may be related to this oestrogenic property. We have studied the biological effects of tamoxifen in the rat and found that the compound can inhibit the stimulatory effects of concomitantly administered oestradiol in immature and ovariectomised rats, and similarly in mature animals it will inhibit the oestradiol-stimulated changes in the vaginal smear. What is of particular relevance is the fact that tamoxifen also produces atypical oestrogenic effects when administered alone.¹

Radiolabelled tamoxifen has been shown to bind to the cytoplasmic oestrogen receptor² and initiate the translocation of complexes to the cell nucleus² but, whereas oestradiol provokes cell division, the stimulatory effects of tamoxifen produce endometrial hypertrophy. The partial uterine growth which results is probably due to the inability of tamoxifen to provoke a prolonged and consistent rise in uterine DNA content.^{1, 2}

Similar effects have been observed in vitro using cultured human breast cancer cells, where it appears that non-steroidal anti-oestrogens in general, and tamoxifen in particular, have effects other than a simple antagonism of oestrogen action, as they can reduce the activity of some biochemical processes to below control values.

It is therefore apparent that, since tamoxifen can play a positive part in subcellular events as well as being an oestrogen antagonist, then any inappropriate biochemical changes which occur in mammary tumours may have a profound effect on continued growth and homeostasis. Therefore, even though tamoxifen has the properties of an anti-oestrogen, its effects as a partial or atypical oestrogen agonist may be of prime importance for its antitumour activity in the post-menopausal patient with breast cancer.

V C JORDAN

Department of Pharmacology,
School of Medicine,
Leeds

¹ Jordan, V C, *Cancer Treatment Reports*, 1976, **60**, 1409.

² Jordan, V C, et al, *Molecular and Cellular Endocrinology*, 1977, **7**, 177.

³ Jordan, V C, and Prestwich, G, *Molecular and Cellular Endocrinology*, 1977 **8**, in press.

⁴ Lippman, M E, Bolan, G, and Huff, K, *Cancer Treatment Reports*, 1976, **60**, 1421.

Chemoprophylaxis of malaria

SIR,—In response to your leading article on chemoprophylaxis of malaria (20 November 1976, p 1215): In Kinshasa, Zaire, *Plasmodium falciparum* is found in perhaps 95% of the cases of malaria in the population. Malaria due to *P falciparum* is easily diagnosed and treated. However, untreated, the morbidity and mortality are high.

Chloroquine is the antimalarial of choice in this area. Chloroquine in doses of 200-300 mg per week is effective in preventing malaria. Chloroquine is effective in treating acute cases of falciparum malaria. The treatment is rapid, can be repeated, and the failure rate is low. The amount of chloroquine given must be determined by the age and weight of the patient. Here many patients have chronic haemolytic anaemia (sickle cell anaemia, etc . . .). These patients have increased folic acid requirements. They must receive additional folic acid to protect them against megaloblastic anaemia. Chloroquine apparently does not affect folic acid metabolism and does not increase folic acid requirements.

Chloroquine should be given weekly for life to patients who have had their spleens removed, whether for sound clinical reasons (trauma, etc) or for questionable, unsupported reasons (for example, sickle anaemia). After splenectomy for any cause there is an increased risk of cerebral malaria due to *P falciparum*.

One final point: The myth that haemoglobin S protects against malaria is simply not true, at least, not against falciparum malaria. The facts are: (1) that infection by *P falciparum* results in many deaths in patients with sickle cell anaemia (homozygous S); (2) patients with sickle cell trait (haemoglobin A-S) may have repeated attacks of malaria due to *P falciparum*. The frequency and severity of these attacks of malaria are the same as in those with haemoglobin A.

F A JOHNSON

Service d'Hématologie
Institut de Médecine Tropicale
L'Hôpital Mama Yemo,
Kinshasa,
Zaire

Royal College of Physicians and fluoridation

SIR,—Mr R V Mummery (21 May, p 1352) points out that in a comparison of the DMF (decayed, missing, filled teeth) indices in adults over 30 years of age from an area of high (1.4 ppm) and low (0.25 ppm) concentration of naturally occurring fluoride in the drinking water the difference was negligible. He fails to remind your readers that the DMF index is not exclusively a measure of dental decay but includes (M) tooth loss from other causes. In young children the predominant cause of tooth loss is decay as reflected in the DMF values quoted of 3.9 (high fluoride) compared to 6.6 (low fluoride) in 5-year-old children.

However, there is a shift in the cause of tooth loss with increasing age. In adults the proportion of teeth lost because of decay falls, and other reasons for tooth extraction, such as periodontal disease and the patient's attitude to dental health are of increasing importance.^{1, 3}

The fact that the beneficial effect of fluoridation is limited to reducing dental decay is undisputed. No claim has been made that fluoridation directly affects periodontal disease. Does Mr Mummery advocate that we refrain from reducing dental decay in children because they may develop periodontal disease as adults?

DOROTHY A M GEDDES

Department of Oral Medicine
and Pathology,
Glasgow Dental Hospital and School,
Glasgow

¹ Waerhaug, J, in *The Prevention of Periodontal Disease*, ed J E Eastoe, D C A Picton, and A G Alexander, p 5. London, Henry Kimpton, 1971.

² Gray, P G, et al, *Adult Dental Health in England and Wales in 1968*. London, HMSO, 1970.

³ Todd, J E, and Whitworth, A, *Adult Dental Health in Scotland, 1972*. London, HMSO, 1974.

Clinical rheumatology and orthopaedic medicine

SIR,—Dr P W Blower (28 May, p 1413) hits the nail on the head when he deplores the inadequate provision for orthopaedic medicine. Surveys have shown that one patient in five visiting his family doctor has an orthopaedic non-surgical complaint. Hence it is

evident that every orthopaedic team should include a medically orientated doctor dealing with the non-surgical lesions of the moving parts. This was the policy adopted at St Thomas's Hospital, where I was the orthopaedic physician. This collaboration worked well, each type of orthopaedic case being seen by an interested consultant. This arrangement exists today at the Strong Memorial Hospital, Rochester (NY), and again is popular on both sides.

What is now needed is an institute of orthopaedic medicine,¹ where tuition can be offered all the year round to those anxious to learn this type of work and to physiotherapists who need to learn the appropriate manual methods. Within a year or two one physician could then be sent out to each orthopaedic team in the country, and the most expensive hiatus in our Health Service would be closed, not only on humanitarian grounds but for the benefit of insurance, industry, and sick-benefit funds. The institute exists on paper as a registered charity (secretary: G Symonds, 81 Belsize Lane, London NW3) but lacks funds to get started. Since very little capital outlay is required for orthopaedic medicine, and the clinic would pay for itself many times over, it presents an immediately feasible measure to deal with Dr Blower's fully justified criticism. In Spain Conesa² describes how, when he incorporated the methods of orthopaedic medicine at his rehabilitation centre, its annual cost fell from 24 to 6 million pesetas, and 47% of the patients got well in one treatment.

JAMES CYRIAX

Visiting professor in orthopaedic medicine

Rochester (NY) University,
USA

¹ Cyriax, J H, *Textbook of Orthopaedic Medicine*, Vol 1, 6th edn. London, Ballière Tindall, 1975.

² Conesa, S H, *Incorporación de la Medicina ortopédica a la Rehabilitación. Rehabilitacion*, 1976, Vol 10, Fasc 1.

Anaesthetic waste gas scavenging systems

SIR,—I was pleased to see that Professor L Rendell-Baker and Dr R A Milliken (21 May, p 1348) have come to the same conclusion as we did here (19 February, p 506), that active extraction is to be preferred to passive, but I am puzzled by their statement that active systems "are very expensive in terms of energy costs." The DHSS Circular (HC (76)38) on the subject calls for an extraction rate of 30 l/m with a negative pressure not exceeding 1 cm/H₂O. Taking this to be 100 Pa, a simple calculation shows that the theoretical power requirements are 0.005 watt. On the most pessimistic assumptions about losses in the pipe line and low-efficiency extraction pumps it is hard to see how the power requirement per patient could exceed 1 watt, or how this could disturb the most ardent conservationist.

This is not a trivial matter, because the belief that an active extraction system would be expensive was at least partly responsible for the DHSS recommendation that a passive system should be preferred. A similar non-quantitative approach has led to the belief that the scavenged gases could constitute a fire hazard and a chemical hazard to the pumps. A simple calculation again shows that if, as it should be, the expired air is diluted at the point of extraction the mixture could not possibly be flammable, and the possible halothane