hospital with chest pain due to suspected myocardial infarction were analysed for coproporphyrin concentration by the rapid screening method of Zielhuis,³ using the Donath coproporphyrinometer. Patients who gave a history of regular heavy alcohol consumption, or who were drunk at the time of admission, were excluded. Urinary coproporphyrin excretion increases with urine alkalinity,⁴ but none of the specimens had a pH greater than 7. Thirty-eight of these 50 patients had in fact sustained an acute myocardial infarct according to electrocardiographic criteria⁵ or changes in the ST segment and T wave suggestive of infarction accompanied by a significant transient rise in serum aspartate aminotransferase (S.G.O.T.) levels (>50 Reitman and Frankel units). Twenty-four of these 38 (63%) developed an abnormally high urinary coproporphyrin concentration ($>100 \mu\text{g./litre}$) within three days of admission, which returned to normal within 10 days in all cases. The other 12 patients had angina without evidence of infarction and three of these patients (25%) developed increased coproporphyrinuria. Control urine samples were obtained from 30 patients with illnesses such as peptic ulcer and chronic bronchitis, which are not known to affect coproporphyrin excretion, and all these samples were normal. The results show that this rapid method of measuring coproporphyrinuria was not a reliable means of distinguishing myocardial infarction from angina.

The cause of the increased coproporphyrinuria following myocardial infarction or ischaemia is obscure. Increased coproporphyrinuria occurs in liver dysfunction⁶ and congestive cardiac failure,⁷ but there was no correlation with clinical signs of cardiac failure in the present series, and bromsulphalein excretion (5 mg./kg. body weight) was normal in the two patients with the highest levels of coproporphyrinuria. Pyrogenic steroids such as aetiocholanolone are known to increase porphyrin biosynthesis,⁸ and this in turn might increase coproporphyrin excretion. It is possible that adrenal corticosteroids released during "stress" are metabolized to aetiocholanolone or related compounds, but in these patients there was no consistent quantitative relationship between either the severity of chest pain or the degree of pyrexia and the levels of urinary coproporphyrin reached.

Thanks are due to Professor K. W. Donald and the physicians of the Coronary Care Unit of the Royal Infirmary, Edinburgh, for allowing me to study patients in their care.

—I am, etc.,

J. L. BURTON.

University Department of
Medicine,
Royal Infirmary of Edinburgh.

REFERENCES

- 1 Eskola, O., Koskela, P., and Halonen, P. I., *Amer. Heart J.*, 1955, 49, 258.
- 2 Koskela, P., *Ann. Med. Int. Fenn.*, 1956, 45, Suppl. No. 24, p. 1.
- 3 Zielhuis, R. L., *Brit. J. industr. Med.*, 1961, 18, 58.
- 4 Bourke, E., Monckton Copeman, P. W., Milne, M. D., and Stokes, G. S., *Lancet*, 1966, 1, 1394.
- 5 World Health Organization, *Tech. Rep. Ser. W.H.O.*, 1959, No. 168.
- 6 Watson, C. J., and Larson, E. A., *Physiol. Rev.*, 1947, 27, 478.
- 7 Kämmerer, H., *Deutsch. Arch. klin. Med.*, 1949, 195, 388.
- 8 Kappas, A., *New Engl. J. Med.*, 1968, 278, 378.

Postnatal Examination

SIR,—In reply to Dr. Ian Capstick's invitation for comments regarding his recommendations for postnatal examination (8 June, p. 626) I would like to point out one serious omission.

Probably the most important aspect of postnatal examination and particularly pelvic examination is performing a cervical smear. I cite the following figures from Aberdeen: In 1965 1,116 smears were performed, 6 of which confirmed preclinical cervical cancer. In 1966 1,043 postnatal smears gave no positive results. In 1967 1,163 postnatal smears gave a pick-up of 23 atypical and 1 preclinical cancer.

I can only presume from Dr. Capstick's letter that it is possible that antenatal smears may be taken. If so, these remarks are not applicable.—I am, etc.,

WILLIAM Y. SINCLAIR.

Department of Obstetrics
and Gynaecology,
Maternity Hospital,
Aberdeen.

Postnatal Consultation

SIR,—Dr. Ian Capstick (8 June, p. 625) doubts the value of the postnatal vaginal examination. We are convinced of the value of a routine vaginal examination and cervical smear, which take only a few minutes to do. It has to be carried out in any case if the patient desires anti-ovulation pills, as so many request them at this time.

In our fairly small practice numbering some 60–80 postnatals a year we have had one case of stage I carcinoma of cervix and another of carcinoma-in-situ—the latter discovered by "Pap" smear following a miscarriage at 16 weeks. There were no symptoms in either case. Both were successfully treated at the local hospital.—We are, etc.,

J. H. WILLIS.

MOREEN C. WILLIS.

Brigg, Lincs.

Ocular Damage due to Paraquat and Diquat

SIR,—Dr. A. A. B. Swan (8 June, p. 624) suggests that the bipyridyls (paraquat and diquat) produce only superficial and relatively trivial ocular burns. Lest his letter in defence of the bipyridyls should give the impression that local damage caused by these weedkillers is trivial we would like to stress the similarity between the effect they cause on the eyes and that caused by an alkali. Since writing our medical memorandum on ocular damage due to paraquat and diquat (27 April, p. 224) we have seen several further cases in which "Preglone" Extra or Weedol solution have been splashed in the eye, and in each case, after a delay of several days, a serious superficial ocular burn had developed, which in two cases has produced corneal scarring. We have had communications from a number of general practitioners describing similar cases seen by them.

Dr. Swan adds that the labels on all liquid formulations of the bipyridyls carry the warnings: "Wear rubber gloves and face shield when handling the concentrate. Wash concentrate from skin or eyes immediately." In all of the cases seen by us, or reported to us, the concentrate has been washed immediately from the skin and eyes, but in all of these cases the inevitable ocular damage has resulted. In view of the widespread and increasing use of these weedkillers in agricul-

ture and horticulture we feel that rather than minimize their effect on the tissues Dr. Swan and Imperial Chemical Industries Limited should emphasize their dangers.—We are, etc.,

J. STANLEY CANT.

D. R. H. LEWIS.

Tennent Institute of
Ophthalmology,
University of Glasgow,
Glasgow.

Gas Gangrene and Intramuscular Injection

SIR,—In view of the recent report of a case of fatal gas gangrene complicating an injection of hyperdural adrenaline by Drs. P. W. Harvey and G. V. Purnell (23 March, p. 744) and the rarity in the literature (23 March, p. 721) I feel justified in reporting a further case.

An 18-year-old woman was referred to me on 26 December 1962 at about 9.30 a.m. complaining of a dull pain in the right thigh. Three days previously she had suffered from a severe attack of urticaria. Her doctor gave her an injection of A.C.T.H. and hyperdural adrenaline, the latter drug being injected into the right thigh. Apart from the urticaria the past history was non-contributory. On examination she looked ill and was in obvious pain. The pulse rate was 120 and the temperature 101°F . (38.2°C). In the right thigh and especially on the lateral aspect there was a large diffuse swelling which appeared to be fluctuant. There was a suggestion of underlying crepitus on palpation. An x-ray film of the thigh showed diffuse gas bubbles in the intermuscular tissue planes. A diagnosis of gas gangrene was made and 500,000 units of penicillin was given intravenously immediately.

She was taken to the operating-theatre, where under general anaesthesia a long vertical incision was made on the lateral aspect of the thigh, extending from the outer aspect of the knee joint to the anterior superior iliac spine. On incising the deep fascia the muscles bulged with considerable oozing of foul-smelling fluid and small gas bubbles. An extensive excision of necrotic muscle was done. The wound was irrigated with hydrogen peroxide and left unsutured. Liberal amounts of gauze dressings soaked in hydrogen peroxide were applied.

At the end of the operation cardiac arrest occurred. External cardiac massage failed to restore the heart beat. A left thoracotomy was made and the heart found to be fibrillating. After about two minutes of cardiac massage vigorous cardiac contractions returned and the left thoracic cavity was closed. After the operation spontaneous respirations returned but the patient did not recover consciousness.

Two hours later continuous oozing of fresh blood was noticed from the wound in the left thigh and the thoracotomy incision. She was given three units of blood, but because oozing continued she was taken back to the operating-theatre. Numerous bleeding points in the thigh wound and on the cut surface of the incised pericardium were found and controlled by diathermy and ligature. On return to the ward, although the bleeding had stopped, her blood pressure gradually fell. She died about 18 hours after admission in spite of the wound resuscitative measures.

Microscopic examination of a direct smear from the muscle tissue taken at the time of the operation showed large Gram-positive bacilli. Culture yielded a growth of anaerobic Gram-positive bacilli of the *Clostridium* group and a scanty growth of anaerobic haemolytic *Staphylococcus aureus*. Microscopical examination of sections of muscle removed at the operation showed an acute pyogenic infiltrate throughout the muscle and innumerable clostridia in all components of the tissue.