were offered some security for themselves and their families to offset their losses—for example, in pension rights—in going abroad. But this demands strong central machinery, oiled with block grants, which has not yet been created and which the Government's new step seems to place more firmly in never-never land.

CONTROL OF CEREBRAL BLOOD-FLOW

Regulation of the cerebral circulation in health and disease was the principal topic at an international symposium held on Sept. 16–19 by the Cerebrovascular Research Group of the National Hospital, Queen Square, London.

Under normal circumstances the blood-flow to the brain is delicately adjusted to meet metabolic requirements, and, although total cerebral perfusion remains relatively constant, local hyperæmia may result from regional increases in neuronal activity. Metabolic regulation of this kind is thought to be mediated principally by changes in the chemical milieu of cerebral arterioles, although neurogenic factors may possibly influence the magnitude of the response. The capacity of cerebral arteries to react in this way may be demonstrated by measuring the changes in blood-flow at different levels of $Paco_2$. Cerebral arterioles also have the capacity, again largely independent of nervous control, of altering in calibre in response to changes in transmural pressure gradient, thus maintaining vascular resistance in a constant relationship to pressure (autoregulation). Within physiological limits, blood-flow is thereby buffered against variation in blood-pressure and intracranial pressure.

In brain disease these precise homœostatic mechanisms may be upset in several ways. Firstly, vascular smooth muscle may be damaged by ischæmia and by œdema, or the lumen may be blocked by thrombus so that arterioles no longer autoregulate and respond to metabolic stimuli. Biochemical alterations, notably acidosis, also affect vascular reactivity not only in the ischæmic area but in the surrounding brain. Under some circumstances some vessels lose autoregulation while retaining sensitivity to CO_2[1]; and in some lesions, notably tumours, shunt vessels bypassing the capillary bed may develop between arteries and veins. Secondly, a rise in intracranial pressure resulting from brain swelling or venous engorgement may reduce the effective transmural pressure, and a severe rise may produce compression of the capillary bed with increased vascular resistance. Thirdly, the metabolic requirements of the brain may be altered so that a blood-supply which would normally be appropriate may be excessive. Thus in the same pathological process some areas of brain may be overperfused while others are ischæmic.

Changes in blood-pressure or CO_2 on a background of disturbed homœostasis may complicate matters still further. In the laboratory animal hypercapnia, by effectively dilating vessels only in normal areas, may still further reduce blood-flow to an ischæmic region.[2] Conversely, hypocapnia, by constricting surrounding normal areas, may increase flow to an ischæmic zone; and it has been shown experimentally that occlusion of the middle cerebral artery during hypocapnia causes less cerebral infarction than under normocapnic conditions.[3]

These paradoxical reactions to CO_2 have clinical implications in occlusive vascular disease, and at the symposium preliminary results of hyperventilation therapy in recent cerebral infarction were reported. Although mortality was lower in the treated group than in controls, no significant difference in residual disability was detected. Possibly the treatment acts by reducing œdema and cerebrospinal-fluid pressure rather than by redistributing blood-flow. These disappointing results should not inhibit further trials of hyperventilation therapy in less severely affected patients—especially when treatment can be started at an early stage. The growing interest in the measurement of cerebral blood-flow and of the effects of therapy should help to dispel the aura of fatalistic pessimism which has for so long surrounded the patient with an occlusive stroke.

COMPUTERS AND IMMUNISATION

THE West Sussex immunisation scheme is often cited as an illustration of the successful use of computers in performing routine administrative procedures. In a detailed assessment of the cost of the first five years of this scheme (1963–68) Saunders [4] has demonstrated that during this period infant-immunisation rates rose more rapidly in West Sussex than in England and Wales as a whole, and that by 1968 the cost was considerably lower than the national average. Saunders has estimated expenditure per completed procedure (unit cost) as opposed to expenditure per 1000 population, because unit costs allow for the fact that higher immunity-rates will result in higher costs. Saunders assesses the saving in local-authority, executive-council, and general-practitioner clerical work, and concludes that the unit cost of the West Sussex scheme is 2*s*. less than that of England and Wales (3*s*. 6*d*. as opposed to 5*s*. 6*d*.). Development costs—designing the computer system, changing from manual to automated record storage, and teething problems—are recoverable within two years of the end of the three-year transitional period. Saunders suggests that if this scheme were introduced nationally there could be a reduction of about £753,000 per year in the cost of immunisation. There would also be additional advantages in, for example, an improvement in immunisation status throughout Britain, the removal of the need for conventional health education, a reduction in staff and storage space used for records, and the simplification and centralisation of administration.

While acknowledging the usefulness of the West Sussex scheme, it is necessary to point out that its success may have been due to factors quite unrelated to the introduction of the computer. Over the past

1. Easton, J. D., Palvölgyi, R. *Scand. J. clin. Lab. Invest.* 1968, **102**, suppl. 5.
2. Brawley, B. W., Strandness, D. E., Kelly, W. A. *Archs Neurol.* 1967, **17**, 80.
3. Soloway, M., Nadel, W., Albin, M. S., White, R. J. *Anesthesiology*, 1968, **29**, 975.
4. Saunders, J. *Br. J. prev. soc. Med.* 1970, **24**, 187.

decade immunisation-rates have improved strikingly throughout England and Wales (as they have in the United States [5]). The relatively greater improvement in West Sussex may be partly attributable to the widespread publicity given to the scheme and to the enthusiasm of the local medical officer of health. Simple before-and-after comparisons may well be misleading in the evaluation of public-health measures, and considerable care should be taken before attributing changes over time to any one cause.

Reports from the United States of different immunisation programmes permit a comparative assessment of the success of the West Sussex scheme. In evaluating an infant-immunisation programme in Kentucky Martin et al.[6] found that postal notices did not result in improved immunisation status in the community. They suggested that knowledge about childhood immunisation was already as extensive as could be expected. Home follow-up, or immunisation immediately after birth or during periods of minor illness (when the child would in any case be under medical care), are proposed as alternative methods of reaching those whose attitudes remained unaffected by health education. In Tennessee an intensive two-year follow-up programme of preschool children was found to result in increases of 12% for poliomyelitis and diphtheria/pertussis/tetanus immunisations, 3·4% for smallpox, and 23·6% for measles.[7] A more direct comparison with the West Sussex scheme is found in an evaluation of the efficacy of an immunisation-surveillance programme in Rhode Island.[8] A list of children due for immunisation was compiled by computer from birth records, and postal notices were sent to all parents in the experimental group; the control group was not contacted. Non-respondents received a further mailing, and, if necessary, a home visit. The programme was most effective in the lower social classes, and diminished with increasing socioeconomic status. The cost of this programme compares unfavourably with that of the West Sussex scheme, being $2 per annum per child and $42 " per additional child immunised " (i.e., those immunised as a result of the programme). However, the higher cost of American medical care must be borne in mind, as must the different method of cost assessment. To reduce expenditure Byne et al.[8] suggest that home visits should be restricted to the lower social classes and that neighbourhood health aides should be used instead of nurses. These three studies all demonstrate the efficiency of the West Sussex scheme. Only in Tennessee [7] were immunisation-rates as high as in West Sussex, though differences in attitudes towards medical care and in social-class distribution may be of considerable importance in such comparisons.

In what circumstances and for which diseases is immunisation always desirable? Doctors have often been reluctant to make changes in established practice —it was many years before smallpox vaccine was given in the second, instead of the first, year of life. Cost is not the only relevant criterion for assessment, and the existence of an economic and efficient system should not be allowed to obscure the need for constant evaluation of immunisation programmes.

5. U.S. Department of Health Education and Welfare. United States Immunization Survey, 1969. U.S. Public Health Service, 1970.
6. Martin, D. A., Fleming, S. J., Fleming, T. G., Scott, D. C. *Publ. Hlth Rep., Wash.* 1969, **84**, 605.
7. Bistowish, J. M., Baird, S. J. *ibid.* p. 1032.
8. Byne, E. B., Schaffner, W., Dini, E. F., Case, G. E. *J. Am. med. Ass.* 1970, **212**, 770.

DARK SIDE OF ADOPTION

WHY are so many bad adoptions still being made—and so many good ones not being made? Why are adopted children over-represented in children's psychiatric clinics, even though they have been carefully examined before adoption? And why do the courts, against the medical and social evidence, so often consign a child to the care of its natural parents rather than allow it to be adopted? These are some of the questions asked by Dr. Christopher Ounsted in his Hilda Lewis memorial lecture on Oct. 14.

Many bad adoptions are being made, Ounsted maintains, because incompetent people are at work. All adoptions, he urges, should be arranged by proper agencies, in the light of all existing knowledge; and, most important, these agencies must follow up their cases. Many agencies have no idea of the outcome of their cases once the adoptions have gone through. Ounsted's analysis of his own experience shows that only one specific behaviour problem—compulsive stealing—is found in excess in adopted children; and this excess is present only in the children placed after the age of six months. One important factor in the difficulties of the children is almost certainly the age of their adoptive mothers. In England, at least, they enter parenthood much later than natural mothers, and so tend to be less adaptable, and also less amenable to treatment when things go wrong. In addition, they may well be going through the menopause at a time when the child's problems are at a peak. Certainly part of the answer is to ensure that children are adopted as quickly as possible by parents who are as young as possible—which has implications, in particular, for those involved in the diagnosis of infertility.

Much of Ounsted's disquiet is directed to the role of the courts in adoption cases. First of all, the Law has in the past tended to treat the child as part of the natural parent's property—and has been reluctant to transfer it to another party. And secondly, the Law has a notable respect for the " blood-tie ". The courts have been known to act as if this tie can withstand years of separation from parent (or grandparent). On the contrary, says Ounsted, there is no evidence that a blood-relationship ensures a satisfactory outcome; much more important are the child-adult relationships early in life.

Experts on adoption have for years been urging that the child's interests should always come first. Ounsted makes a plea that the Law should finally drop the notion that these children are chattels of their natural parents, and should start to take more note of science. The dark side of adoption, he says, is ignorance. And this is not confined to the jurists. If the courts do come to rely more on expert testimony, then this testimony will have to be well founded; and the first step in acquiring the facts will be to ensure that the outcome of every adoption case is known.