or to erythromycin emerged during or after that trial, though lincomycin-resistant *Staphylococcus aureus* appeared and became fairly common in the unit during the trial. Later, when lincomycin was no longer used, lincomycin-resistant staphylococci became scarce and soon disappeared.

On 18 December 1967 erythromycin-resistant *Str. pyogenes* was isolated from the burns of a patient who had been treated with erythromycin. This organism was sensitive to lincomycin, but *Str. pyogenes* resistant to lincomycin as well as to erythromycin was soon isolated from the burns of this patient and of other patients in the ward. Between 18 December 1967 and 22 February 1968 seven patients showed infection of burns with *Str. pyogenes* resistant to erythromycin (9 isolates), or to lincomycin (2 isolates), or to both lincomycin and erythromycin (22 isolates). All but one of these strains were also resistant to tetracycline. A selection of 13 of these strains tested for serotype proved to be of type 12 (the strains reported by us in 1959 were of types 3 and 14). From the same patients 23 strains of *Str. pyogenes* were isolated which were also resistant to tetracycline but sensitive to both erythromycin and lincomycin; two of these strains which were tested for serotype were of type 12. Tests showed considerable variation in the degree of resistance of the streptococci to erythromycin and lincomycin, but some were highly resistant to both antibiotics (minimal inhibitory concentration over 100 µg./ml.). The resistant strains were resistant also to oleandomycin and to spiramycin. On storage of culture these strains, like those isolated in 1959, reverted to sensitivity. All these infections responded well to a course of oral cloxacillin.

It is hard to explain the emergence of lincomycin-macrolide-resistant variants of *Str. pyogenes* after a very long period when they were not found in spite of continuous opportunities for their selection. Something like it happened with the widespread emergence of neomycin-resistant staphylococci of one type several years after the introduction of neomycin.^{2,3} Unlike the outbreak described at Roehampton, the one in Birmingham could not be attributed to the use of lincomycin, since lincomycin had not been used for several years; nor has lincomycin-resistant *Staph. aureus* been isolated in this unit for a long time, though erythromycin-resistant strains are very common. As the outbreaks in Roehampton and in Birmingham were due to streptococci of different types, it would seem that this rare mutation appeared independently and almost simultaneously in two places, which must be considered a remarkable coincidence. The coincidence may be associated with a simultaneous increase in the use of these antibiotics in both units; in Birmingham erythromycin was introduced during the past year for prophylaxis against tetanus in the non-immunized. An alternative hypothesis is that transferable resistance has appeared in these streptococci through contact with a lincomycin-resistant or macrolide-resistant organism of different species that was not previously present but is now becoming widespread. The hypothesis is attractive, too, because the observed instability of lincomycin resistance and macrolide resistance of the streptococci resembles that which is known to occur in certain forms of transferable resistance.⁴ So far, however, we have had no success in attempts to transfer resistance to a sensitive *Str. pyogenes* of type 12 by growing it in culture together with an erythromycin-resistant *Staph. aureus* originally isolated from the same burn as the streptococcus—a burn

from which macrolide-resistant *Str. pyogenes* had also been isolated. A possibly parallel phenomenon occurred some years ago, when resistance to the newly introduced erythromycin did not emerge until eight months after the start of a controlled trial of the antibiotic in burns. Within a few days of this emergence, however, staphylococci in the ward of several different phage types were found to be resistant to erythromycin.^{5,6}

Like Drs. Kohn, Hewitt, and Fraser, we are worried about the possible risks of macrolide-resistant *Str. pyogenes* infection in patients sensitive to penicillin, should such strains become common (which seems improbable in view of the lability of resistance). It is important to test the sensitivity of *Str. pyogenes* isolated from burns and to avoid the use of macrolides or lincomycin if the strain is resistant to these agents. If the macrolide-resistant strain is sensitive to tetracycline this is the antibiotic of choice for a penicillin-sensitive patient, since it is highly effective in removal of streptococci, and there is only a very small risk of resistance emerging in the strain for which treatment is being given.⁷ If the streptococcus is resistant to tetracycline too, cephaloridine may prove to be the most suitable antibiotic for a penicillin-sensitive patient.

We wish to thank Dr. M. T. Parker and the Central Public Health Laboratory for typing these strains of *Str. pyogenes*.

—We are, etc.,

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Extended Family

SIR,—As a doctor who for the last four years has spent the better part of two weeks each month on medical safaris in Kenya, I was interested in the remarks made in your leading article "Extended Family" (4 May, p. 253).

As you point out, the shortage of doctors in Africa is accentuated by the tendency for doctors to congregate in the larger towns, whereas by far the greater part of the population of tropical Africa lives in the rural areas. Perhaps it is not realized in Britain that one of the reasons for this state of affairs is that a university education creates a far wider cultural gap between the graduate and the countryman in Africa than it does in Europe. This cultural estrangement tends to be further increased by the contents of the medical curriculum, which directs the student's gaze, not to the medical circumstances and situations of rural Africa, but to the highly specialized conditions existing in the hospitals of the Western world. African Governments tend further unwittingly to develop this estrangement by devoting an undue proportion of their limited resources to one central

hospital, to the detriment of the many district hospitals. Consequently these hospitals, serving as they do the majority of the people, become less and less attractive to the young men who have been trained at such great expense for the specific purpose of raising the standards of health of the people.

It would seem, therefore, that if African countries are to learn to stand on their own feet medically, rather than to be the recipients of charity for an indefinite period, a considerable change of outlook all round is required. From his final year at school, and onwards, the embryo doctor needs constantly to be reminded by the substance and emphasis of his curriculum that the object of medical training is not to produce a variety of specialists, but to produce general practitioners with public health and administrative experience who will work in district hospitals and give an active lead to the medical assistants in the health centres of their districts. African Governments need to give far more attention to their district hospitals than they do at present, both in regard to staffing and equipment.

African Governments need to give as much attention to the training and use of the medical assistant category as they do to the production of the qualified doctor. These men have proved their worth over many decades all over Africa, and it will be very many decades before they can be dispensed with. The cost of their training and their salaries is within the budget of every African country, while their relatively limited education enables them to work in the rural areas over long periods with far less strain than their graduate colleagues.—I am, etc.,

London E.C.4.

W. R. BURKITT.

Changing Clinical Picture of Neurosyphilis

SIR,—The paper by Dr. R. Joffe and others (27 January, p. 211) reporting seven unusual cases of neurosyphilis does well to remind us that syphilis is a great imitator of disease, not only involving the central nervous system but all systems and in all its stages. Nevertheless, it is important to ensure that the condition producing an atypical clinical presentation is in fact due to syphilitic infection and not to some unrelated medical cause occurring in a late or latent syphilitic, or in a patient whose serological tests remain positive after treatment for syphilis.

I was asked recently to see a patient admitted with polyneuropathy. She gave a history of backache of three months' duration, with gradual increasing loss of power of legs and arms. The results of relevant tests were: Blood—venereal disease reference laboratory (V.D.R.L.) positive; cerebrospinal fluid—Wassermann reaction positive; protein 300 mg./100 ml.; and 30 mononuclear cells.

Our records showed that in 1947 this patient had received several courses of penicillin injections for a syphilitic infection in the secondary stage, and the cerebrospinal fluid in 1948 was normal, although blood serology remained and was still positive when last examined in 1963. Anti-specific treatment was not advised, and the patient's symptoms gradually responded to steroids. Examination of cerebrospinal fluid four weeks later showed: cells to be less than 1; protein 200 mg./100 ml.; Wassermann reaction positive; *Treponema pallidum* immobilization (T.P.I.), Reiter test, and V.D.R.L. all negative.