Emphysema in Coalworkers

SIR,—On returning from abroad I have been most interested to read the paper by Dr. R. Ryder and others on emphysema in coal workers' pneumoconiosis (29 August, p. 481). This study is a most valuable contribution to our understanding of pulmonary disease in coal workers, but I doubt whether the conclusion that emphysema is more prevalent in coalminers than in non-miners has been established. This conclusion depends on the authors' confidence that the miners examined were as representative of all miners as the control subjects were of the general population.

The chief reason for suspecting bias in selection of the miners is the lack of any age gradient of emphysema (and consequently of F.E.V. levels, since F.E.V. and emphysema were closely related). An age gradient of F.E.V. has been reported in all adequate samples of miners that have been investigated. The authors had two explanations for this. First, that advancing fibrosis obscured the emphysema in older subjects: this seems unlikely since there was no gradient of emphysema with age, even in those with pneumoconiosis category O—A. Secondly, a tendency of younger men with emphysema to have "a lower incidence of survival": this should apply equally to the control cases. Indeed if reduction of F.E.V. was so fatal there would be no age gradient of F.E.V. in the general population. It seems just as likely that miners with emphysema were selectively more likely to come to the panel and to die and thus to appear in the series than were men with similar degrees of emphysema in the general population. Although it appears that most miners with pneumoconiosis in South Wales come to the panel and so should appear in the series, not all miners die and not all of them stay in the coal mining industry—these are powerful selective factors.

There is another question raised by this conclusion on which the authors do not comment. Since pneumoconiosis category is well related to dust exposure but emphysema is not, emphysema in miners, if it is more prevalent in them than in the general population, must be due to some other factor in the miners' environment than dust exposure. Have the authors any hypothesis as to what this factor could be? The question, of course, does not arise if the high incidence of emphysema in the miners is due to a selective artefact rather than to occupation.—I am, etc.,

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Response to Stress

SIR,—I would like to confirm the view of Professor S. Shuster (August 29, p. 515) that patients with Cushing's disease (pituitary dependant adrenal hyperplasia) usually show a decreased pituitary-adrenal response to stress. In our series of 19 cases only one has shown a normal rise in plasma fluorogenic corticosteroids during insulin-

induced hypoglycaemia, and others have made similar observations.¹⁻⁴ Two patients have also been found to fail to increase their plasma corticosteroid concentrations during the stress of laparotomy.

It is, however, not yet entirely clear whether such stress unresponsiveness is fundamental to the disease or is the result of high circulating corticosteroid levels. It is unlikely that Cushing's disease is caused by an upward resetting of the feedback control mechanism resulting from the impaired stress response, as suggested by Professor Shuster. Such a mechanism could not account for either the absence of the nyctohemeral rhythm of ACTH secretion found in Cushing's disease, or the very high basal levels of plasma ACTH after adrenalectomy.⁵ On the other hand, loss of nyctohemeral rhythmicity and dexamethasone suppressibility of ACTH secretion with high basal plasma corticosteroid levels may also be a feature of untreated severe depression, producing a biochemical picture indistinguishable from that found in Cushing's disease,⁶ yet we find that stress responsiveness in these patients is unimpaired.

It is an oversimplification to consider control of ACTH secretion to be located within a single hypothalamic-pituitary pathway. Among many lines of evidence favouring multiple pathways are the observations

that amphetamine-induced ACTH release, believed to be produced by an action on centres associated with mediation of the nyctohemeral rhythm, is blocked by the α -adrenergic antagonist thymoxamine, whereas the response to the stress of insulin-induced hypoglycaemia is not.^{7,8}

While the fundamental cause of Cushing's disease is uncertain it is most likely that it is due to a defect in the hypothalamic mechanisms controlling secretion of corticotrophin-releasing factor and hence corticotrophin and corticosteroids, rather than to a primary lesion within the pituitary.—I am, etc.,

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REFERENCES

- 1 Landon, J., James, V. H. T., and Slater, D. J., *Lancet*, 1965, 2, 1156.
- 2 Bethge, H., Winkelmann, W., and Zimmermann, H., *Acta Endocrinologica (København)*, 1966, 51, 166.
- 3 James, V. H. T., Landon, J., Wynn, V., and Greenwood, F. C., *Journal of Endocrinology*, 1968, 40, 15.
- 4 Bethge, H., Bayer, J. M., and Winkelmann, W., *Acta Endocrinologica (København)*, 1969, 60, 47.
- 5 Besser, G. M., and Landon, J., *British Medical Journal*, 1968, 4, 552.
- 6 Butler, P. W. P., and Besser, G. M., *Lancet*, 1968, 1, 1234.
- 7 Besser, G. M., Butler, P. W. P., Landon, J., and Rees, L., *British Medical Journal*, 1969, 4, 528.
- 8 Besser, G. M., Butler, P. W. P., Ratcliffe, J. G., Rees, L., and Young, P., *British Journal of Pharmacology*, 1970, 39, 196P.

Cardiac Arrest and Bone Cement

SIR,—Dr. J. N. Powell and others (8 August, p. 326) suggested that absorption of monomer from methyl methacrylate bone cement might be a cause of acute hypotension with consequent cardiac arrest. The subsequent correspondence which this provoked demonstrated widespread interest and concern over this possibility.

If the monomer were to be a cause of fatal collapse with any frequency there should be a difference in the mortality rate between patients who have received a Thompson prosthesis with cement and those who have received an uncemented Austin Moore prosthesis. A review of 139 cases of primary prosthetic replacement of the femoral head following fracture has recently been carried out in this unit (Woodyard and Wrighton—unpublished work), primarily to compare the clinical results of the two techniques of prosthetic replacement.

Fifty prostheses were cemented, and 89 were uncemented. The mortality rate during the first postoperative month was found to be 16% for the cemented Thompson prostheses and 17% for the uncemented Austin Moore prostheses. There were no fatalities on the operating table. In the uncemented group two patients died on the second postoperative day. In the cemented group one patient died on the day of operation, approximately four hours after the operation had been completed. This patient was aged 88, in congestive heart failure with auricular fibrillation, mentally disorientated, had a blood urea of 123 mg./100 ml., and a haemoglobin of 9.3 g./100 ml. Her blood pressure fell after halothane was introduced into the anaesthetic, and never rose again after the operation had been completed. The blood pressure fell before the cement was introduced into

the femur. There was no sudden episode of collapse on the operating table.

These figures suggest that the monomer does not have any regularly fatal effect, and we would strongly support the sentiments of Mr. D. W. Parsons (19 September, p. 710) that it would be unwise to alter a technique found satisfactory unless it can be proved that it is the cause of complications.

The review of Woodyard and Wrighton showed conclusively that the clinical results of the cemented Thompson prostheses were superior to those of the uncemented Moore's prostheses.—We are, etc.,

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SIR,—We were aware of the risk of hypotension occurring in operations for prosthetic replacement of the femoral head and total hip arthroplasty before the start of the recent correspondence on this subject (8 August, p. 326; 22 August, p. 465; 29 August, p. 523; and 5 September, p. 588). For this reason, monitoring of pulse, blood pressure, and E.C.G. was undertaken routinely. We wish to report the following incident.

The patient was a woman aged 78 confined to bed and chair for four years on