

1966 cultures of meningococci isolated from patients in different areas of England and Northern Ireland have been sent to the Manchester Public Health Laboratory for serotyping and for testing for sensitivity to sulphonamides. From 1966 to the end of April 1972, we have typed 342 cultures isolated from blood or CSF: 27 strains were group A (8%), 185 group B (54%), 113 group C (33%), one strain each group X and Y, and 15 were untypable (4%). The majority of untypable strains (13/15) were received before 1970 and had been stored for long periods before typing. During the same period 370 cultures were tested for sensitivity to sodium sulphadiazine. The majority of cultures 319 (86%) were inhibited by 0.16 mg% sodium sulphadiazine, and a further 18 (5%) by 0.32 mg%. Thirty-three strains (9%) had a minimal inhibitory concentration of 0.64 mg% or greater, and these we have classed as resistant; 12 of these (3%) had a minimal inhibitory concentration of 0.64–1 mg%, and 21 (6%) a minimal inhibitory concentration of 5 mg% or more. The proportion of resistant strains isolated recently appears to be increasing—22% of those isolated in the first four months of 1972 compared with 7% of those in 1971. Resistant strains were isolated from different areas of England and Northern Ireland. The proportion of resistant strains amongst different serotypes varies—6% of group B, 8% of group C, and 44% of group A strains. These findings and the report of sulphonamide-resistant strains in Scotland (Fallon, 1971) clearly indicate that sulphonamides alone cannot be relied upon for the treatment of meningococcal infection in this country, and the efficacy of sulphonamides for chemoprophylaxis may be affected by the presence of sulphonamide-resistant strains.

#### Reference

Fallon, R. J. (1971). *Brit. med. J.*, 2, 403.

**Meningococcal Infection: Serological Studies** D. M. JONES (*Public Health Laboratory, Withington Hospital, Manchester*) The recrudescence of interest in meningococcal disease, particularly in the United States, has resulted in much progress being made towards the understanding of immunity in this disease (Artenstein *et al.*, 1971). A variety of serological techniques have been used to study the antibody response in the carrier state, in disease, and after administration of the recently developed meningococcal polysaccharide vaccines. The indirect haemagglutination technique has been found to be very sensitive, and to detect type specific antibody. This method has been used to investigate the normal antibody responses in carriers and cases in a small outbreak of meningitis in a school in the north west

of England. With this basic information it has been possible to assess situations where multiple cases occur in one family and where there may be a deficiency in immunity. The occurrence of a community outbreak of group B meningococcal meningitis in Bolton and district during 1970 and 1971 enabled the incidence of antibody in the general population of epidemic and non-epidemic areas to be compared. The incidence of antibody was found to increase with age but no significant differences were found in antibody distribution between Bolton and elsewhere in NW England. The distribution of type-specific antibody was found to differ from that reported from the United States; this may be related to the differing distribution of serotypes causing disease in the US compared with England and Wales (Abbott and Graves, 1972).

#### References

- Abbott, J. D., and Graves, J. F. R. (1972). Serotype and sulphonamide sensitivity of meningococci isolated from 1966 to 1971. *J. clin. Path.*, 25, 528–530.
- Artenstein, M. S., Brandt, B. L., Tramont, E. C., Branche, W. C., Fleet, H. D., and Cohen, R. L. (1971). Serologic studies of meningococcal infection and polysaccharide vaccination. *J. infect. Dis.*, 124, 277–288.

**Aspects of the Epidemiology of Haemophilus Meningitis** D. C. TURK (*Bacteriology Department, Radcliffe Infirmary, Oxford*) The incidence of this disease has increased greatly in the past 30–40 years, notably in N America but also in Britain and many other countries. It is now, at least in those countries, the commonest form of meningitis in childhood. Mortality, almost 100% without treatment, can be reduced to 5% or so with suitable antibiotics, but residual disability is common. Virtually all cases are caused by capsulated type B strains of *Haemophilus influenzae*—a type carried in the nasopharynx of some 1–3% of the general population. The disease occurs as sporadic cases, with some seasonal concentration but no true epidemics and seldom with demonstrable case-to-case spread. A personal study of the families of 17 affected children confirmed the high frequency of carriers of type B strains in the environment of the children, and provided serological evidence that, in most cases at least, the strain had been in the family for some weeks before the child (usually the youngest) became ill. Little information about precipitating factors is available; evidence about the influence of social and economic factors is conflicting. The age incidence was explained in 1933 by demonstration that bactericidal antibodies for *H. influenzae* type B are commonly to be found in blood from newborn babies or older children or adults, but rarely in blood from children in the usual age range for the disease. Whether this pattern still applies is a matter currently under dispute—

probably because different workers use different techniques. Adults immunized with type B capsular polysaccharide give encouraging antibody responses, but children under 2 years old may not be capable of responding adequately to this antigen.

## Symposium V

### Equipment for haematology

**Coagulometers** A. A. SHARP (*Department of Pathology, Radcliffe Infirmary, Oxford*) The development of mechanical or optical devices to measure the time of fibrin formation in mixtures of reacting coagulant factors has proceeded with remarkable rapidity over the past two years.

By now eight different types of equipment are known to be available and seven of them have been evaluated, one of which has been withdrawn from the British market. Two other devices appear not to have completed their development.

The devices that have been evaluated may be divided into two main types.

| Mechanical         | Optical  |
|--------------------|--|
| Mechrolab<br>Depex | Clotek<br>Coag-a-Pet<br>Electra 620<br>Electra 600 |

All are basically mechanical stopwatches which have the theoretical advantage of removing the variable of various technician skills. Three are multichannel: Mechrolab (2), Depex (4), Coag-a-Pet (6), while only the Electra 600 offers semi-automation automatically testing and recording 50 consecutive clotting times. Under test, all machines met their manufacturers' claims on the type of tests performed, but they showed a variety of cost/test. Only one showed a true saving of technician time (Electra 600).

The overall results obtained during the evaluation revealed that these machines showed a high degree of reproducibility, differences being due to variations in the volumes of plasma or additions, the former being the most critical. Certain results pointed out limitation of existing techniques.

It has proved impossible to define any ideal machine as any equipment must be available for a given task in a laboratory, bearing in mind the available technician skills.

So far, the availability of servicing and spare parts for certain equipment has not been fully tested, but in one instance, the situation has proved far from satisfactory.

**Automatic Platelet Counters** R. M. ROWAN (*Department of Haematology, Royal Infirmary, Glasgow*) Platelet enumeration continues to pose problems in the haematology laboratory; however, during the past year, two new platelet counting systems, employing differing cell rating mechanisms, have been introduced.

The Coulter Thrombocounter is semi-automatic, performing counts on platelet-rich plasma, obtained by sedimentation, and has a throughput of 20 samples per hour. The Thrombocounter utilizes an electronic gating principle which counts cells by sensing a change in the electrical conductivity of a channel separating two electrolyte solutions when cells flow through this channel. Since counts are performed on platelet-rich plasma, tables are provided which simultaneously correct for the excess platelets in the plasma and the haematocrit.

The Technicon Platelet Autocounter is fully automatic, handling whole blood at a rate of 40 samples per hour. The Autocounter utilizes a light scattering principle which counts particles by sensing the scattering of light occurring when particles flow through the illuminated sensing chamber of a micro-optical system. Platelets and leucocytes are counted by the optical system, the result being presented as analog signals to a single pen recorder. A white cell count, performed independently, must be subtracted from the instrument count to obtain a whole blood platelet count.

Statistical and field evaluations have been carried out on both systems. Reproducibility studies yield excellent results at all levels of platelet count. Carry-over and departures from linearity, although statistically significant, are not sufficient to cause concern in routine use. Correlation with microscopy counts is good. Discrepant counting may occur in dysproteinaemic and myeloproliferative states.

Significant improvements in the process of platelet enumeration are achieved by these systems.

**Automatic Coombs Test Washers** R. N. IBBOTSON (*Blood Transfusion Centre, Birmingham*) A comparative evaluation of three red cell washing machines currently available has been carried out. These include the Dade, Sorvall CW1/AF1, and Spectra Auto I machines. Investigations cover aspects of the mechanical specifications, cell washing facilities, efficiency and bacteriological safety of the machines. All three machines have the capability for automatic triple washing of red cells in saline, the complete cycle times being just over six minutes in the Dade and Sorvall and 14 minutes with the Spectra. The Spectra automatically adds the anti-human globulin reagent and completes a spin type Coombs test. Triple washing of red cells suspended