has to be calculated from the erythrocyte counts and the haematocrit.

Studies on 500 healthy persons indicate that the older age groups, regardless of sex, have higher M.C.V. than the younger age groups. It is quite conceivable that anoxia produced by chronic lung troubles in older age groups, though asymptomatic clinically, may have produced larger M.C.V., as has been observed by Surgeon Commander Lambert and Mr. Morris, who stated smokers have larger M.C.V. than non-smokers. I am puzzled, however, by the fact that there is no sex difference in the studies done here. It appears to me that there are more smokers in the male group than in the female group (and therefore the M.C.V. should be larger in the male than in the female group). No age differences were observed of haemoglobin or haematocrit values by our studies.

The M.V.C. of 500 Healthy Individuals According to Sex and Age Groups

Age Group	Male	Female
16-19 ..	89.5 ± 8.6	89.6 ± 7.6
20-29 ..	90.0 ± 8.7	90.4 ± 8.9
30-39 ..	91.9 ± 6.7	91.2 ± 12.4
40-49 ..	92.5 ± 9.4	91.6 ± 8.7
50 and above	93.0 ± 10.3	93.1 ± 8.7
Average ..	91.4 ± 9.2	91.3 ± 9.4

Each group consists of 50 individuals.

The Difference of the M.C.V. in Different Age Groups

Age Group	16-19	20-29	30-39	40-49	50 and above
20-29	d: 0.46 t: 0.528 p > 0.5				
30-39	d: 2.36 t: 3.049 p < 0.005	d: 1.90 t: 2.429 p > 0.02			
40-49	d: 3.02 t: 3.321 p < 0.005	d: 2.56 t: 2.793 p < 0.01	d: 0.66 t: 0.801 p > 0.4		
50 and above	d: 3.50 t: 3.660 p < 0.001	d: 3.04 t: 3.157 p < 0.005	d: 1.14 t: 1.302 p > 0.1	d: 0.48 t: 0.481 p > 0.8	

Each group consists of 50 healthy male individuals.
d: Difference of the means.
t: Student's t
p: Probability

These studies also indicate that the M.C.V. by the Coulter S is higher than the generally accepted values: 82-92 μ^3 ,² or 76-96 μ^3 .³ The larger M.C.V. values by the Coulter S have also been observed recently by Silver and Frankel.⁴ Their values range 83.6 to 99.2 μ^3 on 200 determinations of male and female blood donors and student nurses. The lower M.C.V. values by the manual methods appear to be due to less precise determinations of the erythrocyte counts.—I am, etc.,

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- 1 Sharp, A. A., and Ballard, B. C. D., *Journal of Clinical Pathology*, 1970, 23, 327.
- 2 Wintrobe, M. M., *Clinical Hematology*, 6th edn. Philadelphia, Lea and Febiger, 1967.
- 3 DeGruchy, G. C., *Clinical Hematology in Medical Practice*, 2nd edn. Philadelphia, F. A. Davis, 1964.
- 4 Silver, H., and Frankel, S., *American Journal of Clinical Pathology*, 1971, 55, 438.

Mandarin Nail Syndrome

SIR,—From time to time changes in cosmetic practice bring their own bad effects on the hair, skin, and nails to those who follow the current trends. Recently I have seen several patients, both young and older women, who present with painful lesions of one or more nail beds, generally associated with some discoloration extending in variable distances from the free margin of the nail to the lunular. At times the nail plates are shed.

This is often mistaken for an infection of the nail plate by fungus, yeast, or mould, though no micro-organisms are recovered. Needless to say, systemic or local treatment will not help in any way, because the changes are brought about through purely mechanical means. The long nail acts as a lever and promotes a force great enough to rupture the connexion between the nail bed and the nail plate, and often produces small haemorrhages as well. This process is frequently repeated, and the separation of the nail plate from the bed progresses until the nail may be lost.

The treatment is obvious: the nail should be cut very short to minimize further damage to the nail bed. Filing should be avoided, and the patient reassured that the nails will grow out normally when they are given a chance.—I am, etc.,

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Action of Disodium Cromoglycate

SIR,—In a recent review of the possible mechanisms of action of disodium cromoglycate Cox¹ has pointed out that a conflict of opinion exists concerning the ability of the drug to alter the sensitivity of the airways of asthmatic subjects to challenge with histamine. Altounyan² in adults and Dickson³ in children have both shown that the fall in forced expiratory volume in one second (FEV₁) after a histamine aerosol was diminished after a period of regular treatment with disodium cromoglycate. Recently, however, Ryo and colleagues⁴ failed to demonstrate any significant effect when the drug was given either chronically or acutely before histamine challenge in adult asthmatics. I have obtained similar evidence in childhood asthmatics who were being investigated during a clinical trial of disodium cromoglycate.

Forty asthmatic children who had taken no drugs for the previous eight hours each inhaled histamine acid phosphate solution (0.03 or 0.1%, according to previously determined sensitivity) for two minutes from a Wright's nebulizer. FEV₁ was measured before and at ½-1 minute intervals after the challenge. When the FEV₁ had returned to the initial value a capsule was administered in a single-blind fashion, either of disodium cromoglycate or of a placebo (lactose with sodium sulphate). After 10 minutes histamine challenge was repeated. Histamine sensitivity was diminished both by disodium cromoglycate and by placebo (see Table) but the difference between the two forms of treatment was not significant. There was a diminution in the fall in FEV₁ of 35% after placebo and of 34% after disodium cromoglycate. Thus the effect of disodium cromoglycate was no greater than the effect of a placebo.

Mean Fall in FEV₁ (%) after Histamine Aerosol

Control	Placebo	Control	D.S.C.G.
46.0	30.0	34.0	22.5
t = 3.22	t = 3.96		
n = 7	n = 33		
p < 0.01	p < 0.001		

The results of this study and that of Ryo and colleagues⁴ differ from those of Altounyan² and Dickson,³ suggesting that there may be a difference between the modes of action of disodium cromoglycate given acutely and chronically. The present study also differs from that of Kerr and his colleagues,⁵ who found that the effect of intravenous histamine on airways was diminished by disodium cromoglycate. This would suggest that the mechanism of action of intravenous histamine on the lung is different from that of the inhaled drug, and that it might be more profitable to explore this difference than to assume, as do Kerr and his colleagues,⁵ that a difference does not exist.—I am, etc.,

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- 1 Cox, J. S. G., *British Journal of Diseases of the Chest*, 1971, 65, 189.
- 2 Altounyan, R. E. C., in *Disodium Cromoglycate in Allergic Airways Disease*, ed. J. Pepys, and A. W. Frankland. London, Butterworths, 1970.
- 3 Dickson, W., in *Disodium Cromoglycate in Allergic Airways Disease*, ed. J. Pepys, and A. W. Frankland. London, Butterworths, 1970.
- 4 Ryo, U. Y., Kang, B., and Townley, R. S., *Journal of Allergy*, 1971, 47, 96.
- 5 Kerr, J. W., Govindaraj, M., and Patel, K. R., *British Medical Journal*, 1970, 2, 139.

Head Injuries in Children

SIR,—From the prominence devoted to benign intracranial hypertension in your leading article (22 January, p. 196) it is clear that you consider this condition to have a close relationship with head injury. The reasons for your belief have not been given. Scant support for it is to be found in Grant's paper¹ from which you quote. The contention that air studies are unnecessary in children with benign intracranial hypertension begs the question, for how can a firm diagnosis be made without the measurement of intraventricular pressure and gas replacement?

Dr. J. H. Burkinshaw (5 February, p. 378) raises other issues. Of course clinical observation of the head-injured patient is of vital importance, but skull radiographs may give useful information which cannot be obtained by other means. In particular, it must be stressed that anticipation of complications after head injury is more than half the battle, and anything which helps is to be welcomed. One of Dr. Burkinshaw's two (and only two) indications for routine skull radiography is "to confirm a clinical diagnosis of depressed fracture of more than trivial degree." This is dangerous stuff. Very occasionally there may be an obvious dent in the head over a depressed fracture, but much more commonly there is a haematoma which effectively conceals what is underneath. Why can routine skull radiography help in management? The following are a few conditions which can be demonstrated by this investigation:

(1) A fracture line crossing the course of a meningeal artery or dural venous sinus. In

such a case the risk of extradural haemorrhage is obvious.

(2) A fracture line crossing a paranasal sinus or the cribriform plate, alerting one to the risks of intracranial infection.

(3) The presence of air within the cranial cavity, providing evidence of a fistula between the subarachnoid space and the exterior.

(4) A fracture under an apparently trivial scalp wound making a compound fracture out of a seemingly innocent condition.

(5) Angulation of a bone fragment suggesting dural penetration.

Occasionally, unexpected dividends result from routine skull radiography. In the last six months in this centre my neuroradiological colleague has picked up one case of craniopharyngioma with suprasellar calcification and another of cerebellar tumour with suture diastasis, both previously unsuspected.

I am more than happy to answer for myself the question in the first sentence of the last paragraph of Dr. Burkinshaw's letter. Skull radiography is complementary to clinical observation and is an essential part of the examination of the patient with a head injury.—I am, etc.,

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¹ Grant, D. N., *Archives of Disease in Childhood*, 1971, 46, 651.

The Haemoglobinopathies

SIR,—Because the article (5 February, p. 363) by Dr. G. W. G. Bird on haemoglobinopathies is so eminently useful and will be widely referred to, I would like to point out an error. Sickling is only caused by a haemoglobin with a β -chain which has in its sixth position a valine instead of a normally found glutamic acid. These are sickle-cell haemoglobin itself and another haemoglobin, known either as C Harlem or as C Georgetown, which has the same mutation in the β -chain as sickle-cell haemoglobin but in addition a substitution aspartic acid $\rightarrow$ asparagine in position 73. Haemoglobin Memphis, I, Barts, F, etc., do not in fact cause sickling.—I am, etc.,

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The Red Cell

SIR,—Dr. G. W. G. Bird (29 January, p. 293) states that "the passage of water through the cell membrane is not a simple matter of osmosis as was once believed; it is exceptional for cells to be in osmotic equilibrium with their environment . . . the cell has an active water transport system, which pumps water out of the cell."

These statements are not in accordance with recent work. It seems possible that they may have been based on some erroneous determinations of the freezing point of intracellular fluids which were current in the 1950s and which seemed to show hypertonicity in intracellular fluids. These determinations were, however, decisively disproved by several authors¹⁻³ who showed that intracellular and extracellular fluids have the same osmotic pressure.

All recent studies of shrinking and swelling in erythrocytes⁴⁻⁷ have shown that the

movement of water in and out of red cells is fundamentally osmotic in nature although there are considerable complications in regard to the osmotic pressure exerted by haemoglobin within the red cell. What is clear is that the osmotic pressure of haemoglobin is not simply proportional to its concentration, so that the effect of haemoglobin in the red cell is to limit the changes of volume which follow changes in the osmotic pressure of the plasma—for example, a 25% increase in plasma electrolytes such as can occur in hypernatraemic conditions will be followed by only a 16% shrinkage in red cell volume. This is a significant mechanism for the preservation of cellular volume, but it is wholly osmotic in nature.—I am, etc.,

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Department of Anatomy,
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- 1 Buckley, K. A., Conway, E. J., and Ryan, H. C., *Journal of Physiology*, 1958, 143, 236.
- 2 Appelboom, J. W. T., Brodsky, W. A., Tuttle, W. S., and Diamond, L., *Journal of General Physiology*, 1958, 41, 1153.
- 3 Maffly, R. H., and Leaf, A., *Journal of General Physiology*, 1959, 42, 1257.
- 4 Dick, D. A. T., and Lowenstein, L. M., *Proceedings of the Royal Society, B*, 1958, 148, 241.
- 5 LeFevre, P. G., *Journal of General Physiology*, 1964, 47, 585.
- 6 Gary-Bobo, C. M., and Solomon, A. K., *Journal of General Physiology*, 1968, 52, 825.
- 7 Dick, D. A. T., *Journal of General Physiology*, 1969, 53, 836.

Raised Protein in C.S.F. in Hypertonic Dehydration

SIR,—A recent report¹ has recorded two instances of extreme elevation of cerebrospinal fluid protein in association with hypertonic dehydration, in the absence of any gross neurological abnormalities. The suggestion was made that vascular damage caused by hypernatraemia had allowed protein to leak from the damaged blood vessels to the brain parenchyma, and then to the C.S.F. We would like to record a similar case which we have recently observed.

A 2-month-old boy was admitted on 29 August 1971 because of irritability and anorexia. He had been well until the previous day, when he became irritable, pyrexial, and had developed diarrhoea. On examination at the time of admission he was found to be a very ill, dehydrated, and acidotic infant with a sunken fontanelle. Temperature was 36.7°C and weight 2.89 kg. Both lungs were clear and there was no heart murmur. He was moving all four limbs, and no neurological defect was apparent. Blood culture was sterile and a rectal swab grew no pathogenic organisms.

Initial biochemistry was plasma Na 162 mEq/l., K 5.6 mEq/l., Cl 140 mEq/l., CO₂ content 13 mEq/l., and urea 168 mg/100 ml. Capillary pH was 7.12, base excess 17 mEq/l., and Pco₂ 38 mm Hg. A lumbar puncture was performed and clear fluid under normal pressure was obtained. Pandey's test was positive, and the C.S.F. protein was 410 mg/100 ml. C.S.F. sugar was 80 mg/100 ml. The C.S.F. contained 3 W.B.C./mm³ and was sterile on culture.

The baby was rehydrated with 5% dextrose in quarter-strength saline. A 10-day course of intramuscular kanamycin was given. The child improved rapidly, and at no time was there any suspicion of neurological pathology such as subdural haematoma or cerebral haemorrhage. A repeat C.S.F. examination was undertaken 11 days

after admission, when the C.S.F. protein was found to be 54 mg/100 ml. Sugar content was 56 mg/100 ml; the C.S.F. contained 90 R.B.C./mm³ and was sterile on culture. The child was discharged well 12 days after admission.

We have surveyed the records of children with hypertonic dehydration admitted to one of the units of this hospital over the period 1968-71. A total of 71 cases were admitted, and 30 children had lumbar puncture and C.S.F. protein estimation. The range of protein levels was 22 mg/100 ml to 68 mg/100 ml.

We would be interested to know of any other instances or explanations of extreme elevation of C.S.F. protein in association with hypertonic dehydration.—We are, etc.,

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¹ Shavwitz, B. A., *American Journal of Diseases of Children*, 1970, 120, 84.

Vasectomy

SIR,—Mr. Philip Whitehead (Derby, North, Lab.) in moving the second reading of the National Health Service (Family Planning) Amendment Bill is reported as saying that: "the Bill dealt with vasectomy only, which was cheap, simple, and 100% reliable" (29 January, p. 321). It is reasonably cheap and perhaps usually simple, but in the experience of the Medical Protection Society it is certainly not 100% reliable, for the Society has had reported to it several cases where the operation has been unsuccessful.—I am, etc.,

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Hospital Staffing

SIR,—At this time the question to be asked is: Can a busy acute unit admitting and dealing with seriously ill patients be manned for any amount of time by only a preregistration doctor with supervision at a distance by a consultant, who may be busily engaged elsewhere or may be living 10 miles (16 km) from the hospital in question? To anyone engaged in clinical practice the answer is patently obvious, but to the non-clinical doctors manning the Department of Health the problem seems to have been completely disregarded over the last few years. Despite the protestations from responsible doctors in some hospitals no effort has been made to provide patients with proper care by experienced junior staff. The irresponsible registrar freeze continues.

We are all awaiting the commencement of the Central Manpower Committee, but there is considerable concern throughout the country that this fundamental issue of proper staffing by experienced junior doctors is to be ignored, with the sole effort being made to provide a career structure with early consultant grading.

Again it is emphasized that over half of the junior staff are from overseas and require registrar posts not only for their theoretical and practical training but also to allow them to take various specialist qualifications. Is this postgraduate training for these doctors to be curtailed?

I think now is the time for the Depart-