Finally, we would draw attention to the inadequacy of measurement of minute ventilation as an index of overall respiratory function in patients who are unconscious from drug overdose.

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1 Collins, J. V., and Goulding, R., *Guy's Hospital Reports*, 1971, 120, 31.
2 Bendixen, H. H., Egbert, L. D., Hedley-White, J., Laver, M. B., and Pontoppidan, H., *Respiratory Care*. St. Louis, Mosby, 1965.

Significance of Milk pH in Newborn Babies

SIR,—Dr. V. C. Harrison and Mr. G. Peat (2 December 1972, p. 515) reported: (1)—That breast milk has a mean pH of 7.29. (2)—That reconstituted and sterilized preparations of cow's milk had a mean pH of 6.51. (3)—That when the pH of such a preparation of cow's milk was raised to 7.4 by the addition of sodium bicarbonate its capacity to support the growth of *Escherichia coli* was reduced to about the same level as that of breast milk. (4)—That newborn infants fed with Similac the pH of which had been raised from 6.7 to 7.2 by the addition of either bicarbonate or trometamol gained weight more rapidly than those fed with untreated milk and had stools which were more acid and in which lactobacilli outnumbered *E. coli*. These findings suggest that merely raising the pH of a cow's milk feed confers on it some important virtues of breast milk. If this be true, it could be of great benefit to alter the formulation of all proprietary infant foods to provide for a pH of 7.2 on reconstitution.

In the experiments on the growth of *E. coli* in milks, a 6-ml sample was inoculated with about 200 organisms and viable counts were done at five intervals up to seven hours. After a remarkable increase in the first hour the counts rose only slowly in breast milk and cow's milk brought to pH 7.4 and were of the order of 10,000/ml at the seventh hour, but the final count in cow's milk at its original pH was 66,000,000/ml. It is quite unexpected that raising the pH of a slightly acid nutritive fluid to that commonly adopted for culture media should have the effect of reducing the rate of bacterial growth in it to this enormous extent.

These experiments were done with 20 samples of breast milk and 20 of "reconstituted sterile cow's milk." Whether the counts in table II and in the figure are means of all these results or those of a single representative experiment is not stated, but since the make or makes of cow's milk preparations

Counts of *E. coli* O111/B4 in Cow and Gate dried milk during six hours of incubation at 37°C. Harrison and Peat's results included. ●=Harrison and Peat's results (without buffer), ○=Harrison and Peat's result (with buffer), X=Cow and Gate (pH 6.8), Δ=Cow and Gate (pH 7.3).

are unspecified, the experiments cannot in either case be exactly repeated. We have repeated them with dried milks in common use for infant feeding in this country, together with Similac, the preparation used in the authors' feeding tests. Their technique was followed exactly, including the use of *E. coli* O111/B4 as test organism, except that experiments were terminated at six hours and that viable counts were done in pour plates of McConkey's medium, which gives more exact results than the drop method of Miles *et al.* (To test the reproducibility of these counts, eight separate dilutions and platings were made of a milk after six hours' incubation; average and maximum deviations from the mean were 25 and 40% respectively.)

Final counts in duplicate experiments with six milks at their original pH and adjusted to about pH 7.3 are shown in the table. In all milks growth proceeded at a closely similar rate in the two samples, graphs of the counts being almost superimposable. Those obtained in one of the milks (Cow and Gate Dried Milk) are shown in the figure, which includes the results of Dr. Harrison and Mr. Peat for comparison. None of the final counts differ significantly except those in Cow and Gate Prepared Feed, which show an approximately three-fold difference between those at pH 6.52 and at 7.38. This is the only result even faintly resembling those reported by Dr. Harrison and Mr. Peat. We therefore contest their conclusion that raising the pH of a cow's milk prepara-

tion "has a bacteriostatic effect on specific *E. coli* in vitro."—We are, etc.,

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The Consultant in Mental Handicap

SIR,—Your leading article (24 February, p. 435) referred to the apparent reluctance of doctors to enter the subspecialty of mental handicap and suggested that teachers, psychologists, and social workers might be invited to fill the gap.

In fact the number of consultants in mental handicap has expanded in the past 10 years, although there are still not enough to meet the recommendation of one consultant to a population of 200,000 made in the Royal Medico-psychological Association's memorandum on "Future Patterns of Care for the Mentally Subnormal."¹ The number of psychologists, social workers, and teachers prepared to work with the mentally handicapped is gradually increasing, but still remains below that needed to do justice to the problem.

Clear definition of the role of the doctor specializing in mental handicap is not easy. Consultants in this specialty cannot claim any unique skills, but they possess a combination of knowledge and experience which confers on them a distinctive expertise and ability in the diagnosis and treatment of mentally handicapped patients. These doctors are more familiar than others with that particular body of knowledge customarily subsumed under the title of mental deficiency, mental subnormality, or mental handicap. They use this knowledge to provide a consultative service for family doctors, their patients, their families, social services departments, education authorities, and other institutions. Most of them are involved in teaching about mental handicap to medical, nursing, and other students and to lay audiences. They may pursue research into mental handicap.

The consultant in mental handicap has access to beds for mentally handicapped patients and, through the hospital and specialist services, to skills which can assist in the assessment and management of these patients. He takes clinical responsibility for these patients and acts as responsible medical officer within the meaning of the Mental Health Act. He has usually accepted the mentally handicapped of all ages as a group of patients in whom chronological age has little relevance and who need life-long care and supervision. Because the hospital for the mentally handicapped is ideally a therapeutic community the consultant in it has generally been more involved in administrative matters than many of his colleagues. The consultants in this work have an ethos of their own: they receive sympathetically patients whom others often appear to find it beyond their abilities and resources to help. The consultant in mental handicap works more frequently at a practical level with human relationships rather than with the application of technology. He is co-ordinator of the multidisciplinary team which brings its skills to bear

Brand of Milk	Original pH.	pH after adjustment with 4.2% sodium bicarbonate.	Counts per ml. after 6 hours
Similac	6.6	7.29	29 × 10 ⁴ 21.8 × 10 ⁴ 32.8 × 10 ⁴ 23 × 10 ⁴
Cow and Gate Prepared Feed	6.52	7.38	12 × 10 ⁴ 14 × 10 ⁴ 39 × 10 ⁴ 44 × 10 ⁴
Trufood Prepared Feed	6.67	7.27	86 × 10 ⁴ 79 × 10 ⁴ 40 × 10 ⁴ 35 × 10 ⁴
S.M.A. Prepared Feed	6.54	7.32	21 × 10 ⁴ 79 × 10 ⁴ 40 × 10 ⁴ 36 × 10 ⁴
Cow and Gate Dried Milk	6.8	7.3	60 × 10 ⁴ 57 × 10 ⁴ 65 × 10 ⁴ 54 × 10 ⁴
S.M.A. Dried Milk	6.54	7.27	15 × 10 ⁴ 22.4 × 10 ⁴ 38 × 10 ⁴ 13.9 × 10 ⁴
Harrison and Peat's results	quoted as range 5.6-6.95	7.4	6 × 10 ⁴ 1.9 × 10 ⁴

to the benefit of the patient for whose treatment the consultant has final responsibility.

Today, with more money spent to improve the facilities of hospitals for mental handicap, more staff, a slowly falling inpatient population, and a growing community commitment, there are more exciting prospects than ever before for the doctor who is prepared to specialize in mental handicap to enjoy a varied, satisfying, and rewarding career.—I am, etc.,

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¹ Royal Medico-Psychological Association, *British Journal of Psychiatry*, 1971, 119, 95.

Troubles with I.U.C.D.s

SIR,—Your leading article (7 April, p. 2) is timely in the light of the experience of the wife of one of us (D.M.H.) in respect of her intrauterine contraceptive device. Whether the complication is called extrusion or translocation, the postulated mechanism in this case and the history are interesting.

The patient was fitted with a Lippe's loop in February 1969 at her postnatal examination after the birth of her second child. At the examination the uterus had involuted normally but was retroverted. The I.U.C.D. was inserted by an experienced operator with the patient in the left lateral position. As she sat up she was aware of severe left shoulder-tip pain which lasted 24 hours. This was commented on, but no action was taken. The patient did not breast-feed her baby, and menstruation occurred normally in April. Further periods occurred in May and June but these were abnormal, there being only altered blood, and this was followed by amenorrhoea. Pregnancy tests were negative and a hysterosalpingogram confirmed the presence of the loop outside the uterus. At laparotomy (N.G.) in September 1970 the loop was removed from the pouch of Douglas. A further pregnancy then occurred resulting in the birth of a normal female child on 26 August 1971. Despite the previous episode, a second Lippe's loop was inserted at her postnatal examination on 14 October, when the uterus was again retroverted. The patient breast-fed her baby and menstruation did not occur. The loop was apparently normally placed in January and May of 1972, but symptoms of pregnancy recurred at the beginning of July. A male child was born normally on 13 February 1973 and the placenta was complete. The loop was not delivered and plain radiography suggested that it was again outside the uterus. On 26 March the I.U.C.D. was retrieved from the pouch of Douglas laparoscopically (N.G.). Inspection of the uterus revealed a small scarred area on the fundus in which the nylon strings were still embedded.

It seems reasonable to suppose that the first loop was embedded in the uterine wall at insertion and that the device went on to "extrude" into the peritoneal cavity. The shoulder-tip pain occurring at insertion suggests that perforation of the uterine wall occurred at that time. The second loop was known to be normally placed for six months after insertion and was then seen laparoscopically to have sought out the weak point in the uterine wall and made its way into the peritoneal cavity via that site in the fundus. The conclusion can be drawn that it may be unrealistic to insert a second Lippe's loop where a first has already perforated the uterus.—We are, etc.,

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NIGEL GARDNER

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SIR,—In your leading article (7 April, p. 2) you state that in order to minimize the risk of perforation or translocation "the cautious clinician will usually wait six weeks or longer after abortion or delivery before putting in an I.U.C.D." However, a W.H.O. scientific group reported that the risks of perforation or translocation "appear to be smallest if the I.U.D. is inserted immediately after delivery or three or more months post-partum."¹ Furthermore, studies suggest that the risk is highest between four and eight weeks after delivery.^{2,3} Thus the injunction to wait "six weeks or longer" before insertion may be counterproductive as it could result in insertions being performed during the period of maximum risk, and owing to the delay some women who might accept an early postpartum insertion will fail to return for an appointment.

Later in the same article you state that "it is difficult to be sure if ectopic pregnancy has a truly raised incidence when an I.U.C.D. is in place." The evidence suggests that the incidence of ectopic pregnancies per woman-month of exposure is in fact reduced.^{1,4} Studies which have indicated an increased incidence of ectopics usually estimate ectopic pregnancies per 1,000 normal or total pregnancies, but the I.U.C.D. protects a patient from uterine pregnancy to a greater extent than from tubal pregnancy. Thus the use of total pregnancies as the numerator of the incidence rate leads to a statistical artefact and a spurious increase in the incidence of ectopics per 1,000 pregnancies among I.U.C.D. users when compared with non-users. However, calculations of the incidence of ectopic pregnancies per woman-month of exposure avoid this pitfall and have shown that the number of ectopic pregnancies is possibly reduced by the I.U.C.D. but to a lesser extent than uterine pregnancies.—I am, etc.,

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- ¹ World Health Organisation, *Intra-Uterine Device*, Technical Report Series, no. 397, Geneva, W.H.O., 1968.
- ² Ratnam, S. S., and Tow, S. H., in *Post-partum Intra-uterine Contraception in Singapore*, ed. D. Wolfers. Amsterdam, Excerpta Medica, 1970.
- ³ Tietze, C., *Co-operative Statistical Programme for the Evaluation of Intra-uterine Devices: Sixth Progress Report, Part I*. New York, National Committee on Maternal Health, Inc., 1965.
- ⁴ Kleinman, R. L., ed. *Intra-uterine Contraception*, London, International Planned Parenthood Federation, 1972.

An I.U.C.D. Dating from 1890

SIR,—Readers of the leading article "Troubles with I.U.C.D.s" (7 April, p. 2) may be interested by the following note, which was found recently in the course of removing old pathological specimens. It was written in elegant, minute script on a label glued to the bottom of the remains of a small mahogany and bevelled glass case that contained a 22-carat gold collar stud set in a decaying blue velvet mount. The note is dated May 1890. It is reproduced verbatim, but for the name of the doctor:

"This intra-uterine device, a golden collar stud, was inserted by an atheistical practitioner of St. Marylebone, ——— M.D., since decd., as the means to procure non-procreation. After the passing of some months a state of pyometra was induced, a mischance, with toxicaemia that quickly subsided when the device was extracted from the canal of the neck of the womb (whence it had near exulcerated itself), a

free flow of puriform foul matter from the parts relieving the Lady of all symptoms of her distress. The practr. had several times before undertaken this same manoeuvre without suffering of his patients. It was the larger aspect of the device that he would place uppermost in the canal, not as might be thought on consideration of the object, the sphaerule, which indeed should not be so closely constrained as the other. Some minims of Chloroform on a mask of cotton calmed the pavor lusus [apprehension] s.o.s. [if necessary].

The local situation following a pyometra—a collar-stud abscess?—might well have precluded a uterine pregnancy thereafter. It is likely that a device so disproportionate in relation to the dimensions of the cervical canal, and with a narrow edge, would cause local ulceration and a substantial risk of ascending uterine infection. The stud measures a centimetre in length and the same in the diameter of its "larger aspect;" the "sphaerule" is 0.4 cm in diameter. It is in one solid piece, everywhere smooth and rounded, but the edge of the base no more than 0.1 cm thick.—I am etc.,

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Serum Alkaline Phosphatase and Rickets

SIR,—Professor A. S. Truswell (17 March, p. 677) is, of course, quite right in pointing out that among the children in our survey (10 February, p. 324) there were more Asian girls than girls of other races with serum alkaline phosphatase levels above 30 K. A. units, but whether it is valid to consider these apart from the rest is not clear. Certainly there was no significant difference between Asian, white, and West Indian girls in the mean alkaline phosphatase levels. While there may well have been some effect of winter on these findings, the first 100 schoolchildren were in fact studied in October, and thereafter in groups of 50-70 through to March.

We appreciate and indeed had not overlooked the many points raised by Dr. R. J. Prescott and his colleagues (7 April, p. 47) and by Dr. T. C. B. Stamp and Miss Joan M. Round (14 April, p. 113), as they will realize on carefully reading our paper. The level of alkaline phosphatase above which children were followed up was chosen by inspection of the histogram of the first 150. As it happens, it was similar to that chosen by Holmes *et al.*,¹ in their review of Asian children in Rochdale. The lowest level of any of our schoolchildren with radiological rickets was 31 K.A. units. The results of follow-up provide some support to our belief that these higher levels are abnormal since 60 children in the survey with these raised levels, treated for 12 months with ergocalciferol, increased, on average, 3.62 cm more in height and 3.87 kg more in weight than 90 children not so treated. The difference was significant in both parameters whether compared with the whole control group or only with those who had had comparable raised alkaline phosphatase levels ($P < 0.0005$) and was independent of race.

The question as to what constitutes normal levels of alkaline phosphatase is not easy to answer. What is clear to us is that a log-normal distribution cannot be used without further evidence as to the 25-hydroxycholecalciferol levels, particularly in those children with higher values of alkaline phosphatase found in the survey reported by