stress. Stress eosinopenia is known to be caused by adrenal cortical hormones, chiefly hydrocortisone either with or without adrenaline. Noradrenaline has no action on the eosinophil cells.

The question arises whether adrenaline alone may not account for a fall in eosinophils in some stress situations, for it is now known that adrenaline acts directly on the eosinophils in man (Hunter, Bayliss, and Steinbeck, 1955) and not simply through the pituitary-adrenal-cortical system as has been demonstrated in animals. However, the available evidence suggests that conditions associated with increased secretion of adrenaline also cause an increase in the secretion of adrenal cortical hormones (von Euler and Lundberg, 1954; Bayliss, 1955; Elmadjian *et al.*, 1956; Hill *et al.*, 1956; Pace *et al.*, 1956b; Elmadjian *et al.*, 1957; Persky, 1957). Hence for practical purposes the eosinophil count can still be regarded as an index of adrenal cortical stimulation either with or without adrenaline.

The present study affords the first evidence of adrenal cortical stimulation in a holiday situation and is of special interest in view of the obvious benefit which most people seem to derive from this kind of holiday. As in many other life situations, several circumstances may have contributed to the effects observed—in this case the exhilaration of downhill running on skis, moderate changes of altitude, and occasional cold stress. However, the other observations suggest that the most important common factor was prolonged physical exertion, and that the lessened effect towards the end of the holiday was due to improved physical condition.

Studies of physical exercise by other workers have sometimes failed to reveal any major increase in adrenal cortical activity except in competitive sport, when adrenaline may have been implicated, but such studies have dealt with short-term exercise of not more than 20 minutes' duration (Domanski *et al.*, 1951; Renold *et al.*, 1951; Thorn *et al.*, 1953; Hill *et al.*, 1956). The present results, particularly those on Channel swimmers, suggest that the duration of exercise is an important factor in this respect. The results obtained on Channel swimmers, showing virtual disappearance of the blood eosinophils and an eightfold increase in urinary corticoids, were indeed comparable with those obtained in major surgery (Cope *et al.*, 1951; Thorn *et al.*, 1953).

Summary

Morning and evening eosinophil counts performed on a healthy adult over a period of six weeks during a three-weeks winter sports holiday showed a daily fall in circulating eosinophils amounting to 50–80%, according to the amount of exercise. The response diminished in the third week in association with improved physical condition. Confirmation was obtained in two other subjects.

Results are presented concerning other forms of exercise. In Channel swimming virtual disappearance of the eosinophils and an eightfold rise in urinary 17-hydroxysteroids, reported else-

where, suggest an adrenal cortical response comparable with that found in major surgery.

REFERENCES

- Aschkenasy, A. (1957). *Sang*, **28**, 400.
 Bayliss, R. I. S. (1955). *Brit. med. J.*, **1**, 495.
 Cope, C. L., Boysen, X., and McCrae, S. (1951). *Ibid.*, **2**, 762.
 Domanski, T. J., *et al.* (1951). *U.S.A.F. Sch. Aviat. Med.*, Proj. 21-32-025. Report No. 1.
 Elmadjian, F., Hope, J. M., and Lamson, E. T. (1957). *J. clin. Endocr.*, **17**, 608.
 ———, Lamson, E. T., and Neri, R. (1956). *Ibid.*, **16**, 222.
 Euler, U. S. von, and Lundberg, U. (1954). *J. appl. Physiol.*, **6**, 551.
 Hill, S. R., *et al.* (1956). *A.M.A. Arch. intern. Med.*, **97**, 269.
 Hunter, J. D., Bayliss, R. I. S., and Steinbeck, A. W. (1955). *Lancet*, **1**, 884.
 Pace, N., *et al.* (1956a). *XX Int. Physiol. Congr.*, Abstr. Com., p. 696.
 ———, *et al.* (1956b). *Univ. Calif. Publ. Physiol.*, **10**, 1.
 Persky, H. (1957). *J. clin. Endocr.*, **17**, 760.
 Renold, A. E., *et al.* (1951). *New Engl. J. Med.*, **244**, 754.
 Thorn, G. W., Jenkins, D., and Laidlaw, J. C. (1953). *Rec. Progr. Hormone Res.*, **8**, 171.

OBSTRUCTION OF RESPIRATORY TRACT IN THE FLEXED FOETUS

A PRELIMINARY COMMUNICATION

BY

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It was noted in the course of anaesthetizing babies who were undergoing surgery to correct congenital defects, such as oesophageal atresia, oesophago-tracheal fistula, and duodenal atresia, that respiratory obstruction could easily take place. This difficulty occurred in spite of having an endotracheal catheter accurately in place beyond the vocal cords. On occasion this difficulty in inflating the lungs has necessitated the removal of the catheter to check its patency and position. The obstruction was beyond the vocal cords.

It was then found that the position of the baby was the important factor. If the child was flat on the operation table the respiratory obstruction might occur. Flexion of the head alone caused no trouble, but if the thoracic spine was in some degree of flexion, difficulty in inflating

FIG. 1

FIG. 2

FIG. 1.—Radiograph taken in the intrauterine flexed position, showing lipiodol held up just beyond the tracheal bifurcation. FIG. 2.—Showing the kinked-tube appearance.

the lungs was encountered. This was overcome quite simply by raising the baby's shoulder on a folded towel.

Radiological investigation of the tracheo-bronchial tree has been undertaken in 10 stillborn babies who had died a few hours before birth. An endotracheal catheter was placed just through the vocal cords. The baby was sat up and allowed to flop into the intra-uterine flexed position. Lipiodol was injected until it began to run back from the mouth. An x-ray film taken at this stage (Fig. 1) showed that the lipiodol was held up just beyond the tracheal bifurcation. Furthermore, the club shape had very much the appearance of a tube that is kinked (Fig. 2). The baby was then extended, when the lipiodol ran on freely and an effective bronchogram resulted (Fig. 3).

FIG. 3. — Showing the effective bronchogram obtained on extension of the body.

It would seem that in the flexed foetus with unexpanded lungs there is a definite obstruction of the main bronchi, which appeared radiologically to be kinked.

This phenomenon cannot be reproduced once the lungs have been expanded, and it may be the reason why foetal lungs are not fully expanded by liquor amnii, *in utero*, where respiratory effort undoubtedly takes place.

Further investigation of this apparent obstruction is being undertaken, using cineradiographic techniques.

Medical Memorandum

A Case of Aspergillosis Treated with Nystatin

Aspergilli are ubiquitous in nature, and *Aspergillus fumigatus* is the member of the genus that is most often associated with disease in man.

In the United States and in France pulmonary aspergillosis constitutes a known occupational hazard for those who work with straw, grain, and flour—materials which, in nature, are apt to be heavily contaminated with fungal spores. Hinson *et al.* (1952), who reported a series of eight cases in this country, noted that seven of the eight had close contact with grain, flour, or other vegetable matter.

Aspergillosis is a comparatively rare disease in Great Britain, although a number of cases of pulmonary infections have been reported in the literature during the past decade. It is usually a secondary infection,

complicating an existing disease of the lungs. The fungus is able to invade areas of devitalized lung tissue in such diseases as bronchiectasis, tuberculosis, and carcinoma.

Although a small number of cases of primary infection, usually in the form of localized mycetomas which are amenable to surgical removal, have also been described (Hinson *et al.*, 1952; Bruce, 1957), the danger of pulmonary aspergillosis as a secondary infection has become more prominent with the widespread use of antibiotics and chemotherapeutic agents in the treatment of bacterial infection of the lungs. These drugs suppress the growth of bacteria in chest lesions, thereby leaving the tissue open to infection with fungi. Such cases have been reported by Abbott *et al.* (1952), Rankin (1953), Hiddlestone *et al.* (1954), and Darke *et al.* (1957).

This paper records the successful treatment, with nystatin, of a secondary infection due to *A. fumigatus* in a long-standing pyopneumothorax. Nystatin is one of the recently available antifungal agents.

CASE REPORT

A nurse aged 36 was diagnosed, in 1950, to be suffering from chronic pulmonary tuberculosis. After antituberculous chemotherapy and an unsuccessful artificial pneumothorax, the lower lobe of the right lung, in which a cavity was present, was resected a year later. A bronchopleural fistula developed soon after operation, the upper and middle lobes of the right lung became completely atelectatic, and, as the closure of the fistula was considered impracticable, a pyopneumothorax soon became established. The fistula has remained open and the patient has continued to cough up varying amounts of sputum; this was considered to come mainly from the pyopneumothorax. The left lung showed only small scattered areas of fibrotic tuberculous disease, which had not materially changed during the previous seven years.

Tubercle bacilli were cultured from the sputum and from the pus in the intrapleural cavity at intervals during the previous seven years, and there were recurrent episodes of secondary bacterial infections of the pyopneumothorax. Amyloid nephrosis was diagnosed in 1955 and has remained unchanged clinically since that time.

Six months before the present episode the patient was admitted to hospital with a secondary pneumococcal infection of the intrapleural cavity. This responded to treatment with systemic tetracycline, and the volume of sputum was reduced from 6 to 1 oz. (170 to 28 ml.) a day. She was discharged home and remained well for four months. When the current episode of secondary infection began she was treated at home by her own doctor with chlortetracycline, 250 mg. four times a day for 16 days, but in spite of this her condition deteriorated and she was readmitted to hospital in March, 1957.

Examination showed an obviously ill woman. She had a swinging temperature of 98–100° F. (36.7–37.8° C.) and was producing about 15 oz. (425 ml.) of mucopurulent sputum a day.

A. fumigatus was isolated in pure culture on three occasions from the sputum and once from the intrapleural pus before treatment was begun. It was therefore considered to have established itself in the pyopneumothorax, and, as it was sensitive to nystatin *in vitro*, we decided to try to control the infection with this substance. 500,000 units of finely divided amorphous nystatin was suspended in 4 ml. of distilled water immediately prior to use, and was given by intrapleural instillations on successive and later on alternate days, as shown in the Chart (see next page). A total of 15.5 million units was given in 38 days.

No side-effects were noted during treatment. This was probably due to the fact that nystatin was not absorbed into