ward, but this is unpopular with the nurses who, quite understandably, resent being moved around. Moreover, this proposal conflicts with our Salmon organization.

We are driven to the conclusion that money for additional nurses must be found by working more efficiently. Paradoxically we believe that the only way to make our service significantly more efficient is to treat more patients, and if this view is wrong we should welcome constructive advice. Certainly few things are more frustrating to a surgeon than to be prevented from operating solely because there is insufficient staff to keep the theatres and intensive treatment unit in action. And few things are more harrowing to a physician than to see patients deteriorating and dying because they cannot have the operation which might cure them.

There are times when it seems morally indefensible to see another new patient, yet if we give up the struggle and let patients look elsewhere for treatment we should not be helping them, for very soon they would find that they were looking in vain. Certainly we should be less of a burden on our hospital funds, but it would be a false economy. Surgeons should be used to capacity before turning to the much more expensive expedient of opening another paediatric cardiology centre to serve the area.

As Professor Hay says, the public will find out. Why should the facts be concealed? The truth is that, although paediatric cardiology has achieved much of which to be proud, we are still short of staff, resources, and money and we cannot give the service which we believe the public wants.

And, no doubt, other specialties can tell exactly the same story.—We are, etc.,

CLIFFORD PARSONS
KEITH D. ROBERTS

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SIR,—Your recent leading article on this subject (26 June, p. 723) is correct in calling attention to the need to avoid delay in transfer from neonatal department to paediatric cardiology department if the best results from cardiovascular surgery in the newborn period are to be obtained. It would, however, be incorrect to assume that as matters now stand in the United Kingdom the neonatal paediatrician is always in a position to avoid delay. In circumstances where accommodation, equipment, and staff for cardiac catheterization and cardiac surgery may be limited, shared, or borrowed, it would be unrealistic to imagine that the ideal of a day and night emergency service can be achieved throughout the country. Indeed, there is reason for thinking that the present practice may fall quite short of the ideal.

Professor J. D. Hay (4 September, p. 579) has rightly pointed to the present national deficiency, whereas your leading article was concerned largely with recent experiences in the North American setting. In our experience in recent years cardiac catheterization and angiocardiology on neonates has often had to be delayed and the catheterization of waiting list patients cancelled or postponed to allow the inclusion of these emergency cases. As an alternative measure more infants have had to be catheterized in a daily session than would be regarded as clinically desirable. Regrettably the paediatric cardiology service

which can offer the facilities to neonates which your leading article advocates is exceedingly expensive in terms of accommodation and equipment. Essential as equipment is, there can be no service without paediatric cardiologists, cardiac surgeons, anaesthetists, radiologists, junior medical staff, trained nurses, cardiological technicians, theatre technicians, and radiographers.

There are, at present, insufficient paediatric cardiologists in training in the United Kingdom and a shortage of trained nurses, cardiological technicians, and radiographers. We are encouraged to record that at the new Royal Hospital for Sick Children in Glasgow adequate accommodation and equipment are being provided for a regional paediatric cardiac service, but whether the staff, in suitable numbers, will be available cannot yet be foreseen.—I am, etc.,

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SIR,—Professor J. D. Hay (4 September, p. 579) has got his priorities wrong; the older child with an operable heart defect should be given priority over the newborn case. If the newborn child dies, it only needs a year for the parents to replace it, and this time almost certainly with a healthy infant. The child of, say, 5 is already a personality and essentially irreplaceable. If he dies, six years of work and sacrifice will be needed to grow another in its place.—I am, etc.,

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Practicalities of Nursing

SIR,—Your leading article on the practicalities of nursing (4 September, p. 545) is justifiably critical of the Salmon report and its implementation. But when will the powers that be realize that in contrast to young women in other competing occupations the nurse is required to study for three years, she has no five-day week from Monday to Friday, she is required to undertake night duty and weekend work, she is required to be on duty early in the morning and late in the evening even if not on night duty, she bears responsibility for human life, and herself is liable to the trammels of institutional existence.

The only way in which nursing can compete with secretarial, technical, or factory work is to provide a substantial financial inducement sufficient to outweigh all these disadvantages for a young girl choosing her occupation. We are heading for a complete breakdown of nursing and midwifery services unless action is prompt and realistic.—I am, etc.,

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Oral Contraceptives, Depression, and Libido

SIR,—Dr. Brenda N. Herzberg and others (28 August, p. 495) have performed a valuable exercise in their comparative study of

women's reaction to different methods of contraception. It is noted that 25% of 218 women stopped taking oral contraceptives after one year because of side effects and 13% of 54 provided with an I.U.D. stopped for similar reasons. It is interesting to note that it is felt that many of these "failures" were predictable and associated with pre-existing evidence of neuroticism. One wonders if a further assessment on the basis of motivation for adopting contraception, particularly the pill, would throw further light on the problem.

Our experience of contraception is virtually confined to women with three or more pregnancies who have had obstetrical histories and varying degrees of intrinsic reno-hypertensive abnormalities. An oral contraceptive is the only available method. "Failure" in the sense of abandoning treatment or even suggesting that it should be abandoned is scarcely ever experienced. This is not just a matter of tolerating side effects through fear of another pregnancy. Side effects, in fact, particularly depression, headaches, and loss of libido, are conspicuous by their absence. Our patients have an obvious and powerful motivating factor for adopting oral contraceptives. In the great majority of cases they have experienced unhealthy, unpleasant, and dangerous episodes in previous pregnancies and they have the obvious incentive to remain well for the sake of the three or more children already at home. In these circumstances any hidden guilt complex that might otherwise obtain is resolved or modified.

It is our feeling that these motivating factors are of the utmost importance in the high rate of adaptation to oral contraceptives seen in our group of women, and distinguishes them from those who are motivated only by the socio-economic factors inherent in routine family planning among physically healthy women. It would suggest also that most side effects of the pill are psychogenic rather than pharmacological in origin.—I am, etc.,

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Possible Hazard in Use of Gentian Violet

SIR,—Dyes of the triphenylmethane series are widely used as topical agents in the therapy of bacterial and fungal agents. Except for occasional contact sensitization,¹ no untoward effects of these drugs have been reported. The present study indicates that gentian violet, crystal violet, methyl violet, and malachite green are capable of interacting with the DNA of living cells. In view of the known relationship between ability to alter cellular DNA and mutagenesis as well as carcinogenesis, our findings suggest that the clinical use of these dyes should be re-evaluated.

Our experimental procedure is based upon the observation that cells exposed to agents which react with genetic material (DNA) attempt to counter this lethal effect by excising and replacing the portions of their DNA which have become altered. The enzyme DNA polymerase appears to be crucial to this repair process.^{2,3} Mutants that lack this enzyme will therefore be more sensitive than their parents to the inhibitory

action of agents capable of reacting with cellular DNA. Recently the isolation³ of a DNA polymerase-deficient (pol A⁻) strain has permitted the verification of this prediction.^{2,4} In the present study the sensitivity of such a mutant to gentian violet and related dyes was examined.

TABLE.—Effect of agents on the growth of a DNA polymerase-deficient strain of *E. coli*

Agent	Diameter of zone of inhibition (mm)	
	Parent Strain	Mutant Strain
Colistin (polymyxin F)	14	14
Kanamycin	24	25
Neomycin	22	22
Streptomycin	19	19
Ampicillin	29	28
Methyl methanesulphonate	42	54
N-Methyl-N-Nitrosourea	3	44
Nitrosofluorene	0	21
Gentian Violet	8	21
Crystal Violet	11	20
Methyl Violet	7	10
Malachite Green	12	15
Acridine Orange	0	9

The procedure used was essentially identical to the one described previously.⁴

The data in the Table indicate that the parent and mutant strains exhibited equal sensitivities for a series of agents known not to react with cellular DNA—that is, ampicillin, kanamycin, streptomycin, neomycin, and polymyxin. On the other hand, as previously shown,⁴ the mutant strain was much more sensitive to the known carcinogens methyl methanesulphonate, nitrosomethylurethane, and nitrosofluorene, which react with cellular DNA. The mutant strain was also more sensitive than the parent to gentian violet, crystal violet, methyl violet, and malachite green.

The interaction between cellular DNA and the triphenylmethane dyes presumably is similar to the intercalative phenomenon which occurs when acridine dyes react with DNA.⁵ In the present context, it is perhaps significant that acridine orange, which also inhibits the pol A⁻ strain preferentially (Table), has been reported to be carcinogenic for animals.⁶

As the experimental procedure used appears to be quite reliable in detecting mutagens and carcinogens⁴ and because agents first detected by this bioassay have been shown to induce tumours in animals (M. A. Anderson and H. S. Rosenkranz, unpublished results), the present findings suggest that the dyes listed above also react with the cellular DNA and might induce detrimental changes. Accordingly the continued clinical use of gentian violet and its congeners requires re-examination.

This study was supported by a grant from the Damon Runyon Memorial Fund for Cancer Research and by the Annie R. Masch Memorial Grant for Cancer Research from the American Cancer Society. H. S. R. is a Research Career Development Awardee of the National Institute of General Medical Sciences (2-K3-GM-29, 024).

—We are, etc.,

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¹ Bielicky, T., and Novak, M., *Archives of Dermatology*, 1969, 100, 540.

- ² De Lucia, P., and Cairns, J., *Nature*, 1969, 224, 1164.
³ Kelly, R. B., Atkinson, M. R., Huberman, J. A., and Kornberg, A., *Nature*, 1969, 224, 495.
⁴ Slater, E. E., Anderson, M. D., and Rosenkranz, H. S., *Cancer Research*, 1971, 31, 970.
⁵ Lerman, L. S., *Proceedings of the National Academy of Sciences of the U.S.A.*, 1963, 49, 94.
⁶ Van Duuren, B. L., Sivak, A., Katz, C., and Melchionne, S., *British Journal of Cancer*, 1969, 23, 587.

Chromosome Breakage and Ultrasound

SIR,—Since publication of our preliminary communication "Chromosome Aberrations Induced by an Ultrasonic Fetal Pulse Detector" (10 October 1970, p. 92), there have been several communications describing similar work with negative results (Mr. W. T. Coakley and others (9 January, p. 109) and Dr. Elizabeth Boyd and others (29 May, p. 501)).

Some of my more recent work has suggested a possible reason for the discrepancy. My cells were treated in a vessel 1 cm in width and 4 cm long with polyethylene windows at either end. I have used Schlieren photography to examine the shape of the ultrasonic beam produced by the crystal of the Doptone probe, which I have used throughout. According to the manufacturers this beam is focused and my Schlieren photographs show that the beam from my crystal has a clearly defined focal point at a distance of 3 cm from the crystal. The beam is not affected by passage through the polyethylene windows, and the Figure is an attempt to show the distribution of ultrasound within the dimensions.

It can be seen that the distribution of ultrasound is far from uniform, with the main beam having a width of only 3 mm at the focal point. This could lead to very high local intensities of ultrasound being delivered to some cells within the vessel.

It is unlikely that such high levels of ultrasound were possible in the apparatus described by Dr. Boyd and her colleagues.—I am, etc.,

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Care of Chronic Psychotics

SIR,—We would like to comment on your leading article (15 May, p. 351) on "Care of Chronic Psychotics" in which the doubts cast on the future need for mental hospital beds and the effectiveness of community mental health programmes are discussed.

Our experience in Saskatchewan has fulfilled our initial high hopes. In 1962

Saskatchewan had the highest ratio of patients in mental institutions (per 100,000 population) in Canada,¹ and one of the highest rates anywhere. A change in system was warranted and was brought about by a programme which envisaged comprehensive, regionalized psychiatric care with good follow-up and no buck-passing to remote mental hospitals. By gradual exploration, research, organizational changes, and planning, the success of this system has been achieved.² Mental hospital population has fallen from 3,091 in 1962 to 882 by July 1971 (0.8 per 1,000 population).

It has been made possible to provide psychiatric care for all types of identified psychiatric problems arising in a definite area in an open unit attached to the regional hospital. A five-year review of such a centre has been published.³ In Prince Albert, total psychiatric care is catered for a population of 120,000 from a 60-bed general hospital psychiatric unit (0.5 per 1,000 population). Clinical areas are divided into six sub-areas. To each of these is allocated a psychiatrist, a psychiatric social worker, and a psychiatric community nurse, who form a treatment team. Each team is responsible for a population of about 20,000 and works directly with other facilities and agencies in their area. Outpatient clinics are held in the geographical areas and when patients are admitted from these areas they continue to be in contact with the same team personnel.

The inpatients' stay has averaged 21 days for 1970 in our unit. The re-admission rate has dropped dramatically except for chronic alcoholics and behaviour disorders. Patients are discharged directly into the community and no use is made of the halfway houses as they do carry the stigma of mental illness and foster dependency. Where family help is not available the patients are placed in approved homes. These homes are selected by the Department of Health or Welfare according to the physical and emotional environment of the family involved. The heads of these families attend orientation courses and thus are aware of mental illnesses and their handling in the community. These patients are visited regularly by community staff and day-to-day problems are dealt with while they are still in the community.—We are, etc.,

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¹ Dominion Bureau of Statistics: *Mental Health Statistics*, 1962. Ottawa D.B.S., 1964.

² Smith, C. M., *Canadian Psychiatric Association Journal*, 1971, 16, 65.

³ Lipscomb, C. F., *American Journal of Psychiatry*, 1970, 127, 232.

Levodopa and Anticholinergic Drugs in Parkinsonism

SIR,—In attempting to explain the fact that patients suffering from Parkinson's disease are aided by anticholinergic drugs, Professor J. H. Burn (26 June, p. 773) draws an analogy between the central dopaminergic fibre and the peripheral adrenergic fibre. He has adduced evidence that in the latter noradrenaline is released through prior release of acetylcholine, and he now suggests that the same may pertain to the release of