infertility, so it would be expected that a group of pregnant patients would have a lower incidence of positive tuberculin tests than non-pregnant controls. Even if the controls were accurately matched for age and parity it would be desirable to do tests in the same individuals in the pregnant and non-pregnant state. Montgomery and colleagues³ did this and found no influence of pregnancy.—I am, etc.,

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J. S. SCOTT

- ¹ Hellström, K. E., Hellström, I., and Brawn, J., *Nature*, 1969, 224, 914.
- ² Jenkins, D. M., and Hancock, K. W., *Transplantation*, 1972, 13, 618.
- ³ Montgomery, W. P., Young, R. C., Allen, M. P., and Harden, K. A., *American Journal of Obstetrics and Gynecology*, 1958, 100, 8.9.

SIR,—Dr. Sylvia M. Watkins (5 August, p. 353) has criticized our recent finding (15 July, p. 150) of a reduced phytohaemagglutinin transformation rate in pregnancy because we used a constant volume of whole blood and therefore did not have a constant number of lymphocytes. As the volume of whole blood was 0.4 ml and the final volume of the culture medium was 6 ml it is unlikely that this variable would have much effect on the final concentration of the lymphocytes. It should also be noted that Purtilo and colleagues¹ reached a similar conclusion using a fixed number of lymphocytes.—We are, etc.,

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- ¹ Purtilo D. T., Hallgren, H. M., and Yunis, E. J., *Lancet*, 1972, 1, 769.

Oral Contraceptives and Serum Amylase

SIR,—To the great number of biochemical alterations caused by oral contraceptives in the human organism we would like to add one more, which we recently observed.

Working with a new chromogenic method for the determination of α -amylase¹⁻³ we found high serum α -amylase values in several young women. It proved that these subjects were taking oral contraceptives. We then examined the serum α -amylase values of 80 control men, 55 control women, 40 women using oral contraceptives, and 61 pregnant women. The results were as follows:

Subjects	Mean Values (U/l, 37°C)
Control men ...	142±44 (S.D.)
Control women ...	167±45 (S.D.)
Oral contraceptive users ...	199±74 (S.D.)
Pregnant women ...	252±99 (S.D.)

Statistically highly significant differences were found between the values for control men and control women ($P<0.005$), control women and oral contraceptive users ($P<0.025$), oral contraceptive users and pregnant women ($P<0.005$), and between the values for control women and pregnant women ($P<0.001$). If we consider the normal range for control women to be the mean value ± 2 S.D. nine of the women using oral contraceptives had values exceeding the normal range, one having a value of 431 U/l (37°C). The nature and source of the increased serum α -amylase found in subjects taking oral contraceptives and in pregnancy

remains to be established. The source is probably the liver, which has been found to be very sensitive to hormonal influences.⁴ Studies on the isoenzyme pattern in serum may clarify this point.

We have not observed increased α -amylase values in urine of patients using oral contraceptives. This is probably owing to the lower clearance value of α -amylase of non-pancreatic origin as compared with pancreatic α -amylase,⁵ which forms the bulk of the α -amylase excreted in urine.—We are, etc.,

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- ¹ Ceska, M., Hultman, E., and Ingelman, B.G.-A., *Experientia*, 1969, 25, 555.
- ² Ceska, M., Birath, K., and Brown, B., *Clinica Chimica Acta*, 1969, 26, 437.
- ³ Soininen, K., Harkonen, M., Ceska, M., and Adlercreutz, H., *Scandinavian Journal of Clinical Laboratory Investigation*, in press.
- ⁴ Adlercreutz, H., and Tenhunen, R., *American Journal of Medicine*, 1970, 49, 630.
- ⁵ Jacobsson, G., personal communication.

Lumbar Disc Problems

SIR,—At the end of the feature "Second Opinion, Please" (29 July, p. 285) it is stated that changes in the posterior joints of lumbar vertebrae are due to degeneration of the related discs. It is implied, but not specifically stated, that pain in the leg in such patients is due to nerve root irritation. While agreeing that degenerative disc changes can speed degenerative changes in the posterior spinal joints, and while agreeing that leg pain may be due to lumbar nerve root irritation, I believe that it is undue emphasis on the parts played by the intravertebral discs and the lumbar and sacral nerve roots that prevents this group of patients' symptoms being sufficiently widely understood and their symptoms controlled.

It was shown long ago¹ that irritation of deep structures in the spine will cause not only local pain but also pain referred to the appropriate segment. Naturally, unless such irritation damages a nerve there will be no loss of feeling, impairment of muscle power, or alteration of peripheral reflexes. It is pain of this type, associated with recurrent minor sprains of the worn posterior joints, which account for most of the backache and lower limb pain seen in my clinical practice. The sprain of the worn joints, caused either by chronic postural strains or more sudden vigorous efforts, differ in no material way from those which cause father to have pain and swelling in his knees a day or two after the "fathers and sons" cricket match. Similarly, the symptoms will subside if the joints are rested and they will not subside if the joints continue to be overused.

It is necessary, I believe, to treat all these many patients in a way similar to that used to treat any other injury and to maintain such treatment for the months needed to heal as fully as possible tough, sprained, worn structures. I suggest that patients should avoid all actions which hurt at the time or cause an ache later and improve training in mobility and muscle tone by painless exercises. Naturally, with worn posterior joints forced extension exercises cannot be

done painlessly and should be avoided and isometric exercises substituted.

When the patient understands why he is having pain he can often modify his way of working to avoid things which might hurt, and I think that this reduces the size of the group suspected of a functional overlay. Yet it is equally clear that as the abilities of the ageing athlete decline so do the abilities of the heavy manual worker and there are groups of workers or housewives for whom alternative employment cannot be found and who have to accept overuse of wearing joints and backache for long periods. Occasionally nature is kind to members of this group, who after some years of back discomfort of varying degree will produce sufficient scarring and osteophyte formation in the damaged area to improve stability and reduce pain. Emphasis on the disc problems of backache and sciatica tends to cause expectations in lay and medical sufferers that something is out of place and should be put back. The severe form of the acute episode comes from muscle spasm and will go when alternating painless movement is started, with or without manipulation, if the precipitating lesion is a sprain. If true persisting pressure from a disc protrusion persists the spasm will not go completely and returns readily.—I am, etc.,

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- ¹ Lewis, T., and Kellgren, J. H., *Clinical Science*, 1939, 4, 47.

Propylhexedrine Chewing and Psychosis

SIR,—Recently, a case of schizophrenia was exacerbated by chewing the contents of several decongestant inhalers, and prompts us to question the easy availability of these proprietary substances to the public.

The patient was a 30-year-old single male, who lived with his mother. He had shown insidious change of personality at the age of 23 when he had become indolent, neglected his personal habits, and had discontinued regular work. He was not admitted to a mental hospital until the age of 27, when he became violent with his family and first exhibited frank schizophrenic symptomatology. He made a good response to E.C.T. and phenothiazine. Two years later the patient was admitted with auditory hallucinations, and improved with phenothiazine treatment. The patient was discharged to this hospital as a day patient, and kept on oral phenothiazines. At that time he showed marked affective blunting and a severe volitional defect. Four months later there was a further relapse. On this occasion it was known that he had discontinued his oral medication, and for the first time his habit of chewing decongestant inhalers was discovered. The patient was started on injectable long-acting phenothiazines and his mental state improved.

Two months later a further deterioration was noted, characterized by acute delusional mood and paranoid delusions. The patient admitted chewing decongestant inhalers and when persuaded to discontinue this practice his mental state improved without any further modification of his management. At this time urine examination by gas-liquid chromatography for amphetamines was reported positive for methylamphetamine, but subsequently corrected to propylhexedrine.

One month later his behaviour showed a further temporary deterioration after chewing several inhalers. A further similar episode occurred six weeks ago. He required heavy sedation for 48 hours, after which his condition settled and his treatment was continued as before. It was found retrospectively that he had been chewing inhalers during the period immediately before his admission.

The practice of breaking open amphetamine inhalers and chewing their contents for their stimulant properties was well recognized up to the withdrawal of these inhalers from the commercial market. The risk of exacerbating quiescent schizophrenia by this practice has been reported.¹ We should like to draw attention to a new amphetamine-like inhaler which has become easily available to the public. Like its predecessors, it seems not only open to the abuse of being dismembered and chewed but also capable of exacerbating quiescent schizophrenic states like amphetamine inhalers. Marsden and Sheldon (18 March, p. 730) have also reported the syndrome of "shock lung" following ingestion of the contents of the inhaler bought without prescription. The severe psychiatric and physical complications resulting from abuse of these nasal inhalers raises the question of whether like their amphetamine predecessors they should be available only through medical prescriptions.—We are, etc.,

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¹ Johnson, J., and Milner, G., *Acta Psychiatrica et Neurologica Scandinavica*, 1965, 42, 352.

Twins and Cancer

SIR,—Several statements made by Dr. R. A. Strang (29 July, p. 294) are of doubtful validity. In particular, I would not wish your readers to believe that the incidence of childhood cancer among twins was 1.9%, as Dr. Strang stated. This figure was incorrectly deduced from the article, "Reported Influenza in Pregnancy and Subsequent Cancer in the Child," by Mrs. Jean Fedrick and Dr. Eva D. Alberman (27 May, p. 485). In their study questionnaires were completed for 98% of the babies born in England, Wales, and Scotland in the week 3-9 March 1958. The authors do not state specifically the numbers of single and multiple births. However, an estimate of the number of pairs of twins can be made using the fact that 17,204 mothers gave birth to 17,418 babies. With the assumption that no triplets or multiple births of higher order occurred, these figures imply that there were 214 pairs of twins—that is, 428 twin babies and 16 990 single births.

From the original article no deductions can be made about stillbirths and neonatal deaths of twins, but out of the 20 cases of childhood cancer two are twins (for both the co-twin was unaffected). Thus the incidence of cancer among twins is 0.47% and not 1.9%. The incidence of cancer in single-birth children is 0.11%, and we can note that the rate for twins is approximately four times that for single-birth children. If the true

incidence of cancer was the same for children whether they were twins or not then my calculations show that the observed result or one more extreme would occur with probability 0.08. So, though in this particular study the twins seem to be more liable to

develop cancer, the figures do not provide conclusive evidence of an underlying difference.—I am etc.,

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Gastritis and Gastric Cancer

SIR,—We have read with interest the leading article on the potential relationship of gastritis and gastric cancer (6 May, p. 309). We should like to comment further on this topic by stressing a few, in our opinion, salient points and by reporting some findings of our own.

You mention that we found nine gastric cancers in 116 patients with atrophic gastritis.¹ It should be noted that among members of the group (totalling 261 subjects) who originally had normal gastric mucosa or superficial gastritis only one gastric cancer was found (the tenth case found in our follow-up study;² in this case, too, cancer was preceded by atrophy of the gastric mucosa). The difference is statistically highly significant, and we do not believe that equally strong indications have been found in any other aspect of the aetiology of gastric cancer.

25.2%. Genetic analyses suggested a polygenic type of inheritance as in many common diseases.⁵ All we can say at present is that it seems as if external factors are able to induce atrophic gastritis only in a susceptible gastric mucosa and if the susceptibility is genetically controlled.

As a further mathematical elaboration of the polygenic inheritance pattern as presented by Falconer,⁶ we plotted the age-specific prevalences of all gastrites and all atrophic gastrites in our random sample of a Finnish rural population⁷ on a normal distribution chart, together with a presentation of the cumulative incidence of gastric cancer in Finland, transformed to represent a comparable mathematical quantity (Fig.). The graphs are strikingly similar, in contrast to those of some other types of cancer also entered in the figure for comparison. An attempt is also under way to

Age-specific prevalence (in ten-year age groups) of (1) superficial or atrophic gastritis, (2) atrophic gastritis in a Finnish random population survey (142 subjects), plotted on normal distribution chart ("probits" over age); also entered in the figure: "prevalence" of gastric and some other cancers, cumulatively synthesized (disregarding drop-out) from incidence data in Finnish Cancer Register.

As you observe, the aetiology of atrophic gastritis is largely unknown. A recent series³ which was collected by Dr. Varis, one of our team, discloses among the first-degree relatives of index patients with severe atrophic gastritis earlier occurrence of chronic gastritis and its more rapid progression than in a randomly selected normal population, resulting in a higher prevalence of severe atrophic gastritis in the former, at a statistically significant level ($P < 0.05$). If the "heritability" is calculated according to Falconer⁴ its value is as high as 79.5 ±

treat our findings in terms of general stochastic (actuarial) risk theory,⁸ which is less encumbered by restricting assumptions.

From a series now in progress concerning the prevalence of gastritis in first-degree relatives of index patients with gastric cancer we can already report 67% gastritis of any type and 44% atrophic gastritis among 72 subjects. These figures distinctly exceed those of the population at large.

We agree emphatically with you on the need for further investigations concerning atrophic gastritis and cancer and their