with permanent injury. These injuries had usually been caused by collision with other swimmers or the side or bottom of the pool rather than by the catapult effect described.

The cases described by Dr Jónasson emphasise the seriousness of injuries which may be associated with the use of this popular type of goggle which incorporates a strong elastic band. In the light of these reports the society is continuing to discourage their use during teaching sessions and proposes to seek the opinion of other organisations responsible for other aquatic activities.

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Immunisation and brain damage

SIR,—In view of the statement of Dr G Schoenewald (30 April, p 1159) that "we have no large-scale experience with either pertussis only or with diphtheria-tetanus only vaccinations" so far as vaccinal brain damage is concerned I should like to recall our data from Hamburg for the period 1961-70. Among 146 480 children immunised with diphtheria and tetanus toxoids we found only two cases of convulsions (1 per 73 445 vaccinees), while among 41 250 children vaccinated with diphtheria-pertussis-tetanus vaccine there were 19 cases of fits (1 per 2200 vaccinees).¹ The difference in the frequency of convulsions after the two types of immunisation is statistically significant (χ^2 test: $P < 0.001$). There is no doubt that figures for permanent damage due to pertussis immunisation vary from country to country: Hansen found one such event among 25 000 vaccinees in Düsseldorf² and we ourselves one among 20 600 vaccinees.¹

It is well known that neural complications following tetanus toxoid administration are extremely rare, and in a review of the literature, including our own cases, we collected only a few cases of neural complications following diphtheria toxoid immunisation.³

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¹ Ehrengut, W, *Deutsche medizinische Wochenschrift*, 1974, **99**, 2273.

² Hansen, F, in *Kolloquium über Impffragen*, Deutsche Gesellschaft für Sozialpädiatrie, Berlin, 1970, p 75. Marburg, Deutsches Grünes Kreuz, 1971.

³ Ehrengut, W, *Monatsschrift für Kinderheilkunde*, 1964, **112**, 331.

Hormonal pregnancy tests and congenital malformations

SIR,—I have read with interest Dr D T Janerich's article (23 April, p 1058) confirming the teratological effect of hormonal pregnancy tests and other exogenous sex hormone preparations in relation to congenital heart diseases.

The discovery of the teratological effect of hormonal pregnancy tests emerged from my studies into central nervous system malformations in 1967.¹ In this and in further publications on this topic²⁻⁵ the teratogenic potential of hormonal pregnancy tests has always been

referred to "congenital malformations," without specifying the type but mentioning that the observation was made on spina bifida cases as my study then included only this particular malformation. The analogous effect between hormonal pregnancy tests and the use of other exogenous sex hormone preparations in early pregnancy has been emphasised in all the above communications.

I am pleased that subsequent studies have confirmed my observation in different types of birth defects.⁶⁻¹⁰ The large variety of malformations reported by the above workers seems to be a clear indication that the teratogenic effect of hormonal pregnancy tests and other exogenous sex hormones is not specific but rather depends on the stage of fetal development when the insult occurs—probably a similar mode of action to that of many other powerful teratogens.

Therefore it would be more prudent to adhere to the above conventional teratological principle instead of using acronyms such as the VACTREL syndrome (after Nora and Nora¹¹) which might lead to confusion.

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¹ Gal, I, Kirman, B, and Stern, I, *Nature*, 1967, **218**, 83.

² Gal, I, *Nature*, 1972, **240**, 242.

³ Gal, I, et al, *Advances in Teratology*, 1972, **5**, 144.

⁴ Gal, I, *British Medical Journal*, 1975, **2**, 749.

⁵ Gal, I, Parkinson, C, and Craft, I, *British Medical Journal*, 1971, **2**, 436.

⁶ Janerich, D T, Piper, J M, and Glebatis, D M, *New England Journal of Medicine*, 1974, **291**, 697.

⁷ Levy, E P, Cohen, A, and Fraser, F C, *Lancet*, 1973, **1**, 611.

⁸ Nora, J J, and Nora, A H, *Lancet*, 1973, **1**, 941.

⁹ Harlap, S, Prywes, R, and Davies, A M, *Lancet*, 1975, **2**, 191.

¹⁰ Greenberg, G, et al, *British Medical Journal*, 1975, **2**, 191.

Quality control for drug monitoring

SIR,—Your leading article on quality control of laboratories (7 May, p 1180) highlighted the necessity for external quality control in analytical work in pathology laboratories and mentioned the national schemes for clinical chemistry, haematology, and microbiology. The lack of schemes for histopathology and immunology was pointed out, but no mention was made of an analytical field which is becoming increasingly important—namely, that of drug monitoring. There is now increasing evidence that the measurement of serum levels is invaluable in the rational use of various drugs, including the antiepileptic drugs, lithium, digoxin, antidiarrhoeals, theophylline, antibiotics, and tricyclic antidepressants. Many clinical chemistry and clinical pharmacology departments now offer a service for measuring these compounds, particularly the first three.

In general, the current techniques used for measuring drug levels are less reliable than those used in clinical chemistry, and there is the added problem of interference from other drugs or metabolites. Furthermore, there is no "normal range" of serum levels to alert the analyst to an erroneous result because levels from zero to toxic may be encountered in patients for whom standard doses of drugs are prescribed. As a result the reliability of drug analyses is poor, as has been clearly shown for antiepileptic drugs.¹ External quality control is therefore essential if the clinician is not to be misled by inaccurate results.

In 1972 I started the St Bartholomew's

Hospital quality control scheme for anti-epileptic drugs, and this has gradually expanded to include 162 laboratories in the UK, most Western European countries, and several countries outside Europe. Although it so far lacks the support of the Department of Health and Social Security, negotiations are proceeding with the Bureau de Référence, Commission des Communautés Européennes, to develop primary reference standards which can be adopted in analytical work. At a recent meeting at the University of Surrey 150 of the participants came together to discuss ways in which the scheme could be improved, and valuable guidance was given by Professor T P Whitehead, who was responsible for initiating the Birmingham scheme for clinical chemistry. In North America a similar scheme for antiepileptic drugs has been set up by Dr Charles Pippenger at Columbia University, New York.

In the future it is intended to expand the St Bartholomew's Hospital scheme to include other drugs which are being increasingly measured. Anyone interested in taking part in the scheme is invited to contact the undersigned.

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¹ Pippenger, C E, et al, *Archives of Neurology*, 1976, **33**, 351.

Lithium as a drug of abuse

SIR,—As a psychiatrist practising in various areas and subspecialties within psychiatry over the past few years it has been brought to my attention by my patients that the spectrum of drugs involved in "drug abuse," particularly by adolescents and young adults, has extended in such a way as to include drugs which doctors would generally not consider to be of much interest to drug abusers. There seems to be an increasing abuse of benzhexol (which, I am given to understand, when taken in fairly large amounts provides a short-lived experience of euphoria) while in addition to the well-known abuse of sedatives and hypnotics, particularly methaqualone/diphenhydramine (Mandrax) and barbiturates, abuse of chlorpromazine, thioridazine, and similar drugs is not at all uncommon.

Of more serious import, however, is the fairly recent (over the past two years or so) abuse of lithium preparations, both as the normal lithium carbonate tablet and also as the slow-release preparations. I have not yet been able to establish why these drugs are being used—indeed abused—by poly-drug abusers. However, in view of the fact that lithium preparations are indeed being abused in this way it is well worth alerting casualty officers and the like to the very serious consequences of the ingestion of large amounts of lithium in any form whatsoever and reminding all doctors that in a case of lithium intoxication a sodium-depleting diuretic is contraindicated—indeed, the administration of such a diuretic will make the situation considerably worse. The treatment of choice so far as I understand it at the present time is to induce an osmotic diuresis by an intravenous infusion of one-sixth molar lactate solution, though when the serum lithium level is in excess of 2.5 mmol/l peritoneal dialysis or haemodialysis may be indicated (depending on the severity of the symptoms).