needed to be wakened several times before he could be got to rise by nine the next morning, and he passed the rest of the day in an incredible stupidity."

Denis attributed this state of affairs to loss of blood rather than to the fever. He accordingly bled the boy of 3 ounces (86 g.) and transfused about 9 ounces (255 g.) into his arm from the carotid of a lamb. The boy felt a burning along his arm, but had no other symptoms and quickly recovered from his drowsiness, becoming as nimble as before and putting on weight. Encouraged by this result, Denis tried another transfusion on a man of 45 "having no considerable indisposition"—in fact the experiment had little justification. The man was bled 10 ounces (283 g.) and was given 20 (567 g.) in exchange from a lamb. He had the same pain along his arm as the first patient, but felt stronger than before and cheerfully slaughtered and flayed the donor lamb, being a butcher by profession. Later Denis performed further transfusions, and one patient, suffering from "an inveterate phrenzy," showed every sign of having received a considerable amount of incompatible blood, exhibiting pain in the arm, a rapid and irregular pulse, sweating, pain in the back, vomiting, diarrhoea, and finally passing urine almost black with haemoglobin.

The best the London *virtuosi* could do was to publish in the *Transactions* for 21 October 1667 part of a letter from Dr. Edmund King describing his *preparations* for transfusing a man from an animal, though the experiment had not actually been done. It was not until 23 November of that year that Arthur Coga, an indigent Bachelor of Divinity of Cambridge, was transfused with lamb's blood by Drs. Lower and King at Arundel House. He suffered no inconvenience and asked for a second transfusion, no doubt in return for a

suitable reward. Samuel Pepys witnessed both the early experiments and the first one done on a man, making many pleasant quips about it in his diary.

It is clear that, though London had priority for the initiation of the preliminary transfusion experiments, Paris could justly claim it for the therapeutic operation on a human being. Even when London first transfused a man, it was purely experimental, not therapeutic. So let us hand the laurel to Paris in this, the tercentenary, year—though we must also record that the value of this priority was soon to be sadly discounted. Denis published five more pamphlets in 1667 and 1668, but in the latter year one of his patients died after three transfusions, and proceedings against the doctor were instituted by the widow. When brought to trial Denis was exonerated, the patient's death having been proved to be due to arsenic administered by his wife. Nevertheless a law was introduced forbidding the performance of any transfusion without the permission of the Faculty of Medicine of Paris. The Faculty was in any case strongly opposed to the whole idea and the practice of transfusion from animals was quite rightly abandoned. In London, too, no account of the second transfusion given to Coga was ever published, since the affair was bringing ridicule and discredit on the Royal Society. Indeed, little further was heard of blood transfusion for more than a hundred years. A tercentenary likely to elicit more enthusiasm will not be due until the year 2118. It was on 22 December 1818 that James Blundell, obstetrician to Guy's and St. Thomas's Hospitals, described in a paper delivered to the Medico-Chirurgical Society the first blood transfusion from *man-to-man*, performed with the help of a surgeon, Henry Cline. That was the true beginning of modern therapeutic transfusion.

CONTEMPORARY THEMES

Some Weaknesses in Hospital Service Organization

GEORGE DISCOMBE,* M.D., B.S.C., F.C.PATH., F.R.I.C.

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It is now clear that no appeals or protests are likely to produce a big increase in the money allotted to the National Health Service. This is a political decision taken because taxation is already heavy, and all Government spending must be kept within the bounds of practicable taxation. Cries to "Take the N.H.S. out of politics" are futile; though everybody wishes to provide excellent medical care, the cost—over £1,500m., or over £30 for every man, woman, and child in the country—can be provided only by the Government out of taxation, which must always be a political matter.

Waiting-lists

The waiting-list for admission to hospital remains steadily at about half a million—about four weeks' admissions; but since in many hospitals half or more of admissions are emergencies the delay for elective admissions may be several months, so that a patient with a simple hernia or with varicose veins may wait for several months. A reduction in stay of only one day for each patient would increase the throughput of the N.H.S. hospitals by about 300,000 each year, and presumably reduce the waiting-list.

The reasons for waiting-lists, like their size, vary from region to region, from hospital to hospital, and from department to department. About 15% of hospital beds for acute cases are occupied by long-stay patients, many of whom are suitable for local authority geriatric homes, were there enough of them; but these again have to be provided for out of taxation. In my own hospital some specialist waiting-lists are inflated because many of those on them have been offered admission but have asked for a delay, thus wasting one or two bed-days. Those who refuse are usually women who cannot arrange for their young families to be looked after during their absence. Closer co-operation between hospital admission officers and local authority social services might reduce these difficulties. Some waiting patients need investigations which could be done while they were outpatients were a day ward available, or radiological or laboratory facilities improved, or, what may be equally important, if sufficient specialist time was available for cystoscopy, gastroscopy, and the like.

In some hospitals the limit to surgical admissions is the time available in operating-theatres. I have heard one surgeon complain that within a month two of his patients had died while he was waiting for an operating-theatre to become available. Registrars complain to me that patients are avoidably detained in hospital to await specialized radiological or

* Pathologist, Central Middlesex Hospital, London N.W.10.

biochemical investigation. During the past few years I have visited several laboratories to study their needs, and repeatedly found that within the space available at present each needed to spend £4,000 to £6,000 to make the laboratory reasonably effective—quite apart from needing more building because they were grossly overcrowded. In these hospitals, as in my own, inadequate laboratory services are a considerable check on patient throughput. In some hospitals this check can be removed by improvements in equipment, though others need more buildings or more staff. Since the demand for biochemical investigations doubles every five or six years, the laboratory will increasingly limit the throughput of a hospital.

Limits to Throughput

Thus the factors which limit throughput are often not a lack of beds but lack of operating-theatres and of radiological or laboratory facilities. We do not know for how many hospitals this is true; but in such hospitals it is much cheaper to improve these facilities than to provide more beds, which in such cases would not affect throughput and yet would demand more nurses, thus uselessly increasing the cost of treatment.

Most hospitals would benefit from an analysis of the factors which limit throughput; in many cases the different clinical units would be affected differently by single specific changes—thus the gastroenterologists may need more laboratory and radiological investigation and the surgeons more theatre time or radiological services. Some sort of analysis of social effectiveness is also needed so as to evaluate the importance to families and to the body politic of clinical advances; for example, an intensive coronary care unit may cut the early death rate by 20% but produce semi-invalids of limited or zero ability to work. Such analyses and comparisons are notoriously difficult, but might indicate directions in which expenditure would be most effective.

Operating-theatres, laboratory facilities, radiological departments, day wards are not cheap to provide, because they usually require new buildings; but within each building there are individual items of equipment that are much less expensive—air-conditioning or operating-tables for the theatre, auto-analysers or data-processing equipment for the laboratory, image-intensifiers or developing units for the radiological department. Such individual items cost £500 to £5,000—0.025 to 0.25% of the annual expenditure of a hospital but 10 to 100% of the money available for all innovations. An increase in revenue of 1% might produce enough to bring considerable improvements to the services available by making it possible to purchase modern equipment.

How can individual hospitals obtain such an increase without recourse to taxation? There are three possibilities—the encouragement of private beds within the hospital service, the encouragement of charitable gifts through the Leagues of Friends, and the imposition of direct charges. This last is very much a political problem, so that here I will confine myself to the former two.

Private Beds

A system where private practice continued separately from and independently of the N.H.S. would inevitably lead to a division of the profession into two groups. The founding fathers of the N.H.S. hoped to overcome this danger by establishing part-time hospital appointments for senior men ("consultants") and by paying salaries sufficient to provide an income comparable to those which could be obtained in private practice. We are now faced with a situation in which an increasing proportion of the middle class are paying insurance premiums in order to obtain the facilities of private attention, oblivious to the fact that outside the N.H.S. are few hospitals with the facilities required for all modern medical

services. Whereas in my hospital a surgeon can, if it be essential, organize an emergency blood transfusion within minutes, and at my outlying hospitals within an hour, the delay in most private hospitals and nursing-homes is far greater, so that in the few cases of unexpected emergency in private hospitals to which I have been called I have preferred to transfer the patient to an N.H.S. hospital—a course adopted by many others.

The facilities which can be obtained in private practice are few, but they are important to many middle-class patients. Among them are privacy, some choice in the time of admission or at least advance warning, and the assurance of the personal attention of the chosen consultant. The importance of privacy can be overstressed—indeed, it is most important for patients whose illness is not severe, such as the business executive recovering from an elective operation. Advance warning of the time of admission is very important to those with managerial responsibilities, whether in office, factory, or home (the housewife is a manager and frequently refuses admission when offered because of the difficulties of running her home). Assurance of personal attention is said to be the backbone of the system of personal doctoring, though I confess that in hospital today the individual consultant is becoming submerged in his team.

There seems to be a choice of two courses: to have two distinct services, clearly separate, one marked "private," the other marked "N.H.S.," or to have a choice within the N.H.S. between two categories of service—the one very much as it is today for most of the population, the other a "private" service providing greater privacy and facilities for such business or social activity as is possible, a reasonable choice in the time of admission, and the certainty of the attention of the consultant of choice and his team.

The cost of private beds anywhere is upwards of £7 daily, the average cost of any N.H.S. bed. At present many large hospitals have no private beds, others barely 1% of their total; many less well equipped small hospitals have 2 to 3%. These proportions could with advantage be reversed: if a 75% bed occupancy were secured for private beds numbering 2% of the total beds in a hospital, then the contribution of 1.5% to the hospital's expenditure would make a considerable difference to the facilities available, and if it resulted in improvements to the services which were limiting throughput it might well result in an increase in the patient-turnover of the hospital as a whole. This assumes, of course, that the receipts from private beds would remain with the hospital group and not be remitted to the Exchequer as is the present practice.

Treasury's Accounting System

The standard accounting system is no doubt admirable for administrative departments; but it is not so admirable for service departments like the N.H.S. in which changes are often needed at short notice. To insist that underspending in one section of accounts may not be set off against overspending in another seems absurd when a capital investment of £2,000 may produce a revenue saving of £800 a year. To insist that sums received by a hospital management committee shall be returned to the Treasury rather than be retained by the committee discourages those officers who are concerned with the collection of such dues, whereas if these receipts were available as extra money for the hospital management committee there would be a direct incentive for the officers to collect every possible penny. No hospital management committee is encouraged to save when any "underspending" is returned to the Treasury at the end of the financial year; but if saving from year to year were permitted (especially of the small sums allowed for "innovations") great care would be exercised in the choice of equipment, contrasting with the present hectic spending spree which starts in February when

the treasurers of regional hospital boards and hospital management committees discover that they may have a surplus.

League of Friends and Charity

From the inception of the N.H.S. it has been policy to prevent hospital administrators soliciting gifts to their hospitals. The reasons are many, but the most important was to break down the idea that the N.H.S. was a charity instead of a service provided by taxpayers for themselves and their dependants to use as a right; and I, for one, think that this break with mediaeval tradition was right and necessary. But now, after 20 years' work, the idea of the N.H.S. as a "charity" must be dead except among the most elderly and those who will never accept any change. Local patriotism is still active.

Most people are benevolent and find the chance of exercising benevolence pleasurable. Until the last war hospitals were the most important object of benevolence, and an organization such as that of the Freemasons supported equally education, the care of the aged, and hospital care. What the Freemasons realize, and what most of the population have not discovered, is that all these establishments need to be maintained. It is comparatively easy to persuade people to give money for bricks and mortar, which they can see and take pride in; it is much more difficult to persuade them to pay for porters, domestic orderlies, postage, and mechanical aids to cleaning. Their consciousness of having exercised benevolence seems to make them expect others to exercise benevolence by giving their services free; yet administrators know that the annual maintenance of a unit such as a pathology laboratory may equal or exceed the initial capital expenditure on building and services.

The conclusion is therefore that if we are to encourage people to give to their local hospital the gifts should be used to buy equipment which demands the minimum of revenue expenditure. Building and general planning must remain the prerogative of the regional hospital board and hospital management committee; but much of a department's equipment, and certainly replacements for old and obsolete equipment, could be given by the public. Yet these are the very things of

which the public can have little or no knowledge unless it receives specific instruction.

Such specific instruction should not be the prerogative of individual consultants trying to build up a department, because when this happens other parts of the hospital—for example, radiology and clinical laboratories—may be overloaded. Further, it should be organized on a group basis, rather than for individual hospitals, partly to minimize jealousy between hospitals and partly to make sure that large gifts are not devoted to hospitals unable to use them effectively and efficiently. It seems reasonable for hospital needs to be analysed by the group medical advisory committee, and the order of precedence and sums required communicated to the lay organization through the hospital management committee mechanism, preferably by the group secretary or his deputy, who will be able to advise the group medical advisory committee about possible future changes in organization.

Conclusion

From the point of view of national finance these suggestions seem harmless. They require no increase in taxation. They would divert income, after taxation, away from personal expenditure into a field which is notably short of money, and much of this income would be spent on the purchase of scientific equipment, most of which home industry is able to supply. It is generally considered that a flourishing and stable home market is a necessary condition for satisfactory exports, so that the changes I have suggested might even improve the balance of payments.

There is a strong and universal emotion that wealth should not control access to medical facilities—a feeling which to a large extent I share; but if wealthy people wish to pay so that more attention is given to their convenience and comfort than can be provided by the N.H.S. for the general run of the population, then surely it is better for this desire to be satisfied within the N.H.S. than outside it. This would be valuable if the money thus received were retained in the hospital group and devoted to improving local facilities. I am satisfied that in some hospitals this would actually increase the number of patients treated in "non-private" beds rather than reduce them.

CONFERENCES AND MEETINGS

Clinical Electroencephalography in Childhood

[FROM A SPECIAL CORRESPONDENT]

A symposium on electroencephalography in childhood was held in Gothenburg in Sweden in August. There was a wide range of topics, from studies on young animals to clinical investigations on children, and, in addition, advanced apparatus was discussed.

Dr. N. MONOD and Dr. P. DUCAS (Paris) discussed the prognostic value of the electroencephalogram (E.E.G.) in the first two years of life of a child. A grossly abnormal E.E.G. in full-term or premature newborn babies was related to an unfavourable clinical evolution in 95% of the cases. An exception to this trend was represented by mongolism and kernicterus, where in spite of the severe clinical sequelae the E.E.G. abnormalities in the neonatal period were minimal. Dr. C. DREYFUS-BRISAC and A. MINKOVSKY (Paris) had studied the E.E.G. of 96 "small for dates" newborn babies. The assessment of

gestational age could be correctly made (within two weeks) in 73 babies who were in reasonable general conditions (out of a total of 96 babies). Dr. Dreyfus-Brisac had been able to recognize differences in the E.E.G. features between true prematures (born before 37 weeks) and "small for dates" newborn babies in 90% of the cases.

The host of the conference, Professor INGEMAR PETERSEN (Gothenburg), reported with his co-workers Dr. EEG-OLOFSSON and Dr. SELLDEN on the occurrence of paroxysmal activity in the E.E.G. of normal children. They had found that out of 1,000 normal children some form of paroxysmal activity in the E.E.G. occurred in 99. When this figure was broken down, however, 38 children showed only abnormal responses to photic stimulation, while a further group of 36 children showed only paroxysmal discharges

during sleep. These workers had found that the amount of paroxysmal phenomena in the E.E.G. was significantly greater in girls than in boys. The prognostic importance and the correct evaluation of these abnormal E.E.G. features in apparently normal children could not be fully appreciated without a very long-term follow-up.

Localization Technique

Some of the papers dealt with applications of special techniques to particular problems. Among these Dr. BECHTEREVA (Leningrad) reviewed special techniques for the localization of lesions, and Dr. W. A. COBB (London) was able to record peculiar phenomena from the depth of the brain in one patient with subacute sclerosing leucoencephalitis.