(aged 24-50) were then visited without prior warning and their height and weight measured. Their reported heights and weights were on average 0.5 in (12.7 mm) above and 6.1 lb (3.13 kg) below their actual measurements. As in Ashwell and Etchell's paper, overweight was assessed using the Metropolitan Life Insurance Company tables.² For 90% of the women the reported measurements indicated a lower degree of overweight than the actual measurements, the difference being roughly proportional to the degree of overweight.

As well as broadly classifying body size as either "overweight," "suitable," or "underweight" Ashwell and Etchell define categories of over- and underweight. Individuals 30%, 20%, and 10% above ideal weight were classed as severely, moderately, and mildly overweight respectively, with corresponding groupings for underweight. Using these categories 15 of the 40 women in our study were classified in a lower category on reported than on actual measurements. Four of these changes were from the broad classification "overweight" to that of "suitable weight."

Our data indicate that reported height and weight should be treated with great caution, as there appears to be systematic underestimation of body size. It may well be that this underestimation of body size as assessed from reported data reflects awareness of overweight status. We would suggest that any further studies on perception of overweight should obtain information on reported as well as actual height and weight and also perceived weight status.—We are, etc.,

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¹ Ashwell, M., and Etchell, L., *British Journal of Preventive and Social Medicine*, 1974, 28, 127.
² Metropolitan Life Insurance Company, *Statistical Bulletin*, 1959, 40, Nov.-Dec.

SI Units

SIR,—If and when SI units are introduced into clinical practice I foresee very real difficulties in the management of patients. Apart from the expense involved in converting to SI, the management of common diseases is surely going to be very much more difficult. When one is informed that a patient in diabetic ketoacidosis has a blood sugar of 780 mg/100 ml one has an instant picture of what that patient's clinical state is likely to be. The SI unit normal range of blood sugar is 3.0-5.0 mmol/l and we are told that the approximate range found in hospital practice could vary from 0.6 to 60 mmol/l. It will not be easy to decide on insulin dosage in such patients. I would think that the same difficulties would arise in uraemic patients when the blood urea is measured in SI units.

We are told that prescribing will not be changed to SI; neither will blood pressure recordings. These have presumably been left alone because of expediency. I think many practising clinicians would feel that much the same argument could be applied to many of the parameters routinely measured in blood chemistry and that to introduce a completely new set of values at this time, when the Health Service is in dire trouble,

will not help in the management of patients.

There is still doubt that the Americans will go over to SI units and this must mean that the American and British medical literature will be in two completely different sets of units. Medicine is not a science; is empiricism now a dirty word?—I am, etc.,

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Tafracher

SIR,—I was most interested in Dr. F. I. D. Konotey-Ahulu's Personal View of the Ghanaian word *tafracher* (8 February, p. 329). Though English has no direct equivalent the sentiment has not, at least in the past, been foreign to us, as is witnessed by the expression of an Irish woman describing the death of her daughter's child to my father some years ago: "... and then, saving your presence, his little bowels gave way."—I am, etc.,

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** We have received several letters drawing attention to similar expressions in use in a variety of languages and cultures.—ED., *B.M.J.*

Comparison between Free Thyroxine Index and Effective Thyroxine Ratio

SIR,—We read with great interest the paper by Dr. E. G. M. D'Haene and others (21 September, p. 708) on the comparison of the Mallinckrodt effective thyroxine ratio (E.T.R.) with the serum free thyroxine index (F.T.I.). Using Spearman's rank correlation analysis, the authors found a highly significant relationship between the E.T.R. and the F.T.I., with a correlation coefficient of 0.68. The correlation coefficient was considerably less than that found by us—namely, 0.95—when we used the Pearson product-moment correlation coefficient in a study of three groups of patients classified as hypothyroid, euthyroid, and hyperthyroid.¹ A similar correlation coefficient (0.93) was found between the E.T.R. and the free thyroxine concentration (F.T.C.). We found it necessary to select patients and subjects in order to yield diagnostic groups of approximately equal numbers. This leads to a much more sensitive regression analysis because of the wider spread of values.

Dr. D'Haene and his colleagues, however, consider that if a given variable has a normal distribution in the population it is necessary, in assessing the variable, to select test subjects (or specimens) by random sampling and hence are critical of our statistical handling of our data. However, we submit that their approach, which studies a randomly selected group of subjects, has no application in the regression model used by us. The essential point in the design is the random distribution of assay errors and not of the population from which the specimens were collected.

It seems that these authors have confused regression with correlation analysis. As pointed out by Hays,² each is appropriate to

a particular kind of research enterprise. Correlation analysis applies especially to problems of prediction. Regression analysis on the other hand determines the relationship between a set of variables—for example, does the E.T.R. increase as the F.T.I. increases and, if so, is there a mathematical rule which describes the relationship? Dr. D'Haene and his colleagues have found a poorer correlation between E.T.R. and F.T.I. because 70-75% of their specimens had normal values and because the E.T.R. has a very low coefficient of variation (C.V.) (3.7% in our hands) in euthyroid subjects. Furthermore, they would have encountered a substantial number of multiple tied values, which would also detract from the degree of correlation found, and there is no indication in their paper that they have corrected for ties.

Further studies from our laboratory³ have indicated that the E.T.R. is a good screening technique, as in euthyroid patients with low activity of thyroxine-binding proteins the diagnostic accuracy of the E.T.R. (80.5%) is superior to that of the F.T.I. (62.5%) and F.T.C. (67%). In euthyroid patients with elevated thyroxine-binding proteins the diagnostic accuracy of E.T.R. is 93.5% compared with 83% for F.T.I. and 91% for F.T.C.

Though the conclusion of Dr. D'Haene and his colleagues that the E.T.R. is not a satisfactory substitute for the F.T.I. is probably incorrect in the light of our studies, we do agree that there are some limitations in the E.T.R., as continuing studies in our laboratory have demonstrated. It is not a good parameter to use in patients undergoing triiodothyronine (T-3) suppression, nor is it a good assay in either thyroid-stimulating hormone (T.S.H.) or thyroxine-releasing hormone stimulation tests. Furthermore, the very low C.V. of the E.T.R. may indicate relative insensitivity rather than a high degree of precision. This leads to a marked overlap in values between clinically hypothyroid patients and normal subjects, particularly where treatment has been given for thyroid disorders. In clinical situations, such as that following radioiodine treatment, it is mandatory to use serum assays such as T.S.H. and T-3 concentration to supplement the E.T.R. test.—We are, etc.,

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¹ Wellby, M. L., O'Halloran, M. W., and Marshall, J., *Clinica Chimica Acta*, 1973, 45, 255.
² Hays, W. L., *Statistics for the Social Sciences*, p. 536. New York, Holt, Rinehart and Winston, 1972.
³ Wellby, M. L., O'Halloran, M. W., and Marshall, J., *Clinical Endocrinology*, 1974, 3, 63.

Venous Gangrene in Multiple Myeloma

SIR,—The incidence of thromboembolism in myelomatosis based on a preliminary estimate of 376 patients admitted to the Medical Research Council's myelomatosis trial up to March 1970 was reported to be about 3%,¹ but the incidence of gangrene of the feet as a presenting feature is uncommon. Catovsky *et al.*¹ reported 14 cases of myelomatosis associated with major

thromboembolic complications: six patients died of pulmonary embolism, seven had deep vein thrombosis as a presenting symptom, and three had evidence of amyloidosis. We report here a case of multiple myeloma presenting as venous gangrene of feet.

A 71-year-old woman presented with bilateral deep venous thrombosis, gangrene of her right foot, and a pregangrenous state of her left foot. She was drowsy, dehydrated, and hypothermic. Her peripheral arterial pulsations were normal, but she had swelling of both calves, which were warm and tender, and all five toes of the right foot were black and gangrenous.

The urine contained 2.8 g/l (280 mg/100 ml) protein and more than 100 pus cells per field. It was positive for Bence Jones protein. Her blood urea on admission was 86 mmol/l (518 mg/100 ml), haemoglobin 14.8 g/dl, and leucocyte count $54.9 \times 10^9/l$ ($54\,900/mm^3$), with 91% neutrophils, 6% lymphocytes, and 3% monocytes, but no immature cells. Blood film showed red cell rouleaux formation. The platelet count was $315 \times 10^9/l$ ($315,000/mm^3$) and E.S.R. 63 mm in 1 h. The total plasma protein concentration was 97 g/l (9.7 g/100 ml), albumin 22 g/l (2.2 g/100 ml), and globulin 75 g/l (7.5 g/100 ml). Serum protein electrophoresis showed grossly increased γ -globulins with a sharply defined band of abnormal protein in the β position on starch gel electrophoresis. Serum immunoelectrophoresis showed the paraprotein to be an IgG and transferrin was reduced. On immunodiffusion IgG was shown to be increased to 68 g/l (6 800 mg/100 ml) (normal 8-16 g/l), IgA 1.1 g/l (110 mg/100 ml) (normal 0.9-4.5 g/l), and IgM 0.34 g/l (34 mg/100 ml) (normal 0.6-2.8 g/l). The Sia test for macroglobulins was negative and no cryoglobulins were detected. Bone marrow examination showed a marked increase in mature plasma cells with depressed erythropoiesis, and the haemoglobin level later dropped to 7.9 g/dl. Serum calcium was normal at 2.45 mmol/l (9.8 mg/100 ml) but serum phosphate was increased to 2.5 mmol/l (7.8 mg/100 ml) owing to renal failure. Serum urate was 79.7 mmol/l (13.4 mg/100 ml). Skeletal survey, which included x-rays of chest, pelvis, upper femora, skull, mandible, humeri, and dorsolumbar spine, showed no evidence of myeloma.

On intravenous fluids her blood urea began to fall and with further treatment it dropped to 8.9 mmol/l (54 mg/100 ml). She was treated with intermittent courses of melphalan and prednisolone with complete disappearance from her urine of Bence Jones protein. The total plasma protein dropped to 73 g/l (7.3 g/100 ml), albumin 32 g/l (3.2 g/100 ml), and globulin 41 g/l (4.1 g/100 ml) and the electrophoretic band due to abnormal protein became faint. IgG fell to 36 g/l (3 600 mg/100 ml). There was a remarkable improvement in her gangrene.

The incidence of venous gangrene in multiple myeloma is rare and it is interesting to note the remarkable improvement of the gangrene in this elderly woman with the treatment of multiple myeloma alone and without any surgical intervention. In view of the good arterial supply to the feet the superficial gangrene was attributable to occlusion of venules associated with the high level of IgG and hypothermia.—We are, etc.,

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¹ Catovsky, D., et al., *British Medical Journal*, 1970, 3, 438.

Illness in the Clouds

SIR,—Your leading article (8 February, p. 295) has caused me some disquiet. I travel not infrequently by air and am therefore one of the doctors who may be expected on statistical grounds to be available in an emergency. As a microbiologist engaged for the past 10 years in administration, this prospect fills me with no enthusiasm. Can anyone advise me on how to prepare for it? Do I need to carry an emergency kit, go

on a course, and carry extra international insurance? On reflexion, I shall avoid air travel where possible—and also reading the *B.M.J.*!—I am, etc.,

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New Causes of Malignant Hyperpyrexia

SIR,—Dr. J. A. Lack (4 January, p. 36) raised the possibility of inadvertent administration of halothane to a patient who developed malignant hyperpyrexia with nitrous oxide.¹ He pointed out that halothane would be present in the gas delivered from most anaesthetic machines due to halothane liberated from rubber breathing tubes, etc. Other sources of contamination have been found such as elastomeric seals and certain rigid plastics within anaesthetic apparatus.²

As we were aware of this danger we took the following precautions: (1) the vaporizer was removed from the machine (a conventional B.O.C. Mk II Boyle's machine); (2) all rubber tubing, rubber connexions, and mask were brand new; and (3) the machine was purged with a nitrous oxide/oxygen gas mixture at a flow rate of 8 l/min for about 30 minutes before induction of anaesthesia. It could be argued that even with these precautions enough halothane could still be present to induce malignant hyperpyrexia. However, during the third anaesthetic given to the patient, which consisted of thiopentone without nitrous oxide, oxygen was administered from the same machine and no pyrexia occurred. A second patient, the above patient's homozygous twin, received a thiopentone/oxygen anaesthetic similarly with no rise in temperature.

There is a potential danger to patients highly susceptible to halothane in leaving the vaporizer on the machine even though it is in the "off" position. On a hot morning in June 1973 we anaesthetized a third patient susceptible to malignant hyperpyrexia using an anaesthetic machine with the halothane vaporizer (Fluotec Mk II) in the "off" position. The patient developed a low-grade pyrexia towards the end of the procedure, which had lasted 1½ hours, and on investigation a faint smell of halothane vapour was detected in the gas mixture. A Hook and Tucker ultraviolet halothane meter indicated that a low but measurable concentration of halothane was present (less than 0.25% v/v). Professor J. S. Robinson and his colleagues in the University of Birmingham investigated our suspect vaporizer in their laboratory under similar conditions and found that there was a constant leak of halothane vapour of between 4 and 9 p.p.m. v/v. However, when the gas flow was first turned on comparatively high levels of halothane vapour were delivered; initial concentrations were well in excess of 123 p.p.m. v/v and fell rapidly to 10 p.p.m. v/v after 15 minutes. The effect of a rising ambient temperature (as we had experienced during the anaesthetic) was to almost double the constant leak. Professor Robinson and his colleagues have described their analytical technique.³

In the light of more recent experience it is impossible to know whether the low grade pyrexia in the third patient was due to nitrous oxide, low concentrations of halothane, both these drugs acting together,

or other cause. When anaesthetizing a patient thought to be highly susceptible to halothane for any reason it would be sensible to take the precautions outlined above. We now use Cyprane equipment comprising a Quantiflex gas mixer, single vaporizer, Selectatec back bar, and a conventional Magill attachment. No vaporizer has ever been fitted to this equipment and we feel that the inadvertent administration of halothane or other anaesthetic vapours is virtually impossible.—We are, etc.,

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¹ Ellis, F. R., et al., *British Medical Journal*, 1974, 4, 270.

² Robinson, J. S., Thompson, J. M., and Barratt, R. S. Personal communications.

³ Robinson, J. S., Thompson, J. M., and Barratt, R. S., *British Medical Journal*, 1974, 3, 515.

Changing from a High- to Low-dose Oral Contraceptive

SIR,—The trend towards reducing the steroid content of combined-type oral contraceptives continues, and products containing 20-40 µg/day ethynylestradiol are now available or on trials in many countries.¹ In the hope of reducing adverse side effects of oral contraceptives many practitioners will transfer patients to these new products. An important problem for such women is to determine whether the sudden reduction in dose is associated with "escape" ovulations during the first cycle of treatment with a low-dose preparation.

We have investigated this problem in 10 healthy young women who were switched from high-dose products (Gynovlar (3 mg norethisterone acetate + 50 µg ethynylestradiol) or Nordiol (250 µg D-norgestrel + 50 µg ethynylestradiol)) to a new low-dose preparation, Nordette (150 µg D-norgestrel + 30 µg ethynylestradiol). Venous blood specimens were collected daily during the first treatment cycle following the change in medication. Plasma progesterone and luteinizing hormone (LH) were measured by specific radioimmunoassays. Progesterone concentration did not exceed 0.9 µg/l in any specimen, while LH concentration remained below 21 IU/l.

We conclude that transferring patients from a high-dose oral contraceptive to one containing only 30 µg ethynylestradiol per day is not likely to allow escape ovulations during the first cycle with the new product. It would therefore seem unnecessary to advise the use of additional contraceptive precautions to patients who make this change in oral contraceptive preparations.—We are, etc.,

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¹ Woutersz, T. B., *Current Medical Research and Opinion*, 1974, 2, 95.

² Schneider, W., Spona, J., and Matt, K., *Contraception*, 1974, 9, 81.