severe left hemiparesis may have biased control of the ipsilesional arm in the dart-throwing condition.

Finally, directional hypokinesia (impaired ability to direct responses toward the contralesional side of space) may have biased bisection errors in peripersonal but not extrapersonal space. Arm movements in peripersonal space, which involve proximal musculature, are impaired in patients with neglect⁴. By contrast, pointing a light

pen at a distant (extrapersonal) target requires only distal manipulation. Any manifestations of directional hypokinesia would be markedly attenuated under such circumstances.

As the directional impairment in neglect can be modified by different response factors, future attempts to elicit dissociation must use identical paradigms in peripersonal and extrapersonal space. If a motor response is required to elicit the dissociation (as Halligan and Marshall suggest), the problem of finding an appropriate paradigm will be difficult, if not impossible. In any case, the kind of data derived from human lesion studies may not be sufficiently sensitive to draw the distinction.

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MARSHALL AND HALLIGAN REPLY— We agree with the neuroanatomical caveats raised by Mattingley and Bradshaw: T.M.'s lesion was large and the link we drew with studies in monkeys², although supporting our hypothesis, was tentative. Nonetheless, the fact is that T.M. showed neglect in near but not far space¹, although the question of why this was so remains open.

The speculations that Mattingley and Bradshaw put forward are not convincing. For all trials in all conditions, T.M. sat upright in his wheelchair. Each trial commenced with his right arm placed on the right armrest of the chair. Each response, with pen, lightpen or dart, accordingly began from this position. When a pen was used, T.M. was encouraged to make a single, overt movement to the centre of the line (as he was in all other response conditions). In future studies, it would be desirable to make a video record of patients' performance⁵; but if T.M. had made more "adjustments until satisfied" in peripersonal space, surely his accuracy would have improved (and given the opposite result to that found)⁶? We observed no "postural abnormalities" when T.M. was throwing darts (other than that he was chairbound with a left hemiparesis!) and cannot readily imagine how such abnormalities would improve his performance.

With respect to the vexed question of directional hypokinesia, the comment of Mattingley and Bradshaw is seriously misleading. In the paper they cite⁴, Heilman *et al.* found that, compared with control subjects, patients with left neglect showed a small but significant increase in reaction time to initiate a leftwards movement of the arm. There was no suggestion that the patients could not perform the task, nor that the involvement of proximal musculature *per*