

Complementary medicine

SIR — Complementary and alternative medicines are more popular than ever before. A recent Australian survey suggests that about half of the general population employs such treatments¹. This is remarkable when we know so little about the efficacy

damage such as spinal cord transection and 1 disk protrusion.

Such survey data are inevitably limited. The first questionnaire was likely to be completed by relatively healthy proponents of CAM and not by individuals with experi-

SUSPECTED ADVERSE EFFECTS OF COMPLEMENTARY/ALTERNATIVE MEDICINE

Therapy	Users survey		GP survey		
	% Reporting AEs	Most commonly reported AEs	% Reporting AEs	Most commonly reported minor AEs	Most commonly reported major AEs
Manipulation	15.8 (24)	Pain (13) Fatigue (2) Dizziness (3)	15.4 (71)	Aggravation (65)	Fractures (3) Nerve damage (2) Disk protrusion (1)
Acupuncture	12.5 (23)	Aggravation (6) Mental effects (3) Fatigue (3) Pain (2) Needle trauma (2)	<0.1 (4)	Aggravation (2) Visual disturbance (1)	Septic arthritis (1)
Homeopathy	9.8 (28)	Aggravation (11) Mental effects (3) Digestive effects (2)	<0.1 (9)	Aggravation (5) Eye infection (1) Skin rash (1)	Liver failure (1) Anaphylaxis (1)
Herbal medicine	7.6 (10)	Digestive effects (3)	<0.1 (6)	Aggravation (2) Rashes (2) Nausea (1)	Liver toxicity (1)

Numbers in parentheses show absolute number of cases.

cy and safety of these therapies. It is commonly believed that complementary/alternative medicine (CAM) is natural and therefore safe and that people can be treated without side-effects. The results of two recent surveys, however, provide evidence on the potential risks.

In the first study, we invited readers of the British daily newspaper *The Guardian* (circulation about 500,000) to answer a questionnaire about their experiences with CAM. The 386 respondents were, as expected, strongly in favour of its use: 91.4% had a positive attitude, and 95.6% said it had improved their quality of life. But when asked about treatment outcome, a large proportion (23.8%) reported adverse effects (AE) (see table). The rate of AEs following acupuncture (12.5%) was similar to that reported elsewhere².

In the second study, a questionnaire was sent to every general practice in Devon and Cornwall ($n = 972$) enquiring whether general practitioners (GPs) had encountered patients experiencing problems with complementary therapies. Of the respondents, 176 (38.2%) reported encountering AEs. The table describes the direct physical AEs, but there were also 11 reports of psychological effects (mainly disillusion at absence of promised benefit) and 17 cases of inappropriate management or frank misdiagnosis by complementary therapists. Manipulation therapy, such as chiropractic and osteopathy, was the dominant cause of physical AEs seen by GPs (see table): 3 of these cases (1.3% of all AEs reported) led to bone fractures and 2 to neurological

ence of serious AEs. The GP survey, on the other hand, was likely to collect reports of the more severe AEs. Furthermore, neither questionnaire provides reliable prevalence figures. However, both sets of data illustrate that CAM is not entirely free of risk. We therefore suggest more rigorous investigations into this topic to determine the extent of the problem and (if necessary) to design a strategy to minimize harm.

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Feynman faux pas

SIR — Our fascination with Richard Feynman's lectures (see review of *Feynman's Lost Lecture*¹) is fuelled in part by the glimpses they give us of his extraordinary mind. Readers of *Nature* might therefore relish learning that Feynman could blunder.

In a lecture at the US National Academy of Sciences in 1955 (reprinted in ref. 2), Feynman muses about why writers and artists do not rhapsodize about science. He wonders if perhaps they don't know "how to read the music", which he suggests is necessary to develop beautiful abstract ideas. He

then invents an example in which ironically he, of all people, appears to misread the music. Feynman says (page 244): "For instance, the scientific article may say, 'The radioactive phosphorus content of the cerebrum of the rat decreases to one-half in a period of two weeks.' Now what does that mean? It means that phosphorus that is in the brain of a rat — and also in mine and yours — is not the same phosphorus as it was two weeks ago."

He tries to make something of the fact that our mind retains information despite replacement of phosphorus atoms in the brain. But the example he gives would not prove replacement; in fact, it suggests quite the opposite. In an endearing lapse, Feynman appears to have blanked out on the half-life for the decay of ³²P to sulphur, which just happens to be two weeks; if the radioactivity decreases to one-half in two weeks it means (within experimental error) that there was no turnover of phosphorus in the cerebrum.

A further irony is that the excerpt is cited approvingly by Daniel C. Dennett in his much-praised book on evolution³; Dennett is also concerned about scientific abstraction and introduces the quotation with reckless adulation, saying (page 360), "Nobody has ever put it better than the physicist Richard Feynman".

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2. Feynman, R. *What Do You Care What Other People Think?* (Norton, New York, 1988).
3. Dennett, D. C. *Darwin's Dangerous Idea* (Simon & Schuster, New York, 1995).

Hard evidence

SIR — It has been suggested that the problem of consciousness consists of an 'easy problem' and a 'hard problem'. Exploring the neurobiology of vision, for example, is 'easy' but understanding subjective visual experience is 'hard'^{1–3}. To solve the hard problem, a 'new theory' has been developed in which 'conscious experience' is an irreducible phenomenon, with a physical (brain state) and an experiential (subjective state) aspect linked by psychophysical laws³. Replace 'conscious experience' with 'unbewusstes Schluss' and this is the theory presented by von Helmholtz in 1857 (ref. 4). Progress in the study of consciousness has not been delayed by theoretical constraints.

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