These results are of special interest for a number of reasons. Firstly, although myasthenia gravis has been found after the introduction of penicillamine therapy, we are not aware of previous studies which have indicated that antistriational antibody may occur in a similar situation. Secondly, antistriational antibody is associated with myasthenia gravis complicating thymoma rather than with myasthenia gravis per se. For this reason alone patients on penicillamine should be followed for the development of a thymoma in addition to the development of myasthenia gravis. Thirdly, no previous examples of drug-induced antistriational antibody have been recorded and hitherto it has been assumed that this autoantibody had far greater diagnostic specificity than other autoantibodies such as antinuclear factor and anti-smooth-muscle antibody, both of which may occur after drug therapy and viral infections and in the aged. Fourthly, it is now clear that penicillamine induces a variety of autoimmune diseases and in view of the present results perhaps a variety of autoantibodies in addition to the antinuclear factor.[5] Finally, we have previously suggested a role for immunodeficiency in the pathogenesis of myasthenia gravis and thymoma.[4] Since penicillamine can be considered immunosuppressive in some respects[6] the present data provide a further argument for the immunodeficiency hypothesis.

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Low protein diets in chronic renal failure

SIR,—Your leading article (29 November, p 486) states correctly, as many of us know, that the imposition of a low protein intake for patients in chronic renal failure introduces in the long term more troubles than it is really worth. Firstly, other than the fact that a low-protein diet was and still is a compromise to postpone the day of dialysis, one might question the whole rationale, since most people still think that it is the toxic products of gut bacteria that are absorbed into the circulation to account for uraemic symptoms. Secondly, when in compensation for a low protein intake a patient is obliged to eat supernormal amounts of carbohydrate and fat it is inevitable that there will be increased triglyceride synthesis by the liver to add to the other explanations for hyperlipidaemia, all of which in the long term lead to premature vascular disease and further difficulties in haemodialysis and transplantation.

Is it really true that "measurement of nutritional status is infuriatingly imprecise"? We have shown that serum transferrin levels and even the blood haemoglobulin concentration give a better guide to nutritional status than the serum albumin.[1] Other groups have made similar observations.[2 3]

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Immunisation against dental caries

SIR,—We should like to comment on your thoughtful leading article (22 November, p 424) which discusses the possibility of immunisation against dental caries in man. There are, of course, many problems to be solved before a clinical trial of *Streptococcus mutans vaccine* should be attempted. However, some of the questions you have posed can be answered directly.

The slow antibody response to *Str mutans* in some rhesus monkeys was found only when a laboratory strain of *Str mutans* (Ingbritt) was used.[1] As soon as an animal-passaged strain[2] or a freshly isolated strain of *Str mutans* (wild strain) was used all monkeys yielded a satisfactory antibody response within one month. Even if the response were to be delayed by a few months this should not cause much concern, as immunisation should be carried out before eruption of the deciduous dentition—that is, at three to six months, when the triple vaccine is usually administered.[3 4]

As to the bias towards a positive result in that the heavy load of implanted organisms in the mouth is the same as the organisms used for immunisation, this does not apply to our second series.[2] Indeed, no organisms were deliberately implanted into the mouth of the rhesus monkey because a naturally occurring *Str mutans* (serotype c) develops if the animals are placed on a human type of carbohydrate-rich diet.[1 2 5] Colonisation of a cariogenic flora occurs under conditions analogous to those found in man and artificial implantation of organisms, possibly disturbing the microbial ecology of dental bacterial plaque, is not required. Immunisation with *Str mutans* induces protection from caries by changes in the development of a naturally acquired and not artificially induced cariogenic flora.

We wish to correct a possible misunderstanding of our results in that there is not only a postponement but also a decrease in the incidence of smooth-surface caries in deciduous teeth. Some of these animals have now been followed for four years—that is, up to the time of shedding of most of the deciduous teeth—and the decrease in the incidence of smooth-surface caries in the effectively immunised compared with the sham-immunised monkeys was maintained at about 70%.

The answer to the question why an attack of the disease does not produce natural immunity is more complex. It is possible that the antigenic dose of *Str mutans* on the teeth is inadequate or inaccessible to the lymphoid tissue and does not result in effective immunisation. The immunogenicity of *Str mutans* is rather poor, and effective antibody titres, decrease in the number of colonising *Str mutans*, and protection from caries resulted only when an adjuvant was used with the whole organism.[6] Alternatively, in view of the frequent transient bacteraemias that occur, particularly with bacteria normally found adjacent to the gingival crevice,[7 8] it is possible that a low dose tolerance[9] might be induced in some subjects who might then be unable to respond to the relevant organism. However, there is some evidence from immunological studies in man that natural immunity may occur in a small number of subjects.[10 11]

We have shared the fears expressed in your article that inhibition of some strains of *Str mutans* by immunisation might lead to the development of other serotypes of this species or other cariogenic organisms. Our experience in immunisation of rhesus monkeys has so far not substantiated these fears. If a new cariogenic flora were to have emerged under the pressure of immunisation, then the incidence of caries should have increased. In fact, immunization with *Str mutans* resulted in a very significant protection from dental caries from the time the deciduous teeth were fully erupted to the time they were shed.

We think that an immunological approach to dental caries might well lead to a significant prevention of dental caries, as the results of the experiments with *Macaca fascicularis*[12] and our investigation with *M mulatta* suggest.

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Laparoscopy explosion hazards with nitrous oxide

SIR,—In reply to our warning letter (27 September, p 764) Dr I M Corrall and his colleagues (1 November, p 288) report that over a three-year period more than 3000 laparoscopies have been performed at King's College Hospital and that "sterilisation by tubal diathermy has accounted for less than 30%" of these, which they consider to be but a small proportion, even though it represents about 300 cases per year. If this use of nitrous oxide became common there would be likely to be many thousands of such cases per year. Even if the risk of an explosive mixture being ignited is small (for example, less than one in 10 000) is it right to ignore that risk? Considerable amounts of money were spent on the reduction of the explosion hazards involved in using diethyl ether as an anaesthetic agent. Several explosions have been reported[1-4] when diathermy has been used in electrosurgical procedures on the colon, caecum, and rectum, some of which have been fatal.

As intestinal gas generally contains only a very small percentage of oxygen (less than 1%),[1] an explosive mixture can be formed

only by introduction of oxygen into the gas mixture after the initial opening of the bowel by diathermy, after which continuation of diathermy serves to initiate the explosion, or by uptake of nitrous oxide (used in the anaesthesia) into the intestinal gas bubbles from the surrounding capillary network in the intestinal wall, because the high concentration of nitrous oxide in the blood during anaesthesia would enable a high concentration gradient towards the intestinal gas to be maintained.

The consequences of an increase in $Paco_2$ due to laparoscopy with carbon dioxide are simpler to deal with than the blast damage to internal organs caused by an explosion. Our critics at King's College Hospital have themselves recognised another potential hazard of nitrous oxide used in laparoscopy (1 March, p 511)—an unexpected rise in $Paco_2$ in two of their patients. The possible explanation (1 November, p 288) of this arterial hypercapnia needs further justification with some experimental evidence.

As little in the way of measurement has been done to assess the intermixing of nitrous oxide with intestinal gases, either during laparoscopy or during open abdominal procedures, we echo the sentiment expressed by Dr Corrall and his colleagues for a study of this problem. In the meantime, would it not be wise to be cautious and avoid the potentially explosive and fatal hazard involved in using nitrous oxide?

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Thyrotoxic periodic paralysis in Britain

SIR,—We read with interest the case report by Dr K Ali (29 November, p 503). There have, however, been at least four previous reports of British patients with thyrotoxic periodic paralysis.[1-4] We should like to describe a further case.

The patient, a 22-year-old male student of Chinese extraction from Johore, Malaysia, was symptom-free when he came to the United Kingdom in 1973. In July 1974 he noted frequent attacks of leg pain and weakness, which were most severe when resting after exercise or in the late evening after a heavy meal. The patient regularly walked to the university, but after sitting through lectures he was unable to rise without assistance. In spite of visits to his general practitioner and the student health centre the correct diagnosis was not made for several months. By December 1974, when he was referred to the thyroid clinic at this hospital there was unequivocal clinical and biochemical evidence of hyperthyroidism (plasma thyroxine 331 nmol/l (26 μg/100 ml), plasma triiodothyronine 14·8 nmol/l (0·96 μg/100 ml) by radioimmunoassay).

Carbimazole and propranolol were prescribed, but because the patient developed a severe skin reaction carbimazole was discontinued and he was given a therapeutic dose of ^{131}I in January 1975. Within three weeks the painful paralytic attacks became less frequent; he became hypothyroid 10 weeks after treatment and thyroxine replacement was started. He is now clinically euthyroid on 125 μg thyroxine daily and remains free of paralysis.

Periodic paralysis is the rarest of the neuromuscular complications of hyperthyroidism. However, it has been shown to affect more than 10% of male Chinese thyrotoxic patients[5]; this is the first such patient to be described in Britain.

Although, as Dr Ali states, the pathophysiology of thyrotoxic periodic paralysis remains to be defined, an abnormality of carbohydrate metabolism may be responsible.[6] Shishiba *et al*[7] described a patient whose plasma immunoreactive insulin (IRI) level rose from 75 mU/l to 500 mU/l immediately before a paralytic attack. While thyrotoxic our patient, in response to high carbohydrate feeding,[8] showed a similar rise in IRI to 582 mU/l. Currently we are analysing metabolic studies which were undertaken while the patient was hyperthyroid, when he was hypothyroid following ^{131}I therapy, and after he had become euthyroid on thyroxine replacement. Preliminary evaluation indicates that an abnormality in insulin metabolism existed in our patient and may have played a pathogenic role in his paralytic attacks.

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Medical recruitment

SIR,—There have been a number of references in your columns to the loss sustained to clinical medicine by the promotion of experienced ward sisters to administrative posts and the resulting lack of valuable support in decisions affecting the care of patients. There are other forms of expertise not confined to the graduates of medical schools, and room should be made for other branches of the profession working in the clinical field by the institution of a conversion course to medical graduation from among those who have proved their worth.

Apart from nurses there are scientists, senior technicians, and members of other supplementary professions who could provide a field of recruitment of exceptional value. Indeed, there are many examples now serving who have graduated in this way by their own initiative. This form of advancement is already available in other learned professions and widely recognised in the armed Forces.

Skill in administration is only one of many specialties and it is a waste of ability in other fields of equal importance to make it the only ladder towards professional advancement.

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A case for private practice?

SIR,—I read with great interest the commentary by Mr Rudolf Klein (6 December, p 591). He presents a perceptive but not an entirely accurate analysis of the reasons why patients may wish to seek private medical care. Medicine is based on confidence and it is a tremendous help if a patient knows that a certain surgeon or physician has looked after one of his friends and in addition that his own family doctor has confirmed that he is indeed a suitable consultant. It is perfectly reasonable for patients to wish to get the most appropriate consultant for their particular problem and the same would be equally true if they were seeking professional legal or architectural advice. I believe there are very few patients who seek to "buy time." There are a great many who wish to maintain control over the arrangements for their treatment. This is indeed essential for many who are concerned with small businesses. Contrary to general newspaper comments, queue-jumping based on the purse is relatively uncommon. At least nine out of 10 private patients would get more quickly into an NHS bed than into private accommodation. It is almost unknown for a patient with an acute emergency to get into a private room, as the general private beds are continuously occupied. For the patient with a non-urgent problem such as an inguinal hernia it is certainly true that quicker admission can be arranged privately than under the NHS. The private NHS sector serves a very useful purpose in providing flexibility in treatment for business reasons. The small private sector constitutes a most valuable safety valve for the NHS, and indeed is an important asset.

Mr Klein is the editor of a recent book, *Inflation and Priorities*, published by the Centre for Studies in Social Policy, to which he contributed a most interesting commentary on the background financial problems of the NHS.

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Junior staff ballot results

SIR,—I was interested to read the result of the junior staff ballot (22 November, p 482) and to see that Sir Robert Payne was entirely satisfied about the integrity of the staff involved in the mechanics of the operation. The *Concise Oxford Dictionary* defines "integrity" as "wholeness; soundness; uprightness; honesty." I regret that I am unable to accept the "soundness" of the figures presented.

Altogether 14 440 ballots were received and 227 defective ballots were rejected and excluded from the count, yet the answers to question 1 total 14 201 instead of the expected 14 213. If 12 respondents failed to answer question 1 they too should have been rejected since question 1 is the key question offering the possible alternatives of questions 2 or 3.

Question 2 was to be answered only by the 2192 "no" respondents to question 1, yet there are 3513 answers. Should not the scrutineers have correlated questions 1 and 2?

Question 3 should have been answered only by the 12 009 respondents replying to question 1 with a "yes," yet there are 12 691