

clear, even if the ways for getting them are not. Firstly, general practitioners must have a sound knowledge of medicine. Secondly, the conditions in which they practise must be such that they can apply their knowledge to the full. Thirdly, they must have time for unhurried clinical work. Fourthly, they must have time to keep up to date. Fifthly, their pay must be enough to ensure for them a fair standard of living. Doctors must in the main learn as they earn, and there is no greater stimulus to keeping abreast than working alongside colleagues in the same and in other branches of medicine. The trend must be towards practice in groups and closer association with hospitals. It is for consideration whether that might lead naturally to a unified medical service based on hospitals and with a common career structure for doctors.

Fears that in the demand for greater efficiency in medical practice the more human needs of the patient may be forgotten are not groundless. One of the finest features of British general practice is the admirable relationships which have bound doctors and patients together. Some of the art in medicine, so essential when science was lacking, is outworn. But modern medicine takes patients as well as doctors anxiously into unfamiliar ground. If courtesy, kindness, and gentleness form part of the art of applied medicine then there will be more need than ever in the future for the exercise of these qualities in the doctor-patient relationship. It is never out of time for doctors to remind themselves that if one of their prime duties is to cure when possible so it is also to comfort always.

## Penicillin Encephalopathy

Not long after penicillin first became available it was realized that it could cause epileptic fits if injected directly into the brain or if too concentrated a solution was introduced into the ventricles or the subarachnoid space.<sup>1 2</sup> This led to the use of diluted solutions in the intrathecal treatment of, for instance, pneumococcal meningitis. And despite long-term treatment in high dosage given by mouth or intramuscular injection to thousands of patients toxic effects on the nervous system have been rare. They have included occasional hypersensitivity reactions and the disastrous results of direct injection into a nerve trunk. The protective action of the blood-brain barrier and the efficiency of clearance mechanisms no doubt prevent toxic levels being reached in or around the nervous tissue. However, if either or both of these mechanisms break down, and if in addition the penicillin is given intravenously in very high dosage, as in the treatment of some relatively resistant Gram-negative organisms, then a much more dangerous situation may arise.

Since 1952 nine cases have been reported of an encephalopathy developing under such circumstances, and H. A. Bloomer, L. J. Barton, and R. K. Maddock<sup>3</sup> have now added four of their own. By describing these in conjunction with six of the previously reported cases they have built up a remarkably uniform clinical picture. All the patients except

one were in their sixth to eighth decade, and all had renal insufficiency at the time of the onset of toxic symptoms. Penicillin was being administered intravenously for infections with resistant Gram-negative organisms in a dosage amounting to at least 25 million units per day, and often considerably more. After two to three days the patients' conscious level became depressed, some becoming comatose, and this was rapidly followed by myoclonic jerking, affecting particularly the face, pectoral muscles, and limbs. The jerks were at one time focal, at another generalized, sometimes occurring in bouts resembling a status epilepticus. In between these bouts some patients were able to communicate normally, but in others generalized convulsions also occurred. Phenobarbitone gave little benefit, but liberal and repeated use of paraldehyde controlled the myoclonus. In seven patients on discontinuing the penicillin the syndrome settled down, but coma persisted in the remaining three and death ensued. Few of these patients had any history of disease affecting the central nervous system, and they were not overhydrated, hypertensive, or suffering from electrolyte disturbance. The same authors refer to a similar syndrome, developing under similar circumstances, in a uraemic patient on intravenous sodium cephalothin and point out that renal failure potentiates the toxic effects of chloramphenicol, streptomycin, and polymyxin.

Clearly it is necessary to bear in mind the danger to the nervous and vestibular system of antibiotics given intravenously in high dosage to patients in renal failure, a point emphasized only a few weeks ago in this journal by the studies of J. R. Curtis, S. J. McDonald, and J. H. Weston<sup>4</sup> on the use of gentamicin. Indeed the symptoms may be mistaken for uraemic convulsions rather than for an effect of the treatment. For such patients it is possible that bactericidal levels of the antibiotic may be obtained on lower dosage and with less danger to the nervous system. And if, as it seems, penicillin G is particularly apt to produce such an encephalopathy, other antibiotics might be considered as first choice in treatment. When a preparation is as safe as penicillin there is a danger of becoming a little careless about its use, and this recent study sounds a timely note of warning.

## Rheumatic Fever in Scotland

In 1939 2.6% of London schoolchildren under 15 years of age had had rheumatic fever,<sup>1</sup> though its incidence had been falling for many years. The crude annual death rate from rheumatic fever in England and Wales was 67 per million living in 1901, 23 per million in 1939, and 2 per million in 1965.<sup>2 3</sup> The fall continues, but the disease still presents important problems, for its victims are mainly children and young adults, and with proper application of our present knowledge it could be largely eliminated. In addition, though new cases are now uncommon, there are still a large number of patients with heart disease resulting from rheumatic fever.

In 1962 the Standing Medical Advisory Committee of the Scottish Health Services Council appointed a subcommittee "to consider the problem of rheumatic fever and rheumatic heart disease in Scotland with particular reference to the incidence of these diseases and the means of prevention." Its report,<sup>4</sup> recently published, gives the facts in Scotland,

<sup>1</sup> Johnson, H. C., and Walker, A. E., *J. Amer. med. Ass.*, 1945, 127, 217.

<sup>2</sup> Walker, A. E., and Johnson, H. C., *Arch. Surg.*, 1945, 50, 69.

<sup>3</sup> Bloomer, H. A., Barton, L. J., and Maddock, R. K., *J. Amer. med. Ass.*, 1967, 200, 121.

<sup>4</sup> Curtis, J. R., McDonald, S. J., and Weston, J. H., *Brit. med. J.*, 1967, 2, 537.