chronic pulmonary disease, but then gives reasons for preferring to consider this a "nervous manifestation of their invalidism" rather than a metabolic consequence of respiratory failure. Yet most patients with this disorder show no signs either of systemic disease or of psychoneurosis, though they soon become obsessed with the severity of their symptoms.

In view of the many different conditions with which Ekbom's syndrome has been associated,[2 4] and our ignorance of its cause or causes, it would be reasonable to classify it as a functional disorder of nervous or vascular supply to the lower limbs, provided the term is used in its true sense of a disturbance of function rather than of structure and not interpreted to mean a psychoneurosis. Certainly diazepam, which helps many patients with disorders of vasomotor and muscular behaviour such as tension headaches, often also provides relief in this distressing syndrome,[5] and perhaps those who favour a vascular cause should pay more attention to the venous than the arterial side. Its association with relaxation[6] and its common development during the latter stages of pregnancy[7] may in this respect be relevant.

M.R.C. and the squeeze

Publicly and privately supported medical research in Britain consumed about £60m. in the year 1968-9. The universities provided about a third of this and the Medical Research Council financed about a quarter.[1] The Chancellor of the Exchequer in his October mini-budget told Parliament that the grants to Government research councils were to be cut.[2] What effect, then, will this have on the Medical Research Council?

In the year ended March 1970 the Parliamentary grants-in-aid to the M.R.C. were around £17·5m. To this sum were added contributions from Government departments and other sources making an overall income for the M.R.C. of £19·1m.[3] Total direct expenditure on such things as administration, the National Institute for Medical Research, the Clinical Research Centre, and other research units was almost £14m. Indirect expenditure amounted to £5·2m., and it is this area which is probably the most vulnerable in time of squeeze. For much of the direct expenditure, committed as it is to current spending on staff salaries and building maintenance, cannot easily be cut, at least not in the short term. As most indirect expenditure goes to support individual doctors and scientists working in universities and hospitals, they may understandably be worried about the future of their research projects. Past periods of Government financial stringency appear to have been associated with a drop in the numbers of applicants for grants. If this expression of anxiety about future prospects is more than a chance coincidence it is not generally justified by events, because the publicity surrounding Government cuts usually exceeds the magnitude of any real cut in resources available for research. Certainly the M.R.C. welcomes applicants for grants despite financial stringency, for the strength of its programme for indirectly supported research depends on a good supply of applicants.

The research carried out at the M.R.C's own centres and units broadly covers the main lines of medical advance, and its overall control lies with the council.[3 4] A useful feature of its indirect grants, which are of limited duration, is that the M.R.C. can pick original or promising developments it considers justify support but which have not reached a stage of meriting long-term funds or a special unit. Cuts in these grants could have a serious effect on research.

Fortunately it seems that despite the Government's much-publicized economies the M.R.C. will have more money (expressed in 1970 prices) for the academic year which started on 1 October 1970 than in the previous year. The amount budgeted for 1970-1 is about £22·4m., and will allow awards on short-term projects (three-year grants) to rise to £3·3m. from £3·09m. in 1969-70. £1·7m. is to be devoted to longer-term projects (five years) as compared with £1·42m. previously. From 1965 to 1970 the amount of money devoted to short-term research grants has gone up by about a half, and money for training awards has been doubled, as has that for long-term grants. In the same period the Council's total expenditure rose from £11m. to about £19m.[3] This is a good growth rate, and at constant prices the grant-in-aid has increased by 49·5%, a higher rate of real growth than either the N.H.S. at about 20·5% or the national economy. Despite the cost of the recently opened Clinical Research Centre, some of which has been met from special funds, the proportions of income allocated to the council's various activities have changed little in the past five years.

Medical research is a specialized and in some respects a small world, where mutual confidence counts for much and rumours of economies can rapidly undermine it. Fortunately there now seems little likelihood of Mr. Barber's mini-budget having any damaging effect on Government-financed medical research. This news should relieve most of the anxieties felt by doctors whose research work is currently supported by the M.R.C., and doctors who were thinking of applying for assistance should not be deterred from doing so.

The Jet Set

The advent of the jet airliner has made it possible to leave Europe in the morning, fly for nine hours, and arrive in the heart of the U.S.A. on the afternoon of the same day, there to be welcomed and later taken out to dinner at a time when people at home are having the morning milk delivered. Eventually the traveller gets to bed, but by now it is his normal breakfast time so he sleeps only a few hours and then rises, perhaps working till the dawn. Feeling out of sorts, he may meet many new faces and be required to make important new decisions. Under these conditions the business man is more likely to make an unwise choice, a statesman a gaffe, and an airline pilot an error.

We have internal clocks that govern near-24-hour (or circadian) rhythms of a large number of bodily functions. Our body temperature, for example, falls in the hours before breakfast and rises sharply till 10.00 a.m., and then remains high till 10.00 p.m. before declining again.[1] Our efficiency on tasks requiring sustained attention, judgement, and intellectual effort follows a similar 24-hour curve. When suddenly we are transported to a different clock-time, or when starting on

[1] J. G. Duncan, *Constitution and Functions of the Medical Research Council*, address given to the Medico-Legal Society. In press.
[2] *British Medical Journal*, 1970, **4**, 377.
[3] Medical Research Council *Annual Report April* 1969-*March* 1970. London, H.M.S.O. 1970.
[4] *British Medical Journal*, 1970, **3**, 178.

night-shift, our internal clock does not immediately change to suit the new conditions. Body temperature and mental efficiency may take four to eight days to adapt,[1-3] and in the meantime the individual has to force himself to work at times when both temperature and efficiency are low. Sleep takes longer to adjust and is meanwhile briefer and more broken by awakenings and by frequent shifts between stages of sleep as defined by the electroencephalograph.[4 5] Industrial workers who start shift work often change their sleeping hours only on days when this is imperative and on days-off continue to sleep at night, trying to live according to normal time routines whenever possible, with the result that they never fully adjust. Consequently their circadian temperature curve may merely flatten, leaving them below their best potential while at work.[6]

The jet passenger may feel inconvenienced in a host country, but his time-clock will be readjusted almost at once on return home if the visit was short. The pilot of the aircraft is in much worse case. He may live in London, and have a biological clock with a basic adjustment thereto, but he is off to Tokyo one day, then back to London, and away to Chicago soon after. One B.O.A.C. pilot kept a careful log of his rest and sleep for 18 months, and, whereas during off-duty spells his sleep periods ranged between 6 and 7.5 hours, on flying duty they ranged from brief naps to as long as 11 hours.[7] His passengers would not have been reassured to learn that, in a representative spell of flying on North Atlantic routes this particular pilot had one period of sustained wakefulness lasting 23 hours, another of 33 hours except for a 2-hour nap, and that he fell asleep for some minutes half an hour before the time for landing. The pilot concerned recorded his own sleep on flying tours, and it averaged as much per 24 hours as during non-flying periods. There are large individual differences, however, in all sleep functions and in adjustment to changing routines of work.[8] Quite apart, therefore, from unknown qualitative defects, quantitative shortage of sleep must be presumed to occur in some aircrew, both on individual flights and over longer periods. Loss of sleep impairs performance of many kinds, and its shortage enhances the deleterious effects that a change in shift work may have on efficiency.[9]

Military and civil aircrew at times go to bed in the evening, knowing they must get up to fly at 0300 hr. Should they go to bed early with a sleeping pill, get some sleep, and accept the impairment it will cause to their efficiency next day,[10] or instead accept sleep deprivation? It is interesting to learn that Apollo spacemen have sometimes taken quinalbarbitone and dexamphetamine during missions.[11] How often such drugs are used by aircrew, and with what hazards, we shall never know.

[1]Colquhoun, W. P., Blake, M. J. F., and Edwards, R. S., *Ergonomics*, 1968, **11**, 437.
[2]Hauty, G. T., and Adams, T., *Aerospace Medicine*, 1966, **37**, 1027.
[3]Siegel, P. V., Gerathewohl, S. J., and Mohler, S. R., *Science*, 1969, **164**, 1249.
[4]Weitzman, E. D., *et al.*, *Transactions of the American Neurological Association*, 1968, **93**, 153.
[5]Weitzman, E. D., Kripke, D. F., Goldmacher, D., McGregor, P., and Nogeire, C., *Archives of Neurology*, 1970, **22**, 483.
[6]Colquhoun, W. P., Blake, M. J. F., and Edwards, R. S., *Ergonomics*, 1968, **11**, 527.
[7]Nicholson, A. N., *Aerospace Medicine*, 1970, **41**, 626.
[8]van Loon, J. H., *Acta Physiologica et Pharmacologica Neerlandica*, 1959, **8**, 302.
[9]Alluisi, E. A., and Chiles, W. D., *Acta Psychologica*, 1967, **27**, 436.
[10]Malpas, A., Rowan, A. J., Joyce, C. R. B., and Scott, D. F., *British Medical Journal*, 1970, **2**, 762.
[11]National Aeronautics and Space Administration, *Apollo 7 to 11: Medical Concerns and Results*. N.A.S.A. Technical Memorandum X-58034, Houston, 1969.

Cancer Report

What is described[1] as the first report by Dr. Joseph Issels of his work in the treatment of malignant disease was published last week. Favourable publicity in the press and on television for his results has already encouraged patients in Britain to put themselves in his care, sometimes at the expense of friends and well-wishers who have subscribed to the costs. The British Cancer Co-ordinating Committee, which includes among its distinguished members the director of the Institute of Cancer Research and the director of research at the Imperial Cancer Research Fund, has examined his claims. And the editor of the journal publishing the report expresses grateful acknowledgement to Professor John Anderson "for his verification and advice" in acceptance of the paper. Thus Dr. Issels's work, as well as offering hope to sufferers from a group of diseases too often apt to engender despair, has also engaged the attention of men whose professional life is to study them.

Unfortunately the paper[2] published last week must disappoint most of its readers. Presented, in its author's words, as a preliminary report, it outlines his concept of the cancerous process, describes the treatment he devised for his patients, and records the results he obtained on some of them. His concept is that cancer must be understood and treated primarily as a chronic systemic illness of the whole body. Loss of resistance to cancer cells allows tumours to develop. This loss of resistance is due to disorder of the mesenchymal system, preventing it from regulating and controlling the growth and distribution of normal cells and the lysis of abnormal cells, including abnormal cells which may be the origins of cancers. Treatment is designed both to reduce the rate at which abnormal cells arise and to destroy tumour tissue already present. It entails among other things the correction of "faulty diet"; the removal of septic foci in teeth, tonsils, and intestine; "desensitization of the body" by a "serum activator"; injection of "autovaccines"; treatment to restore the normal functions of damaged organs; and the elimination of psychic and emotional stresses.

The results that Issels presents for five-year survival are those obtained on 252 out of 750 patients admitted to the Ringberg-Klinik in Bavaria before May 1954. The 252 patients are referred to as a "random sample" of the 750 cases available, but the method of sampling is not described. Of the 252 patients, only 88 fulfilled all the criteria needed for an analysis for five-year survival. These criteria included a requirement that patients should have progressive tumour growth with metastases, diagnosis by an independent physician before admission, microscopical verification by a pathologist, and relapse after the termination of conventional treatment. The 88 patients comprised 48 with cancer of the breast, 15 with cancer of the colon or rectum, and 25 with cancer of the uterus. Issels compares them with the results reported by three other workers—Schwaiger, Rossolec, and Dalicho—though references to their papers are omitted. Between them these authors reported on 78 patients (only six of whom had cancer of the uterus). Of Issels's 88 patients 16 (18·2%) were alive after five years; of the 78 "control" patients seven (9%) were alive after five years. Even if the cases reported in the three papers were sufficiently similar to Issels's patients to be satisfactory controls—and no evidence to this effect is given—the overall difference between the numbers of five-year

[1] Phillips, S., *Clinical Trials Journal*, 1970, **7**, 355.
[2] Issels, J., *Clinical Trials Journal*, 1970, **7**, 357.