

Normal full-term infants require about 100 IU of vitamin D daily to prevent rickets and premature infants about 200 IU. The adult requirements may be so low as to be met by the amount in unfortified foods and exposure to sunlight.<sup>2</sup> A survey of American children (newborn to 17 years) showed that half ingest 400-800 IU daily; almost 10% consistently consume over 1000 IU daily.<sup>3</sup>

In contrast, in the past half-century magnesium intakes have fallen, whereas dietary contents of protein, fat, sugar, and calcium have risen.<sup>4</sup> High intakes of these nutrients, and of vitamin D, increase magnesium requirements and increase susceptibility to magnesium deficit.<sup>5,6</sup> Metabolic balance studies indicate that Occidental magnesium intakes are suboptimal.<sup>7</sup> The cardiovascular and renal lesions of experimental magnesium deficiency and experimental hypervitaminosis D are similar, as are those of infantile hypercalcaemia, an outbreak of which in England was related to excessive vitamin D—2000-4000 IU daily.<sup>6,8</sup> Increased magnesium intakes protect against cardiomyopathy produced by many agents, including excessive vitamin D.<sup>5,9</sup>

It may be the combination of excesses of most nutrients, with the exception of magnesium, that contributes to the high incidence of ischaemic heart disease in the industrialized countries. Perhaps the amount of magnesium provided by hard water<sup>10</sup> may be sufficient to correct a marginal deficit, thereby contributing to the lower death rates from ischaemic heart disease in hard-water than in soft-water areas.—I am, etc.,

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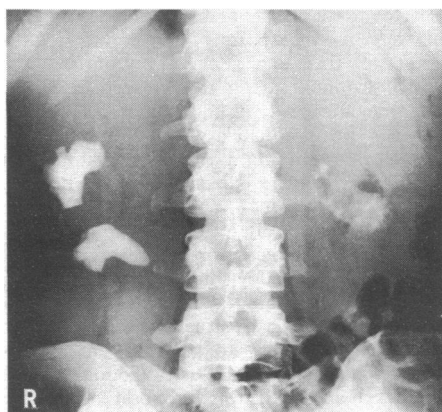
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### Wandering Gall Bladders

SIR,—I noted with interest your leading article (26 July, p. 193) and would like to report a further variation of the "left-sided gall bladder."

A 34-year-old woman presented at the outpatient clinic with a three-month history of epigastric pain, nausea, and vomiting. On examination she was found to have a large, mobile, non-tender mass in the right loin. Intravenous pyelography was performed but the preliminary plain abdominal film (see figure) provided the basis for the diagnosis. The pyelogram suggested that the three opacities seen on the right side of the abdomen in the plain x-ray were renal calculi lying in a large non-functioning right kidney. The oval opacity lying to the left of the third lumbar vertebra



and containing multiple filling defects was shown on the pyelogram to lie anterior to a normally functioning left kidney. An oral cholecystogram showed concentration of the dye in the oval opacity and confirmed it to be a gall bladder containing limey bile and multiple radiotranslucent gall stones. An erect film of the abdomen showed the stomach bubble to lie on the left side of the abdomen and thus discounted the possibility of complete situs inversus.

At laparotomy a huge hydronephrotic right kidney was found to have rotated the liver through 180° around the axis of the falciform ligament, bringing the gall bladder into a left-sided position. Right nephrectomy and cholecystectomy were performed, the kidney containing three calculi and the gall bladder multiple calculi of the mixed type.

Cholelithiasis occurs in 7-15% of the population of the United Kingdom,<sup>1</sup> some 10% of these stones being radio-opaque. Limey bile is a rare finding during biliary tract radiology with an incidence quoted as low as only one case in 6700 gall bladder examinations.<sup>2</sup> Urinary tract calculi develop in 2-3% of the population of the Western world, of which 90% will be radio-opaque.<sup>3</sup> The finding of a false left-sided gall bladder is a rare occurrence in itself, but for the diagnostic features detailed above to be present on a single plain abdominal radiograph seems extraordinary. Incidentally, no abnormality in the patient's calcium metabolism could be demonstrated.—I am, etc.,

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### Wastage from Training in Radiology

SIR,—A survey has recently been completed into the numbers of doctors leaving radiology either during or immediately after training. The survey was carried out retrospectively by asking the consultants in charge of training departments in the United Kingdom and Eire for the numbers of doctors entering training in the years 1968-73 inclusive and the numbers known to have left radiology. The overall wastage rate was 11% with some regional variations (see table).

At the end of 1973 there were 653 consultants in radiology in England<sup>1</sup> and 39 in Wales,<sup>2</sup> the total of 692 being 6% of all consultants. At the same time there were 97 consultant radiologists in Scotland.<sup>3</sup> In England and Wales the number of consultant

	No. Entering Training	No. Leaving Radiology
Scotland	97	12 (12%)
Wales	31	1 (3%)
Eire and N. Ireland	33	9 (27%)
England (excluding London)	303	27 (9%)
London	178	22 (12%)
Total	642	71 (11%)
Mean/year	107	12 (11%)

radiologists increased over the six years 1968-73 from 595<sup>4</sup> to 692, this annual increase of 2.7% being a little less than the 3.4% annual increase for all consultants over this period. The number of senior registrars in England and Wales increased from 79 to 150 and those in other training grades from 162 to 195 in the same period,<sup>5</sup> annual increases of 15% and 3.4% respectively. In the seven years up to 1974 an average of 18 consultant or senior registrar radiologists emigrated each year and this increased to 35 in 1974.<sup>6</sup>

Training programmes have to take into account the expected vacancies occurring from deaths, retirements, emigration, and expansion as well as wastage from training. There appears to be no previous estimate of this last factor.

I am most grateful to all those radiologists who completed questionnaires and to Mr. P. Powesland of the University Department of Psychology and Professor J. H. Middlemiss for their help.

—I am, etc.,

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### Treatment of Shoulder Subluxation in the Hemiplegic

SIR,—Your leading article on "Shoulder Pain from Subluxation in the Hemiplegic" (14 June, p. 581) rightly emphasized this common problem in hemiplegics. Until the present, treatment of such chronic painful shoulders has been inadequate. For patients who regain the motivation and ability to undertake household activities, indefinite application of a sling is annoying and may predispose to shoulder-hand syndrome.

Previously surgical treatment has been limited to shoulder fusion. In many cases such immobilization would further impair the limited function of a hemiplegic's upper extremity. A few models of total glenohumeral joint prostheses have been designed for resurfacing the degenerative articular surfaces in arthritic patients in whom the capsule of the joint is intact. These models have been contraindicated in the presence of a degenerative capsule or paralytic rotator cuff. Recently Fenlin<sup>1</sup> has described an operation for use in patients with degeneration of the rotator cuff which should be of great benefit to hemiplegics with chronic, painful, subluxing shoulders. It is a glenohumeral joint replacement with methyl methacrylate fixation wherein the "ball" is captive in the socket to provide mechanical