patients might have received a favourable bias as they tended to have aneurysm surgery earlier, and there were no postoperative deaths or rebleeding.

The restriction of my study to patients who had survived the presenting haemorrhage in a good condition was deliberate. In the past confusion has arisen because of failure to distinguish between the many deaths from effects of the first bleed, often days or weeks after reaching hospital, and those due to recurrent haemorrhage. Obviously, antifibrinolytic treatment (or surgery) can only improve mortality in the latter group. Inclusion of obtunded patients in a trial will lead to inclusion of many deaths from the first bleed, as in the study of van Rossum *et al*, where 18 patients died from the primary bleed as against only seven from rebleeding. I have already suggested in my paper that antifibrinolytic treatment might be positively harmful in patients in poor condition.

The trial of van Rossum *et al* was small. Of 51 patients admitted, only 24 proved to have aneurysms on angiography. The discrepancy with my findings may be due partly to delay in starting treatment and partly to the fact that their patients received only 4 g of tranexamic acid a day and for only 10 days. The fibrinolytic activity induced in the nervous system after a subarachnoid haemorrhage may last for much longer than this as shown in my study.

I feel that the comments of Drs van Rossum and Wintzen on the existing literature are hardly fair. Earlier studies have had a limited follow-up as the antifibrinolytic treatment was used merely as a prelude to surgery. The study referred to in my article as a "personal communication" from Dr Fodstad has now been published.² It provides further evidence for the apparent efficacy of antifibrinolytic treatment.

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¹ van Rossum, J, *et al*, *Annals of Neurology*, 1977, 2, 242.
² Fodstad, H, *et al*, *Surgical Neurology*, 1978, 10, 9.

Cervical presentation of rectal carcinoma

SIR,—We were very interested to read the case report by Dr M J Sworn and others (8 July, p 98) on "Rectal carcinoma presenting as massive metastatic involvement of foot bones." The authors commented that this was the first report of such massive metastatic disease of the foot. We would like to present another such case with the primary tumour being in the cervix.

A 52-year-old woman presented with occasional blood-stained vaginal discharge and after a normal clinical examination underwent dilatation and curettage. Histological examination of the curettings showed fragments of moderately differentiated squamous carcinoma. A further punch biopsy of the posterior vaginal wall showed infiltration by moderately differentiated squamous carcinoma obviously derived from the cervix. Treatment consisted in radical radiotherapy using two insertions of caesium and external megavoltage x-ray treatment.

Over a year later she was referred for review on account of a two-month history of increasing pain in her right foot culminating in inability to bear weight. A radiograph (see figure) showed extensive metastatic disease affecting

Extensive metastatic disease of right foot.

the whole foot, including the calcaneum, talus, navicular, cuboid, the three cuneiform bones, the five metatarsals, and with probably further deposits in the phalanges. A bone scan showed other metastatic areas of skeletal involvement—namely, the ipsilateral tibia and upper femur, pelvis, and lumbar spine. A biopsy specimen taken from the mid-tarsus showed invasive moderately to poorly differentiated squamous carcinoma fully consistent with the original tumour of cervix. The patient has recently had palliative radiotherapy to control her symptoms.

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Thyroid extract

SIR,—My friend Dr P B S Fowler (26 August, p 636) has, I think, misunderstood the letter from Dr W van't Hoff and his colleagues (15 July, p 200). The danger to which they refer is a negative one. The potency of thyroid extract is very variable and I have on several occasions seen a hypothyroid patient successfully treated with the extract who has suddenly become myxoedematous. The onset of myxoedema is often so insidious that the risk of coronary heart disease to which Dr Fowler has so often drawn our attention must in such patients be increased.

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Whooping-cough fatality rate

SIR,—Dr Dick (19 August, p 562) suggests that the fatality rate for pertussis may have diminished. He uses as his denominator notifications.

General practitioners are rightly selective in the way they choose to respond to the notification of infectious disease, and notifications are a notoriously unreliable indicator of the incidence of common diseases. The present interest in the incidence of pertussis is likely to increase the proportion of cases notified. As fatalities are always recorded an increase

in the proportion of cases notified will diminish the case fatality rate.

Until we have reliable measures of incidence we can make no valid statements regarding case fatality.

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Paracetamol poisoning

SIR,—Dr T J Meredith and others (12 August, p 478) quote from the *Mortality Statistics*¹ that in England and Wales in 1975 there were 105 deaths due to paracetamol and a further 107 due to paracetamol in combination with other drugs. It could be inferred from this statement that all these deaths were the direct result of paracetamol overdose. In table 10 of the *Mortality Statistics* it is noted that inclusion in the list does not necessarily imply that a substance was the cause of death even where solely involved. With this in mind, we have carried out a study which indicates that the recorded number of paracetamol deaths considerably exceeds the actual number which can be directly attributed to paracetamol.

The pathology of paracetamol overdose is now clearly defined with the clinical course being consequent on the extent of any hepatic damage. Death due to paracetamol overdose is primarily caused by hepatic failure and occurs some days after ingestion of the overdose.² Our study included a consideration of additional data made available to us by courtesy of the Office of Population Censuses and Surveys. These showed that evidence of hepatic necrosis was reported in only 50 out of the 105 deaths attributed to paracetamol alone. Additional information was obtained in 50 of the remaining 55 cases by courtesy of HM Coroners under whose jurisdiction the inquests were held. From this it was found that in 12 cases there was evidence of hepatic necrosis resulting in death, and in one instance hepatic necrosis was present but was not the immediate cause of death (peritonitis from perforated peptic ulcer). In the remaining 37 cases, however, death was sudden, and at necropsy the liver was regarded as normal. Twenty-five of these individuals were known to have ingested, in addition to paracetamol, other drugs, which were mainly those with a respiratory depressant action, particularly dextropropoxyphene. There is no evidence that the paracetamol contributed in any way to these deaths. The Office of Population Censuses and Surveys also provided us with additional data on a further 112 cases where paracetamol was listed together with other substances. As 84 of these people died before being admitted to hospital we consider it unlikely that paracetamol contributed to their death. Of the 28 who died in hospital, there were only two reported cases of hepatic necrosis while 20 died from the results of overdose of respiratory depressant drugs taken with paracetamol. In the remaining six cases the possibility that paracetamol was the cause of death could not be excluded.

We therefore estimate that the total number of deaths definitely attributable to paracetamol in 1975 in England and Wales amounted to 64. In 37 cases listed as due to paracetamol alone there was no evidence of paracetamol toxicity, and in 104 cases where paracetamol was taken in combination with other drugs it is unlikely

that paracetamol contributed to the death. In the remaining 12 cases information was inconclusive or incomplete.

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¹ Office of Population Censuses and Surveys, *Mortality Statistics: Accidents and Violence*. London, HMSO, 1977.

² Clark, R, et al, *Lancet*, 1973, 1, 66.

Radiology work load

SIR,—I read Dr M J Brindle's article (12 August, p 514) with much interest. I feel sure that his method of implementing the chosen solution of a static work load is as fair as is possible to all parties and that he clearly understands the points raised by Dr J D Wigdahl (2 September, p 707), but it is essential for all referring doctors to make representations about the situation rather than the radiologists alone.

Dr Brindle's department is to be more than doubled to accommodate the increased number of requests, but no additional radiologists are to be appointed to allow the rooms to be used effectively. The apparent deterioration in the service is an arrest of expansion. The reason that Dr Brindle is not to get even one additional colleague (when he needs two) is that there is a shortage of radiologists. This is not, I think, due to poor recruitment nor to lack of good training facilities but in large part to the emigration of well-trained capable radiologists. Of my contemporaries in training (all British graduates), 10 personally known to me have emigrated.

The portrait of radiology given by Dr M Lea Thomas (2 September, p 706) is depressing and his solution is, I hope, not intended to be taken seriously. There are many parts of Britain and many more places abroad where radiologists do not have the low status and dull professional life he refers to. However, radiologists are far better paid in other countries and work loads and conditions are better. Diagnostic radiology incorporating isotope and ultrasound imaging techniques is not an artificial specialty, although a specious dialectic can present it as such. It is an imaging service that provides precise anatomical and sometimes physiological information about disease processes. Sometimes it is important to know that the structures concerned are normal and an experience of radiology much wider than that attainable by a single clinician in a narrow field is necessary for this. The three imaging techniques are best provided from one department so that the shortest diagnostic path can be followed, the investigation being tailored for the individual patient. "Letting out" the subspecialties of radiology fragments this approach and many problems take longer to solve. I have no confidence in clinicians being able to take over the role of radiologists and direct radiological technicians effectively. This proposal would ensure that control of another aspect of patient management would be lost to non-medical personnel. The collapse of radiology as a specialty in the NHS would be a disaster for the patients and our clinical colleagues in both specialist and general practice.

Diagnostic radiology is an important and fascinating branch of modern medicine, well worth study in its own right, and it must be presented as such, every effort being made to

stimulate recruitment and retain all our best radiologists in Britain.

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SIR,—I was astonished to read the letter from Dr M Lea Thomas (2 September, p 706) in which he advocates the dissolution of radiology as a diagnostic specialty. Assuming that he intends this to be regarded seriously, I take issue with him on several points.

Firstly, he proposes that specialised investigations should be performed by the clinicians of the relevant specialty—cystograms by urologists, angiograms by vascular surgeons, etc. Nobody doubts the desirability of close clinical involvement in certain radiological procedures such as cardiac angiography, hysterosalpingography, and endoscopic retrograde cholangiopancreatography, and for various good reasons such tests are performed in many centres by the clinical staff without the direct assistance of a radiologist. It is, however, preposterous to argue from this that all the specialised procedures now done in x-ray departments by radiologists could be performed as safely or as competently by clinicians. A high proportion of such investigations would inevitably be performed by junior clinical staff who would have neither the time nor the inclination to achieve the degree of expertise which a full-time specialist in a subject accumulates. The skill a radiologist acquires in the manipulation of machine and patient during his training is applicable to all the investigations he undertakes and serves both to improve the quality of the images he obtains and to reduce the radiation to the patient and himself to a minimum. If all investigations were performed by clinicians acting as "part-time" radiologists the procedures would take longer, involve more radiation, and increase expenditure on x-ray film and equipment repair and replacement. It takes no great feat of imagination to contemplate the effects on expensive and delicate equipment of manipulation by dozens of different (untrained) hands every week, and the prospect of an unarbitrated scramble for precious x-ray time by the various clinical factions in a large hospital is positively mind-bending for anyone who has ever organised the work load of a busy department.

Secondly, I am sure that our clinical colleagues do genuinely appreciate the opportunity to discuss x-ray films with a radiologist and value his or her advice. This is particularly true concerning radiographs of systems other than those in which the clinician concerned specialises and even more so for junior clinical staff, many of whom take the brunt of day-to-day management decisions concerning patients.

Thirdly, how does Dr Lea Thomas imagine that any progress can be made in the science of radiology without radiologists and their established institutions continually promoting teaching and research in the subject? His world would be one of "users" only, without any contributors. Does he think that the clinicians would arrange radiological meetings and symposia and fill the radiological journals with original articles? Of course they would not, because, quite properly, they are principally interested in their own clinical specialty; radiologists on the other hand are interested in radiology as a subject in its own right, and it is from this interest that the advances in radiology stem which provide our clinical

colleagues with an ever-increasing range of diagnostic facilities.

Finally, Dr Lea Thomas says the diagnostic radiologist is overworked, underpaid, and low in status and has a dull professional life. I find it difficult to follow the logic that asserts that a specialty can at one and the same time be overworked and redundant; with regard to pay I believe radiologists earn the same salary as their clinical colleagues in the Health Service. If they don't like the NHS I am given to understand that they can obtain salaries abroad that are equal to those of practically any other specialty.

A dull life and a low status? I respectfully suggest that Dr Lea Thomas should speak for himself. It seems to me that radiology has never been more exciting, particularly with the new interventional techniques that are being introduced. As for status, every man creates his own, high or low.

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Muscle cramp and oral salbutamol

SIR,—Salbutamol is often given by mouth for the relief of chronic airflow obstruction. To discover the nature and incidence of side effects when the drug is given by this route a study was undertaken, with Dr Gillian Buchanan, of 50 patients with chronic airflow obstruction who had been taking 4 mg of the drug by mouth three times daily for a year.

The incidence of side effects was: finger tremor 42%; palpitation 20%; muscle cramp 46%; and other symptoms 6%. All were dose-but not age-related and disappeared or became less when the drug was stopped or the dose reduced. Finger tremor and palpitation are well recognised,¹ but muscle cramp is not. Patients should be warned of this possibility and doctors should know that this symptom may be due to oral salbutamol.

This rather high incidence of side effects and the fact that when taken by mouth the drug may cause metabolic effects² strengthens my view that whenever possible the drug should be given by aerosol. Then the incidence of side effects is nil, there are no metabolic effects,³ and the bronchodilator effect is equivalent to that obtained by the oral route.^{4 5}

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¹ Association of the British Pharmaceutical Industry, *Data Sheet Compendium*, p 51. London, ABPI, 1978.

² Taylor, M W, et al, *British Medical Journal*, 1976, 1, 22.

³ Neville, A, et al, *British Medical Journal*, 1977, 1, 413.

⁴ Gaddie, J, et al, *British Journal of Diseases of the Chest*, 1973, 67, 215.

⁵ Legge, J S, Gaddie, J, and Palmer, K N V, *British Medical Journal*, 1971, 1, 637.

Throwing off warts

SIR,—I read with interest your leading article entitled "Throwing off warts" (19 August, p 521), which related the difficulty most doctors have in successfully treating them. One method of treatment not mentioned is to use liquid nitrogen to "freeze" the warts and a small segment of surrounding normal skin. From my relatively small experience in this field I have concluded that the best and most