herpes simplex stomatitis he does himself an injustice.

The patient had the typical triad of an acute febrile illness, mouth ulcers, and cervical lymphadenopathy with no rash or genital ulcers and no past history of cold sores. Diagnosis was possible without laboratory investigations. The antibody titre to HSV was ≥ 1280 , and for varicella zoster (VZ) the titre was ≥ 1280 ; and it is therefore difficult to see why lack of this numerical information should cause comment when the titres had been stated as being "very high." It is recognised that in primary herpes in young adults there may be a rise in the VZ antibody titre, but the converse is not true. There is no massive rise in the HSV titre in zoster. It seems reasonable to accept these titres as confirmation of the clinical diagnosis. To suggest that the patient had concurrently both primary herpes stomatitis, which is rare in adults, and facial paralysis due to zoster (what used to be called the "Ramsay Hunt syndrome"), also uncommon, hardly strengthens Dr Juel-Jensen's case. It is unlikely that paired sera in this instance would have clarified the position. That culture was not undertaken is unfortunate not because the diagnosis needed further confirmation but because it is not known whether it was a type I or type II infection. There is some evidence, I understand, that type II infections tend to cause a rise in both HSV and VZ titres and it was a type II infection that was implicated in the only other report of Bell's palsy in association with HSV infection. Finally, Dr Juel-Jensen suggests that perhaps the mouth ulcers were unilateral and therefore due to zoster. It would seem that his reading of my report was incomplete, for it was stressed that the ulcers were generalised, a fact to which considerable importance had been attached.

Perhaps no connection does exist between HSV and Bell's palsy, but it would be wiser for the present to remain undecided rather than discount the possibility because this evidence is not consistent with a personal opinion, however authoritative its source.

P GROUT

Conwy, Gwynedd

Saliva carbamazepine levels in children

SIR,—The usefulness of saliva levels for monitoring phenytoin therapy is well established^{1,2} and recent studies indicate that it may be possible to use salivary concentrations of carbamazepine³⁻⁵ and, with more difficulty, phenobarbitone⁴ in a similar way. These studies, however, were mainly carried out on adult patients. Little is known of anticonvulsant drug pharmacokinetics in children, and the relationship between plasma level and clinical effect is usually assumed to be similar to that in adults.

We have measured plasma and saliva concentrations of carbamazepine in 15 patients aged 3-14½ years receiving long-term treatment with carbamazepine to determine whether a correlation exists in children. Mixed saliva was collected (using a mucus extractor for younger children) after stimulating flow with a few crystals of citric acid and strawberry flavouring powder placed on the tongue. Saliva samples were collected at the time of blood sampling, which was being carried out as part of routine patient management. Samples were frozen at -20°C until assayed for carbamazepine by a modification of the GLC method of Least *et al.*⁶

There was a good correlation between the saliva and plasma levels of carbamazepine ($r=0.87$, $P<0.001$), and the saliva:plasma ratio resulting, 0.30 ± 0.07 (mean $\pm$ SD, $n=17$), is similar to the saliva:plasma³ and CSF:plasma⁷ ratios in adults and to the reported free fraction of drug in adult plasma.⁴

We have used saliva levels in a preliminary study of dose frequency requirements for carbamazepine in children. Using the methods described above, serial saliva samples were obtained from children in hospital and assayed for carbamazepine. The figure shows results obtained in a boy receiving carbamazepine 400 mg twice daily for temporal lobe epilepsy.

Saliva carbamazepine concentrations after administration (arrows) of 400 mg twice daily. Circle indicates plasma carbamazepine concentration $\times 30$. Broken line indicates predicted minimum therapeutic level. Conversion: SI to traditional units—carbamazepine: $1 \mu\text{mol/l} \approx 23.6 \mu\text{g/100 ml}$.

The saliva concentration rose steadily after drug administration (2×200 mg proprietary tablets), reaching a maximum of $10.8 \mu\text{mol/l}$ ($255 \mu\text{g/100 ml}$) after 4.5 h and then declining to minimum levels of $5.6 \mu\text{mol/l}$ ($120-140 \mu\text{g/100 ml}$).

Although the therapeutic range of plasma carbamazepine levels in the treatment of epilepsy has not yet been established, we have accepted a level of $18-50 \mu\text{mol/l}$ ($425-1180 \mu\text{g/100 ml}$) to be optimum on the basis of studies relating plasma levels and clinical effects in adults.^{5,8} The equivalent range in saliva is $5.5-15 \mu\text{mol/l}$ ($130-355 \mu\text{g/100 ml}$). The saliva levels of the patient illustrated here were within this "predicted" therapeutic range and the patient was judged to be clinically well controlled before this study was carried out.

Although the patient was in a "steady state," large daily fluctuations in drug concentration were observed and illustrate how misleading a single level may be if taken at random between doses. The magnitude of the daily fluctuation is probably greater in children than in adults receiving the same dose regimen since the rate of carbamazepine elimination appears to be more rapid in the former age group. As part of a larger study the saliva half life of carbamazepine was determined in the patient described above while receiving single daily doses of the drug. The value obtained was 7.3 h and this agrees with previous findings⁹ that the rate of elimination of carbamazepine in children is greater than in adults.

In the case illustrated saliva samples taken within 1 h of drug administration gave no indication of contamination by unabsorbed drug, but when crushed tablets in orange juice were given to a 3½-year-old child con-

tamination was detected up to 1.5 h after administration.

Saliva levels appear to provide a means of monitoring carbamazepine therapy, enabling the dose to be tailored to suit individual requirements. Care must be taken, however, that there is no contamination by unabsorbed drug. This method also provides a valuable means of studying drug pharmacokinetics. Further work on carbamazepine and phenytoin dosage requirements in children (including the distribution and elimination of the active metabolite of carbamazepine, carbamazepine-10,11-epoxide) is being undertaken.

G W RYLAND
G M BUTCHER
T MORELAND

University Departments of Child Health
and of Pharmacology and Therapeutics,
Ninewells Hospital and Medical School,
Dundee

- ¹ Reynolds, F, *et al*, *Lancet*, 1976, **2**, 384.
- ² Paxton, J, *et al*, *Lancet*, 1976, **2**, 639.
- ³ Chambers, R E, *et al*, *Lancet*, 1977, **1**, 656.
- ⁴ McAuliffe, J J, *et al*, *Neurology*, 1977, **27**, 409.
- ⁵ Troupin, A, *et al*, *Neurology*, 1977, **27**, 511.
- ⁶ Least, C J, Johnson, G F, and Solomon, H M, *Clinical Chemistry*, 1975, **21**, 1658.
- ⁷ Troupin, A S, and Friel, P, *Epilepsia*, 1975, **16**, 223.
- ⁸ Morselli, P L, and Frigerio, A, *Drug Metabolism Reviews*, 1975, **4**, 97.
- ⁹ Rane, A, Höjer, B, and Wilson, J T, *Clinical Pharmacology and Therapeutics*, 1976, **19**, 276.

Shortage of anaesthetists

SIR,—All correspondents on this subject have concentrated on manning by full-time anaesthetic specialists and have chosen to ignore the large number of doctors in general practice who possess the DA, many of whom no longer administer any anaesthetics.

I have no doubt that the majority of these doctors would be willing and indeed delighted to spend a few sessions a week in the hospital confines giving anaesthetics were it not to their financial detriment to do so. I am not suggesting that these part-time (though basically qualified) anaesthetists should be carrying out thoracic or neurosurgical lists, but there is little else from which they should be barred and they could be supervised in the same manner as junior staff by their consultants.

C A N JARVIS

Parry Sound, Ontario

The other handicap: brightness

SIR,—It is encouraging to see the problems of the gifted child being brought to the attention of doctors by Mr M E Lobascher and Dr N P C Cavanagh (12 November, p 1269). Their article rightly points out the role that education authorities should, but in some cases do not, play in helping these children.

However, there is an organisation, the National Association for Gifted Children, which was formed 10 years ago specifically to aid these children and advise their parents, who are often completely bewildered by the needs of such a child. The association has branches all over the country. Besides giving advice, it holds meetings where parents can discuss their mutual problems and meetings where children can take part in a variety of intellectual and physical activities and have the chance to make friends with others of like interests and ability.

The association is always willing to give advice to and co-operate with any doctor who finds he may have one of these "other"