

Laboratory, Colindale, London) The traveller newly arrived at his destination, particularly if a warm climate, is commonly affected by acute diarrhoea within 14 days, a condition usually referred to as 'traveller's diarrhoea'.

In 1965 a bacteriological study was made on 540 men belonging to an Army unit which moved by air from the United Kingdom to Aden.

Cases of diarrhoea commenced about four days after arrival; the incidence reached a peak at 10 days and then dropped off to 14 days. In the subsequent weeks cases of diarrhoea continued to occur but no peak incidence was found. Thirty-eight soldiers suffered an attack of diarrhoea during their first 14 days after arrival. Faecal specimens were investigated from 35 of these subjects. A new serotype of *Escherichia coli* 0148K ?H28 was isolated in the acute phase from 19 subjects (54.3%).

Two cases (5.7%) suffered from gastroenteritis due to a *Salmonella* and in the remaining 14 (40%) of cases *E. coli* of various O groups were found which could not be related to diarrhoea. The peak of the isolations of *E. coli* 0148K ?H28 corresponded with the peak incidence of the cases of diarrhoea. This serotype was not isolated from a healthy subject in Aden nor has it been found in the United Kingdom, except in a case of laboratory infection associated with this work.

This work suggests that in Aden in 1965 this specific serotype of *E. coli* caused the diarrhoea in about 54% of the cases of traveller's diarrhoea.

ANTIBACTERIAL ACTION OF COMBINATIONS OF COLISTIN AND THE SULPHONAMIDES

N. A. SIMMONS (*Chase Farm Hospital, Enfield*) The activity of colistin *in vitro* combined with sulphamethoxazole against 184 strains of Gram-negative bacteria was investigated. Seventy-four of the organisms were *Pseudomonas aeruginosa*, 37 *Escherichia coli*, 21 *Proteus* spp, 30 *Klebsiella aerogenes*, 12 *Shigella* spp, and 10 *Salmonella* spp. All the strains of *Proteus* were sensitive to sulphamethoxazole and resistant to colistin, but the activity of sulphamethoxazole was enhanced by colistin. Seventy of the 74 *Ps. aeruginosa* were sensitive to sulphamethoxazole as were 27 of the 37 *Esch. coli*, 24 of the 30 *Klebsiellae*, eight of the 12 *Shigellae*, and all 10 of the *Salmonellae*. All of the organisms other than *Proteus* were sensitive to colistin whose activity against sulphamethoxazole-sensitive organisms was enhanced by the sulphonamide. Sulphamethoxazole did not enhance the activity of colistin against sulphamethoxazole-resistant organisms. Investigations carried out on 29 of the organisms showed that with sensitive strains colistin was bactericidal, sulphamethoxazole was only bacteriostatic, and combinations of the two drugs were bactericidal.

CHANGES IN ANTIBIOTIC SENSITIVITY OF STAPHYLOCOCCI IN A NON-HOSPITAL POPULATION DURING THE PAST 20 YEARS

D. J. GOLDIE, V. G. ALDER, AND W. A. GILLESPIE (*Bristol*) The proportion of antibiotic resistance in *Staph. aureus* isolated from skin sepsis and nasal carriers outside

hospital has been determined periodically since 1949. Penicillin resistance, originally less than 4%, began to increase in 1952, reached 57% in 1967 and has not changed significantly since. Resistance to other antibiotics was first observed in 1957 when it quickly rose to 17%; this was due to the spread of multiresistant type 80 staphylococci from hospitals in which it was behaving epidemically. By 1967 the proportion of multiresistance had fallen again to 8%, and has not changed significantly since. Methicillin resistance, first looked for systematically in 1969, has not been found.

The failure of phage group III multiresistant staphylococci to proliferate outside hospitals, though prevalent inside them, perhaps may be explained by their relative inability to colonize noses and their susceptibility to drying (as discussed in the next paper).

In 1969, 6% of non-hospital staphylococci and 44% of hospital staphylococci were resistant to sulphonamide. None were resistant to trimethoprim. Treatment of infections by such strains with sulphonamide-trimethoprim mixtures might promote the development of resistance.

THE SURVIVAL OF *staphylococcus aureus* ON SKIN

R. W. LACEY, V. G. ALDER, and W. A. GILLESPIE (*Bristol*) Experiments were performed to determine whether some strains of *Staph. aureus* consistently survive longer than others on the skin. Suspensions containing known numbers of cocci were dried on the forearms of volunteers and the survivors counted after five hours by an adhesive label technique.

In preliminary experiments, day-to-day and person-to-person variations in survival of single strains were sufficient to mask possible differences between strains. To overcome this, mixtures of three staphylococci were inoculated, one of which was a standard strain with which the survival of the others could be compared. The component colonies of the mixture on recovery from the skin were distinguished by two independent properties on milk agar, pigmentation and colony size; lipase-negative strains gave larger colonies than lipase-positive strains.

As a group, strains isolated from primary skin sepsis and strains in phage groups I and II survived longer than other strains. Although it was not known whether the source or the phage pattern was primarily associated with long survival, it was concluded that length of survival on skin may be related to the production of cutaneous sepsis. Similar differences were found when the strains were dried on glass, but were diminished by increasing atmospheric humidity. Hence variation in the survival of strains on dry skin can be explained, in part at least, by differences in their susceptibility to desiccation.

STUDIES ON STAPHYLOCOCCI FROM COLONIZED VENTRICULO-ATRIAL SHUNTS

R. J. HOLT (*Queen Mary's Hospital for Children, Carshalton, Surrey*) Bacterial colonization of the shunt associated with indolent bacteraemia is a major complication in children with ventriculo-atrial shunts for the relief of