that there was more evidence of obstructive respiratory disease in his sample of workers than among the workers exposed to similar products examined by ourselves.[1] On the other hand, the F.E.V./V.C. ratio is not age standardized and differences in age structure of the two populations might to some extent account for the difference. Also, a higher proportion of the workers in his survey were sensitized to the *B. subtilis* derivatives than in our own series.

Levels of enzyme concentration in air are not given, but exposure to higher levels for longer periods might account for the difference.—I am, etc.,

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London School of Hygiene and Tropical Medicine, London W.C.1.

REFERENCE

1 Newhouse, M. L., Tagg, B., Pocock, S. J., McEwan, A. C., *Lancet*, 1970, 1, 689.

Hypotension Caused by L-Dopa

SIR,—I have read with interest the report of Dr. D. B. Calne and his colleagues (21 February, p. 474), regarding hypotension caused by L-dopa in patients with Parkinson's disease, and the subsequent comment of Professor J. H. Burn (7 March, p. 629) on the mechanism of this effect. If patients on chronic L-dopa therapy are in fact secreting dopamine from their sympathetic nerve terminals, then a beta-adrenergic blocking agent such as propranolol should antagonize this effect, since dopamine appears to have predominantly beta-adrenergic properties.[1] This line of reasoning led us to attempt the administration of propranolol to a small number of patients on L-dopa treatment who had developed symptomatic hypotension. We observed in several an abrupt cessation of symptoms and a partial correction of the hypotension. One patient had a particularly striking response.

A 46-year-old woman with Parkinson's disease of six years' duration presented as a severe primarily bradykinetic parkinsonian with minimal tremor and only mild rigidity. She required assistance to arise from a sitting position, stood with a markedly stooped posture, and could barely walk with small shuffling steps festinating very severely. Blood pressure was 110/70 sitting or standing. The pulse was 80/minute and regular.

Treatment with laevodopa was begun in August 1968 at a daily dose of 1 g. When the daily dose was increased to 2 g., the patient complained of "dizziness" when standing. Blood pressure fell to 95/70 on one occasion with no increase in pulse rate. Her symptoms were controlled with the use of elastic bandages on the legs and the daily dose of L-dopa was gradually increased to 3, 4, and finally 5 g. At this dose level there was appreciable improvement. Rigidity was abolished to be replaced by a general hypotonia. However, she was still occasionally dizzy and blood pressure fell to 70/50 on standing—despite the use of elastic bandages and an abdominal binder. Continuing symptoms of postural hypotension compelled a further reduction of the dose to 3·5 g. per day, on which she continued for a year without any change in hypotensive symptoms.

Various amphetamines including dextroamphetamine, ephedrine, propylhexedrine, and hydroxyamphetamine were tried with negative results. Propranolol was then begun in November 1969 at a dose of 10 mg. t.i.d. There was a prompt and striking subjective response. The patient had no further syncopal episodes and no longer experienced light-headedness on standing up. The daily dosage of laevodopa was increased to 4·5 g. without a recrudescence of these symptoms.

The patient was then readmitted and after a period of observation, propranolol was discontinued. Blood pressure readings were consistently lower without the propranolol. Faintness and light-headedness and several brief syncopal episodes occurred despite the use of elastic bandages in the lower extremities. These symptoms were so severe that the patient was unable to assume the upright position. After a three day hiatus, propranolol was resumed. Blood pressure readings returned to the levels previously observed and symptoms of orthostatic hypotension became milder and less frequent. No further syncopal episodes occurred. Propranolol was withdrawn a second time for several days with similar results. Advantage was taken of the apparent protection afforded by propranolol to increase the dosage of laevodopa by gradual increments ultimately to a total daily dose of 8 g. per day. The dose of propranolol was also gradually increased to 30 mg. given four times daily. On this regimen the patient still had some occasional low blood pressure readings, circa 90/60 or 80/50, but rarely experienced faintness or light-headedness and had no syncopal reactions. The pulse remained slow at 50-60/min. The increased dose of L-dopa yielded some additional significant improvements. The patient has maintained these improvements for the past six months.

While further experience is necessary to assess the clinical value of propranolol in treating L-dopa-induced hypotension, our preliminary experience indicating that it can at least partially antagonize this effect of L-dopa gives some support to the views advanced by Dr. Calne and colleagues, and by Professor Burn.—I am, etc.,

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REFERENCE

1 Goldberg, L. J., Talley, R. C., and McNay, J. L., *Progress in Cardiovascular Disease*, 1969, 12, 40.

Pseudo-obstruction of the Large Bowel

SIR,—The article by Mr. P. K. Caves and Dr. H. A. Crockard (6 June, p. 583) on pseudo-obstruction of the large bowel was very interesting. I was surprised, however, that in no case was the simple procedure of a diagnostic enema applied, where there was no contraindication such as evidence of peritonitis. It is possible on occasion to avoid laparotomy in these circumstances by its use.—I am, etc.,

HUGH DAVIES.

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Smallpox Vaccination

SIR,—I am delighted by your leading article (9 May, p. 311) supporting our position on curtailing routine smallpox vaccination. This same conclusion was reached by Dick,[1] when reviewing data from Great Britain.

I am concerned that you support the thesis that a safer vaccine may solve most of our problems in smallpox control. The death rate from smallpox vaccination is in the order of one per million primary vaccinations, and the incidence of severe complications such as post-vaccinal encephalitis is only about five per million primary vaccinations. It is evident that only a massive trial involving several millions of vaccinees could convincingly demonstrate greater safety of a new strain. If greater safety of a new strain will be difficult to prove, acceptable efficacy will be equally so. At present there is so little smallpox in the world, even in India and Pakistan, that it would be exceedingly difficult to carry out a field trial of a new vaccine to prove its efficacy.

While I am delighted to see the academic interest in attenuated strains, I feel we should not expect them to be introduced for routine use. The only way to reduce the current toll of vaccination complications in non-endemic nations, then, is reduction of the number of vaccinations performed.—I am, etc.,

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REFERENCE

1 Dick, G., *Progress in Medical Virology*, 1966, 8, 1.

Epidemic Malaise

SIR,—Dr. D. C. Poskanzer (16 May, p. 420) rightly draws attention to the need to apply the principles of epidemiology to the study of epidemics of benign myalgic encephalomyelitis (epidemic neuromyesthenia).

The basic features of the condition as seen in a general practice in North London between 1964 and 1966 by Dr. Betty D. Scott (17 January, p. 170) were identical to those described by Wallis[1 2] in a general practice at Dalston, Cumberland, between January and August 1955. Extensive virological studies carried out at the Public Health Laboratories in Carlisle and at Colindale were negative. Apart from the frequent finding of cortical depression, objective neurological changes were found in 20% of cases and indicated a widespread involvement. Upper motor neurone lesions with extensor plantar responses were recorded in two cases; ataxia, nystagmus, positive Romberg test, and a patchy motor weakness with brisk tendon reflexes and hypotonic muscles were found in others, and muscle atrophy with ulnar nerve lesions occurred in eight patients.

The latter complication was probably responsible for my first contact with the epidemic, as the number of ulnar nerve lesions referred to my electrodiagnostic clinic in the neighbouring county of Durham early in July 1955 suddenly increased five-fold (none was from Dalston). Ulnar nerve involvement had been reported in previous epidemics in Iceland[3] (1948) and New York State[4] (1950). Later in 1955 and in 1956 a few cases with more generalized motor weakness were seen in Co. Durham. On electromyography the characteristic grouping illustrated in Drs. C. P. McEvedy and A. W. Beard's article (3 January, p. 7) was not

observed, but polyphasic motor units were seen in increased numbers as part of a reduced interference pattern on volition, or in restricted areas as highly complex polyphasic units either isolated or grouped in pairs. A similar picture has been found in cases from Los Angeles, U.S.A.[5]

The electromyographic picture would fit in well with changes noted when an agent was transferred to Rhesus monkeys from patients involved in the Adelaide epidemic (1949-51).[6] The association of benign myalgia encephalomyelitis with polymyelitis epidemics may not therefore be the result of mass hysteria but to an agent related to poliomyelitis virus. This view is supported by the excellent antibody response after Salk vaccination in children without previous antibody to poliomyelitis in areas affected by the Iceland epidemic in 1955. A poor response was obtained in neighbouring areas unaffected by the epidemic.[7]

The prevention of sequelae and protracted convalescence depends on a sound understanding of the nature of this peculiar disease. Recurrences may be due to exacerbation of the basic illness with fever and lymphadenopathy[2] or extension of the neurological complications with new features, which may be confirmed on electromyography. On the other hand deterioration in the patient's condition may be due to reactive depression or hysteria as found in case notes of some of the patients in the Royal Free Hospital epidemic?—I am, etc.,

J. G. PARISH.

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2 Wallis, A. L., 1957, M.D. Thesis, University of Edinburgh.
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6 Pellew, R. A. A., and Miles, J. A. R., 1955, *Medical Journal of Australia*, **2**, 480.
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Health Services for Young People in Industry

SIR,—Adolescents are in danger of having been lost to the school health and paediatric services without coming into an alternative service providing good comprehensive medical services for all of them. The bill[1] on the new Employment Medical Advisory Service abolishes the appointed factory doctor scheme, which was good in places, and substitutes supervision and help only for those young people who would have been on the old disabled register anyway.

Yet the essence of a good service for health education and prevention is that it shall include all the population concerned. Special health services are rightly provided for young people at universities, and Seebohm[2] recommended that industrial health services for young people in industry should be as good as student health services.

Furthermore, it is not merely a question of what is fair. Since 300 million days are lost each year from work through sickness and one-third of this absence is due to functional illness there is good reason for paying attention to preventive measures for promoting better physical, intellectual, and psychosocial health during the years in which these young people are leaving school and going into industry.

Would it not be wise for reconsideration to be given even now to meeting the needs of these young people?—I am, etc.,

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REFERENCES

1 *Employed Persons (Health and Safety) Bill* (Bill 104). London, H.M.S.O., 1970.
2 Local Authority and Allied Personal Social Services, *Report*, Cmnd. 3703. London, H.M.S.O.. 1968.

Mass Radiography

SIR,—Drs. D. R. Wallace-Jones and M. Goldman (9 May, p. 367) seem to imply that a miniature chest *x*-ray taken by the M.M.R. service will necessarily expose the examinee to a radiation dose which they claim is 15 times the dose involved in taking a full-size chest film. The final Adrian report on radiological hazards to patients,[1] however, gives comparative figures for both techniques based on surveys carried out in 1957-8. These figures indicate that the mean marrow radiation dose involved in taking a miniature film is only 6·5 times the large-film dose, and it should be remembered that implementation of the recommendations of the Adrian committee since then will have reduced the radiation dose proportionately in both techniques.

Against the higher radiation dose involved (which is still very small in comparison to the dose involved in almost all other routine radiodiagnostic procedures other than a straight chest film) one must consider the advantages of the miniature film examination—viz:

(1) Greater penetration of the denser tissues facilitates the detection of lesions in areas which are usually "blind" on the corresponding full-size film. This is a common observation among those who are familiar with miniature-film interpretation.

(2) When large numbers of films are being read the smaller field for visual scanning greatly reduces observer fatigue. The closer juxtaposition of the right and left lung fields also accentuates any difference in density between corresponding zones.

(3) Ease and economy of storage making for ready availability of previous films for comparison.

If Drs. Wallace-Jones and Goldman really believe that "everyone who is entitled to a chest *x*-ray should have one with the minimum (radiation) dose" can their department, and hospital radiodiagnostic departments generally, absorb the full demand upon them which would result from the premature withdrawal of M.M.R. facilities? Figures for a single day's attendance at the Bradford M.M.R. Unit during the past winter have frequently exceeded 300 referrals from general practitioners alone, in addition to other categories of examinees. I cannot see that hospital *x*-ray departments are likely to be ready to cope with attendances in such numbers.—I am, etc.,

J. B. DEASY.

Medical Director, Leeds and Bradford Mass Radiography Service. Bradford, Yorks.

REFERENCE

1 Ministry of Health, Scottish Home and Health Department, *Radiology Hazards to Patients*, London, H.M.S.O., 1966.

Teething Troubles

SIR,—Whereas I would be one of the first to admit that far too much emphasis has been placed on teething as a cause of discomfort in the young, I cannot agree with Dr. C. Josephs (30 May, p. 543) when he states that "teething is a normal physiological process and therefore is unlikely to produce symptoms." Surely no one would doubt that parturition and breaking of the hymen are physiological processes despite the discomfort involved. The argument that they are no longer truly physiological because of our sophisticated society could equally apply to teething.

Some children certainly do suffer discomfort as their teeth erupt. Those who are old enough will even tell us so.—I am, etc.,

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Bowel Transit Times in Bantu Populations

SIR,—Using carmine as marker, previously we noted much faster transit times in Bantu than in Caucasians.[1] This method has limitations; we now use the new more quantitative procedure of Hinton *et al.*[2] Under supervision 20 radio-opaque pellets (3 mm. cubes) are ingested before breakfast, and consecutive stools are collected in numbered cartons for two to three days, times of voiding being recorded. Subsequent observations by *x*-rays, whether in subjects or in stools, are inexpedient and prohibitively expensive when many persons are to be studied. Instead, sieving faeces through a stiff copper gauze (40 cm. square) resting on a bucket and using a wooden spoon and water supply is highly satisfactory, if done in the open. This method has proved suitable for extensive studies in the field with Bantu assistance.

About 2,500 stools from 485 country Bantu scholars and students have now been examined, together with collections from 25 Caucasian students. In the different Bantu groups 53-75% passed one or more pellets within 12 hours. The proportion in the English group of Hinton *et al.*[2] was 3 of 25 subjects (12%), and in our Caucasians, 4 of 25 (16%). In the Bantu groups, 38-62% passed all pellets by the end of the second day. The figure for our Caucasian students was 24%; for the English group, it was 16%.[2] The rapid time of transversal of digesta in these people is thus confirmed. In passing, we find that times are markedly affected seasonally by the fruit and vegetables available. In Bantu (and to a lesser extent Caucasians) enormous residues from guavas, mangoes, and tomatoes were very common.