infection; and, secondly, do they help to eliminate infection from the gastrointestinal tract and thereby reduce the risk of cross-infection? With regard to the first point there was some evidence from the Manchester outbreak in 1968 that a few children on gentamycin or colomycin fared better than those on other antibiotics.12 Recently M. Coetee and F. M. Leary,13 from Capetown, have reported encouraging results on the use of gentamycin in gastroenteritis due to E. coli strains. Their findings in 90 acute cases showed a rapid clinical improvement with intravenous correction of fluid and electrolyte imbalance followed by gentamycin as soon as the bacteriological diagnosis was made. On the other hand a further 29 children with severe illness requiring rehydration did equally well without gentamycin.

On the use of antibiotics to control the spread of infection various studies have shown clearance rates of the infecting organism from the bowel of 20-90% in colisti-treated cases. But natural clearance occurs in untreated cases, and relapses sometimes follow treatment. This is true of Salm. typhimurium infection as well. Without careful bacteriological control of treated and untreated cases evaluation of antibiotic therapy in eradicating the organism is extremely difficult. This point is well borne out by Ironside and colleagues. A Medical Research Council report on gastroenteritis is often quoted as proof of the efficacy of antibiotics in this condition. This study was carried out 20 years ago with antibiotics which would not now be used for treatment of gastroenteritis (sulphadiazine, chloramphenicol, and aureomycin), and, as Ironside and colleagues comment, the investigation contained inconsistencies because other antibiotics were also used in the treated and control groups.

There would seem to be a good case for a new, controlled trial in an attempt to settle this important issue. In the meantime it would seem unwise to place too much reliance on antibiotics to prevent cross-infection. The first line of attack is skilled nursing and strict attention to ward and cubicle technique. In particular, scrupulous attention should be paid to hand-washing when handling infected infants, with doctors also observing the rules and thereby setting an example. This applies equally to infectious-disease units and to neonatal surgical units. In addition, hospital regulations should provide the necessary administrative control, so that cases can be quickly identified and decisions taken to restrict or suspend admissions to potentially susceptible areas.

At the same time an alternative approach, that of immunophylaxis, requires consideration. With the resurgence of interest in bacterial vaccines,15 studies by R. Triau and his colleagues16 17 on the use of active immunization by mouth with antigenic extracts of pathogenic strains of E. coli are encouraging. They showed higher levels of IgA globulin (and to a less extent IgM) in the faeces and duodenal juice of vaccinated than in unvaccinated children. They also found higher levels of E. coli antibody in duodenal secretions in the faeces, but not in the serum. This approach is supported by experimental studies, and though the work is in the early experimental stage it would seem to be worth further exploration. Alternatively, passive oral administration of serum or globulin containing specific IgA might be considered. There is no doubt that we still have a great deal to learn about this disease.

1 British Medical Journal, 1969, 2, 263.
4 Brosch, J., Journal of Pathology and Bacteriology, 1945, 57, 239.
5 Ironside, A. G., Brennand, J., Mandal, B. K., and Heyworth, B., Archives of Disease in Childhood, 1971, 46, 815.
13 Coetee, M., and Lundy, P. M., Archives of Disease in Childhood, 1971, 46, 466.
15 Frederick, M. J., and Brothers, C. M. F., Lancet, 1970, 1, 1312.

Viral Hepatitis

The latest edition of the British Medical Bulletin is on viral hepatitis and provides an excellent review of this topical subject.1 F. O. McCallum and his co-workers in the 1940's were among the first to show that there were two main forms of the disease—namely, the short-incubation form or infectious hepatitis and the long-incubation form or serum hepatitis.

For many years after this little progress was made because no tests were available with which the viruses could be demonstrated and because neither virus could be cultivated in the laboratory. This changed dramatically with the discovery of Australia antigen in 1964.2 Australia antigen is present in the serum of most cases of serum hepatitis in the acute phase of the illness and can be detected by a variety of immunological tests. In reviewing these techniques Patricia Taylor points out that the best available methods probably detect only from 20 to 50% of the carriers of the virus and clearly more sensitive methods of detecting the antigen are required. The recent discovery that different samples of Australia antigen are antigenically heterogeneous3 is of considerable importance in this respect. All the samples examined contained one antigen in common, but they also possessed other antigens which were not present in all samples and by which three subgroups of Australia antigen can be identified. This suggests that tests might lack sensitivity unless the antisera with which tests are carried out contains antibodies to these additional antigens. A. J. Zuckerman describes the multiplication of Australia antigen particles in organ cultures of human embryo liver, and though this technique is of limited value for cultivation of virus on a large scale it may well be possible to adapt the virus grown in this way to a different—and easier—culture system.

In most patients with serum hepatitis Australia antigen disappears from the blood during the first six to 12 weeks of convalescence, but a few patients develop long-lasting antigenaemia. Though this antigenaemia is not necessarily accompanied by signs of liver dysfunction, some of these patients eventually develop chronic liver disease. Australia antigen is in fact present in some patients with chronic active hepatitis, which indicates that some cases of this disease, though probably not all, are due to persistent infection following an attack of serum hepatitis. The apparently healthy carrier with antigenaemia but with no history of serum hepatitis is another problem. A proportion are probably suffering from subclinical hepatitis. There have been
The discovery of Australia antigen was followed by reports of a different serum antigen, which appeared to be associated with infectious hepatitis. This antigen, the Milan or epidemic-hepatitis-associated antigen, was detected by precipitation reaction with an antiserum from a Milanese patient whose serum also contained antibody to Australia antigen. But A. J. Zuckerman presents evidence that this antigen is probably an abnormal serum lipoprotein which appears as the result of liver damage due to various causes and is not specifically associated with infectious hepatitis. In another article A. A. Ferris describes the discovery of an antigen in the faeces of patients with infectious hepatitis. The antigen cross-reacts with the larger Dane particles but not with the smaller particles of Australia antigen. Like Australia antigen it disappears during convalescence, but it has not so far been found in samples of serum. It appears to be relatively common in patients with infectious hepatitis and is rarely found in control groups, but its role in the disease requires further investigation.

Though serum hepatitis may occasionally be acquired by ingestion or inhalation, there is no doubt that parental inoculation or contamination of the skin by blood or blood products is the commonest route of transmission. Screening of blood for transfusion for the presence of Australia antigen is therefore of great importance, and W. d'A. Maycock discusses the control of the disease from the point of view of blood transfusion services. Fortunately the system of voluntary donation in Britain means that the incidence of Australia antigen among donors is very low. Nevertheless all blood for transfusion should nowadays be screened before use. The problem of serum hepatitis has been greatly increased by the formation in many hospitals of units for renal dialysis and transplantation. B. P. Marmion and R. W. Tonkin show that, in 1971, 43% of these units reported cases of hepatitis among their patients. The mortality rate varies but is occasionally high. For example, in the severe outbreak in Edinburgh, 24% of the patients and 33% of the staff who contacted serum hepatitis died. Not surprisingly, the risk of infection is greatest to the members of staff who have the closest contact with the patients. In the Edinburgh outbreak it was found that the non-disposable connecting tube to the venous pressure gauge became contaminated with patients' blood and it was thought that this might have played a part in the spread of infection among the patients. Apart from obvious preventive measures, such as the careful avoidance of contamination with blood, patients on these units should be screened for Australia antigen at fortnightly intervals and the staff every three to six months. Marmion and Tonkin also give valuable advice on the control of infection in renal units, which includes methods for the cleaning and disinfection of both parts of the dialysis equipment which are non-disposable and which cannot be autoclaved.

Treating Incontinence Electrically

B. R. Hopkinson1 has recently presented the results of five years' experience in treating incontinence of urine and rectal prolapse by electrical stimulation, using intra-anal electrodes. The conditions studied included rectal prolapse and incontinence in both adults and children, stress incontinence of urine in women, neurogenic incontinence of urine, incontinence of urine following prostatectomy and major pelvic surgery, and a triad of symptoms almost exclusive to women — namely, frequency, precipitancy, and urgency.

The fact that a simple device such as the anal plug electrode might be used in the treatment and cure of such a wide range of distressing conditions should provoke a critical analysis of the present state of the electrical treatment of incontinence. K. P. S. Caldwell 5-7 was the pioneer in the field of electrical control, using an implantable device devised at the Medical Research Council's Sphinctor Research Unit in Exeter. The disappointing results of others, 8 subsequently experienced by yet more workers, 9 10 led to an increase in the popularity of the external electrode system devised by S. Alexander and D. Rowan11 for use in the female, in which a standard vaginal pessary served as an electrode carrier. Further similar devices have been designed.12 13

The present alternatives are either control by implantable apparatus, equally applicable to both sexes, or control by externally applied devices, also applicable to both sexes, except that the device used necessarily depends on the sex of the patient. The anal plug electrode is the only external electrical device available for use in adults of both sexes and children.

Much patient research undertaken in centres at London, Bristol, and Glasgow has not produced results as satisfactory as had been hoped. Reported success rates have fallen in consecutive publications, of which the latest14 shows success in just over 40% of adult women with stress incontinence. This is a lower figure than the 53% reported in a smaller group treated by Hopkinson, but the important difference between his series and any other published is that cures are claimed, whereas all others have reported control dependent only on the continued use of the prescribed apparatus.

Apart from the falling success rates, the other disturbing fact that has been reported is that there would not yet appear to be any objective method of predicting success in any one patient. This was one of the chief findings of L. Edwards, 15 confirmed by others, 16 and there would not appear to be any reason to doubt the validity of these observations. The inability to select patients for electronic treatment will constitute little in the way of a practical disadvantage if the use of external apparatus is considered, though it has to be remembered that each device costs up to £50, time may be lost, and the patient may suffer disappointment. With implanted electrodes the failure to predict success poses major problems. Should the procedure be limited only to those centres where it is undertaken frequently? Should it even be abandoned? There would appear to be little justification.