non-immune rosette formation are the facts that a relatively large proportion of lymphocytes of unimmunized animals participate in the reaction, and that thymocytes are more active than non-thymic lymphocytes.

The proportion of human lymphocytes which adhere to sheep red cells is often relatively large in non-immunized human subjects, and human fetal thymocytes are more active than peripheral lymphocytes.⁹ The adherence of non-immunized human lymphocytes to sheep red cells is therefore likely to occur through non-immune rather than immune mechanisms. The adherence probably occurs through fortuitous cross-reactivity of sheep red cells with human lymphocyte surface receptors concerned with an autologous non-immune adherence.—I am, etc.,

ISRAEL SIEGEL

The Roosevelt Hospital,
New York, N.Y.

- 1 Zaalberg, O. B., *Nature*, 1964, **202**, 1231.
- 2 Siegel, I., and Christy, N. P., *Federation Proceedings*, 1972, **31**, Abstract No. 2932.
- 3 Siegel, I., *Cellular Immunology*, in press.
- 4 Siegel, I., *Journal of Immunology*, 1970, **105**, 879.
- 5 Siegel, I., *Journal of Allergy*, 1970, **46**, 190.
- 6 Siegel, I., and Sherman, W. B., *Journal of Allergy and Clinical Immunology*, 1972, **50**, 65.
- 7 Siegel, I., *Journal of Cell Biology*, 1970, **47**, 191a.
- 8 Jondal, M., Holm, G., and Wigzell, H., *Journal of Experimental Medicine*, 1972, **136**, 207.
- 9 Wybran, J., and Fudenberg, H. H., in *Transactions of the Association of American Physicians*, 1971, **84**, 239.

Major Accident Teams

SIR,—To my surprise the one member of the consultant staff not included in Mr. P. E. A. Savage's major accident action card (1 July, p. 42) is the ophthalmologist. Some 15 years ago an explosion in a coal mine resulted in about 20 patients being admitted to the Victoria Hospital, Burnley, where, thanks to the presence of the orthopaedic surgeon, a major accident procedure had been instituted. Every one of these patients had eye injuries.—I am, etc.,

K. R. BROWN

Malta, G.C.

Activated Charcoal in Tricyclic Drug Overdoses

SIR,—The letter by Dr. J. L. Crammer and Dr. B. M. Davies (26 August, p. 527) calls for comment. It is stated, without reference, that tricyclic drugs undergo enterohepatic circulation and that "large amounts are secreted into the bile and delivered into the duodenum." The importance of being certain that "large amounts" of the active drug are excreted in the bile lies in the fact that if such secretion did occur then there would be a temptation to undertake biliary drainage as an emergency measure in the management of acute tricyclic poisoning.

At one time biliary drainage was considered an acceptable measure in severe acute glutethimide (Doriden) overdose¹ on the assumption, since discounted, that substantial enterohepatic circulation of the active drug occurred. Other heroic measures in tricyclic poisoning included gastrostomy undertaken by French toxicologists with no operative mortality but a death rate of 50% in 16 patients.² The procedure has understandably been discontinued.

Drs. Crammer and Davies also make an

inaccurate statement about the effect of activated charcoal on aspirin ingestion. They state "activated charcoal was shown to prevent the absorption of aspirin from the human gut." As your leading article in the same issue (p. 487) points out, activated charcoal does no more than reduce absorption of salicylate, the degree of reduction depending on a number of factors. It has never been claimed that prevention of absorption will be achieved.—I am, etc.,

HENRY MATTHEW

Regional Poisoning Treatment Centre,
Royal Infirmary,
Edinburgh

- 1 Maher, J. F., Schreiner, G. E., and Westervelt, F. B., *American Journal of Medicine*, 1962, **33**, 70.
- 2 Gaultier, M., Fournier, E., Gervais, F., Dalayun, J., and Frejaville, J. P., in *Deuxième Congrès Européen des Centres de Lutte Contre les Poisons*, 1966, p. 17. Paris, Masson et Cie, 1967.

SIR,—The communication of Dr. J. L. Crammer and Dr. B. M. Davies (26 August, p. 527), which was brought to our attention only in October, has prompted us to submit some preliminary results obtained by us.

Early this year we considered activated charcoal as a means of intercepting the enterohepatic circulation of imipramine and its active metabolite desipramine. We compared levels of imipramine plus desipramine in hearts, lungs, and livers of control rats and of rats pretreated with activated charcoal after parenteral infusion of imipramine (approximately 3 mg/kg intravenously and 10 mg/kg intraperitoneally). The parenteral route was chosen to prevent adsorption of imipramine to charcoal before intestinal absorption had occurred. Imipramine plus desipramine was determined by the method of Wallace and Biggs¹ using an improved extraction procedure according to Maes.²

We often found a lowering of the organ concentrations in the pretreated group, suggesting immobilization of part of the imipramine dose. The concentration ratios pretreated/control are shown in the Table. Owing to a large biological variation not all experiments yielded significant results. Equilibrium dialysis with charcoal showed a near quantitative binding at pH 7.4 in the concentration range 0.50 µg/ml under our conditions, 1 mg activated charcoal adsorbing 1.25 mg imipramine at 50 µg/ml. We are now changing the design of our animal experiments to obtain more clear-cut results.

	Intravenous Infusion			Intraperitoneal Infusion		
	A	B	C	D	E	F
Heart ..	0.54*	0.90	0.70	0.47*	1.00	0.92
Liver ..	0.60*	0.94	0.85	0.76	1.10	1.10
Lungs	0.72*	0.70*	0.75	0.74	0.84	0.66*

*Significant at the 0.05 level.

Even if binding is not quantitative and irreversible the resulting levelling off of the imipramine load on the target organs may improve the prospects of patients with imipramine poisoning. On the basis of these preliminary results the National Poison Control Centre in the Netherlands now stresses the use of activated charcoal even in cases where absorption of the tricyclic anti-

depressant dose may well be complete before therapy is started.—We are, etc.,

A. G. RAUWS
J. VAN NOORDWIJK

National Institute of Public Health,
Bilthoven, the Netherlands

- 1 Wallace, J. E., and Biggs, J. D., *Journal of Forensic Sciences*, 1969, **14**, 528.
- 2 Maes, R., 1972, personal communication.

Hormones in the Treatment of Psychoses

SIR,—I believe the neurophysiological matrix of tension and depression is a central functional organizational scheme related to stress and increased drives, while the neurophysiological matrix of schizophrenia is a central functional organizational scheme related to reduced stress and drives. It seems that the hippocampus and the pineal gland are related to the second functional scheme, and the biochemistry of the pineal is related to that of schizophrenia. I believe, further, there are some hormones which affect these functional schemes of adaptive behaviour. In recent years in my outpatient practice I have found that Choriogonin (chorionic gonadotrophin) is effective in the treatment of affective disorders and tension with depression. I used this hormone in doses of 1,500 I.U. to 3,000 I.U. daily, using four or more injections for a course.

Oxytocin had a favourable effect in the treatment of acute schizophrenia and, in a less degree, in the treatment of chronic schizophrenia. I used 10 I.U. to 15 I.U. of oxytocin intravenously (with 10 ml to 15 ml of glucose) or 20 I.U. to 25 I.U. of oxytocin intramuscularly (one daily injection); the course is six to ten injections. I observed some rapid therapeutic effects and, then, some hospitalizations were prevented. It seems that prolactin has also some antipsychotic effect (25 I.U. daily).—I am, etc.,

W. BUJANOW

Vyborg Mental Dispensaire
Leningrad, U.S.S.R.

Spironolactone and Ammonium and Potassium Chloride

SIR,—In a programme of intensive drug monitoring we have found a possible interaction between spironolactone, ammonium chloride, and potassium chloride.

The patient, a 58-year-old woman with paralysis due to a compression fracture of the D 8 and 9 vertebrae and extradural compression of the cord, required an indwelling catheter and urinary antiseptics. Treatment with digoxin and frusemide for mild congestive heart failure was continued after admission, and potassium supplements were given as potassium chloride (about 50 mEq/day). The plasma potassium fell slowly to reach 2.9 mEq/l. 14 days after admission. Frusemide was discontinued and spironolactone, 25 mg four times a day, substituted. The potassium chloride was continued, and a week later ammonium chloride 4 g/day together with methenamine mandelate was started.

At the beginning of spironolactone treatment plasma sodium was 140 mEq/l., plasma potassium 4.1 mEq/l., plasma CO₂ content 28 mEq/l., and blood urea 28 mg/100 ml. Twenty days after beginning ammonium chloride the patient's condition deteriorated and she appeared acidotic. All drugs were stopped. On this day the plasma sodium was 120 mEq/l., plasma potassium 5.7 mEq/l., plasma CO₂ content 13 mEq/l., blood urea 24 mg/100 ml, plasma

creatinine 1.0 mg/100 ml, arterial pCO_2 33 mm Hg, and arterial pH 7.30. The acidosis was corrected, but two days later the patient died with bronchopneumonia. At no time were the blood urea or creatinine levels raised.

A 4 g/day-dose of ammonium chloride should not in itself cause acidosis in a patient with adequate renal function and no other contributory factors. Spironolactone is an aldosterone antagonist and patients with aldosterone deficiency due to adrenal disease commonly develop metabolic acidosis.¹ Studies in dogs have indicated that the acidosis of aldosterone deficiency is the consequence of impaired distal hydrogen ion secretion.² Thus possibly the long-term administration of an acidifying drug like ammonium chloride to a person being treated with spironolactone may overtax the impaired ability of the kidney to excrete acid and therefore result in an acidosis. Furthermore, increase in plasma potassium concentrations should result in the extrusion of H^+ ions from the intracellular fluid into the plasma.³

There were therefore three factors tending to produce acidosis in this patient: (1) increased acid load owing to ammonium chloride administration; (2) possibly a decreased ability of the kidney to excrete H^+ ions owing to the aldosterone-antagonist effect of spironolactone; and (3) increased acid load resulting from hyperkalaemia due to concurrent administration of spironolactone and potassium chloride. To what extent each of these factors was involved in producing the acidosis in this case cannot be known. However, it shows the hazards of administering a potassium supplement with a potassium-sparing diuretic, and seemingly caution should be also taken when administering an acidifying drug with spironolactone.—We are, etc.,

M. L. MASHFORD
M. B. ROBERTSON

Austin Hospital,
Heidelberg, Victoria, Australia

¹ Bondy, P. K., in *Duncan's Diseases of Metabolism*, ed. P. K. Bondy, Vol. II, p. 855. Philadelphia, W. B. Saunders, 1969.

² Kurtzman, N. A., White, M. G., and Rogers, P. W., *Journal of Laboratory and Clinical Medicine*, 1971, 77, 931.

³ Cooke, R. E., Segar, W. E., Cheek, D. B., Coville, F. E., and Darrow, D. C., *Journal of Clinical Investigation*, 1952, 31, 798.

Accident Flying Squad

SIR.—A five years' experience in Cumberland has convinced me that medical care for the injured and seriously ill outside the hospital is well worth while and that in a widely scattered area the patient is best served by having the services of both a general-practitioner based and a hospital-based service. A well equipped and properly trained general practitioner with radio communication can be at the site of an accident as soon as the other rescue services and can initiate treatment. If the problem is one requiring complicated or difficult procedures the assistance of a senior hospital doctor is of value not only because he is practised but also because more than one doctor is necessary to carry out some manoeuvres. Also the general practitioner may be more than 40 miles from a hospital and if he can hand over to a hospital team en route it allows him to return to his own practice.

While the early resuscitation and care of

the most seriously injured is clearly of importance I think it is presumptuous to suggest that lives have been saved in this way, and I believe we should concentrate more on the other benefits of roadside medical care. These would include the following: (1) Closer personal links between the hospital accident and emergency staff and the rescue service personnel. Each would learn the other's problems at first hand, and the hospital staff could provide more realistic training for ambulance, fire, and police personnel. (2) A doctor at the accident known to be well-equipped and trained (whether he be general practitioner or hospital doctor) allows the rescue services to concentrate on their primary task of releasing trapped casualties. Doctors and rescue-service personnel working together has resulted in many improvements in rescue techniques. (3) The existence of an active hospital-based unit in routine use, with a well worked out radio communication system, is much more likely to be of value in the event of a major disaster than the teams which exist only on paper in many hospital major disaster schemes. (4) Finally, the presence in the ambulance of a doctor who can initiate resuscitation and early observation of his patient allows the journey to hospital to be unhurried. This results in less anxiety for all concerned—not least the patients and their relatives.

There is a need for all those interested in this activity to pool their expertise and experience—and, indeed, a start has been made in this direction under the auspices of the Medical Commission on Accident Prevention.—I am, etc.,

P. A. M. WESTON

General Hospital,
Nottingham

Enormous Chondroma

SIR.—A 71-year-old woman presented with a huge tumour arising from the index finger of her left hand (Fig. 1). An accurate history

FIG. 1

was difficult to obtain, but it seemed that she had had the tumour since childhood and possibly from birth. Certainly her general practitioner had known about it for many years and had often tried, unsuccessfully, to persuade her to have it removed. She eventually agreed to go to hospital because the tumour was increasing in size.

The tumour together with the left index finger and half of the index metacarpal bone were removed under general anaesthesia. The postoperative appearance is shown in Fig. 1.

The pathologist's report was as follows: "The tumour was approximately 10 cm in diameter and appeared to have replaced most of the phalanges except the terminal portions of the first and third. The cut sur-

FIG. 2

face showed a greyish translucency and a patchy, gritty appearance. Sections show a chondroma with patchy calcification. The section examined shows no histological malignancy."

I have not been able to find a similar case in the medical literature.—I am, etc.,

R. H. V. HAFNER

London W.1

Lumbar Disc Problems

SIR.—I would like to reply to Dr. J. H. Cyriax (23 September, p. 769) both for the specific point that he raises and because backache is too common and important for the idea to be perpetuated that it demands active treatment in all cases. I believe the fundamental requirement is to remove by education the idea that backache is a mysterious condition requiring in all instances professional intervention.

I lay no claim for any originality in stating that the common cause of low back pain is a sprain of the joint complex between either the fourth and fifth lumbar vertebrae or between the fifth lumbar vertebra and the sacrum. This occurs either from one specific injury or from a series of minor stresses, as in a postural back strain. The force required to cause the sprain will depend upon the strength and stability of the structures forming the complex joints between the vertebrae and upon the strength and control of the supporting muscles of the back, belly, and buttocks. Their strength and stability vary widely with age and previous injury. One of the weak links in the articulation is wearing posterior joints. I have already stated (26 August, p. 529) that it is indeed fortunate that with increasing age the degree of stability of the lower lumbar spine increases by increased osteophyte formation, dehydration of the intervertebral disc, and scarring. Since with age the stresses decrease this combination leads to a smaller incidence of acute and chronic back strains in the 60s.

A sprain of the lower lumbar region does not differ from a sprain of an ankle, save that the articulation sprained is more complex and is surrounded by muscle and is near important nerves. If the sprained back