A Health District Courier Service

SIR,—General practitioners and laboratory workers may be interested in the Torbay Health District's courier service. The service, introduced in March of this year, came into being as the combined result of multi-disciplinary management and is therefore an example of a project, originally suggested by a pathologist and a general practitioner in 1973, coming to fruition successfully and satisfactorily during the N.H.S. reorganization.

The Torbay Health District serves a population of approximately 210 000 in a comparatively extensive area of south Devon, including coastal areas and the southern part of Dartmoor. The district includes 16 hospitals, nine health centres, nine clinics, two convalescent homes, and 112 general practitioners organized into 48 collection and delivery points. Thirty per cent of this laboratory's work load comes from general practitioners and a further 20% from small hospitals in the district. Prior to the introduction of the specimen collection and mail delivery service specimens were transported to the laboratory by a variety of routes, including public transport, community nurses, general practitioners, and patients; taxis and a laboratory blood transfusion van were also used. In all, an expensive and unsatisfactory method. The economics of individual deliveries of pathology specimens plus the cost of postage were therefore worth investigation. A working party was set up and, in collaboration with the South-western Region work study department, we were able to suggest that, with two vans and two drivers, over a period of five years the scheme would show a small saving. It is interesting to note that, even with a 4½p postage rate, this District was spending £64 a week on postage and the Exeter Family Practitioners Committee a further £24. Of this sum, £42 a week was accounted for by pathology reports.

Now two vans make twice-daily deliveries of mail and collect specimens, and the result is a highly efficient service which is costing less than the conventional methods.—I am, etc.,

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Treatment of Eye Injuries from Bomb Explosions

SIR,—As an ophthalmologist involved in the initial care of the bomb victims treated at the Birmingham General Hospital Accident Unit on 21 November 1974, I am driven to comment on Mr. R. A. Evans's criticism (26 April, p. 195) of Mr. T. A. Waterworth and Dr. M. J. T. Carr's interesting paper (5 April, p. 25). The simple answer to Mr. Evans's inquiry as to the reasons for using sulphacetamide drops for some cases of flash-burn conjunctivitis and chloramphenicol drops for others is that those patients who were seen initially by an ophthalmologist were prescribed chloramphenicol and those who were treated initially by a non-ophthalmologist were prescribed sulphacetamide. Mr. Evans will know that chloramphenicol and neomycin are generally regarded by ophthalmologists as being more effective. It would be surprising

if minor therapeutic anomalies did not occur under the pressures of such a major civilian disaster, and in the particular case in question treatment was changed next morning from sulphacetamide and amethocaine drops to chloramphenicol eye ointment and homatropine drops.

It has been shown that local anaesthetics delay the re-epithelization of corneal abrasions, but their restricted use may be indicated in the initial management of patients in severe pain from extensive corneal epithelial loss or with multiple deep corneal foreign bodies. The early relief of eye pain with alleviation of the fear of blindness reduces the severe psychological trauma of bomb victims. Amethocaine is a useful drug in this situation because of its relatively long action, but for the same reason it is not entirely satisfactory as a local anaesthetic for routine use in general casualty departments. Oxybuprocaine (benoxinate; Novesine), which is available as single-dose sterile "Minims," is of short action, and is preferable, though it does sting initially like the other local anaesthetics.

Of the 82 survivors treated at the General Hospital accident department, 11 suffered eye injuries of varying degree and these were of three patterns: (I) shrapnel injury; (II) blast contusion injury; (III) flash burn. The distribution of injuries was as follows:

- Group I: 1 bilateral perforation
1 multiple corneal foreign bodies
1 corneal abrasion
- Group II: 3 hyphaema (1 with macular choroidal tear)
3 mild contusion
- Group III: 2 corneal flash burn

Corneal perforation or intraocular foreign body require surgical repair as soon as the patient's general condition will allow. The removal of a small number of corneal foreign bodies may be attempted under local anaesthesia on the slit-lamp microscope but multiple embedded corneal foreign bodies should be treated medically with chloramphenicol eye ointment and atropine drops. Hyphaema from explosive blast is treated conservatively by bed rest without local medication, and after absorption of the blood associated intraocular damage should be excluded. Loss of corneal epithelium from flash burn is treated with chloramphenicol eye ointment and atropine drops, and symblepharon development following conjunctival damage may be prevented by daily glass-rodging of the fornices or by the insertion of an annular scleral contact lens.—I am, etc.,

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Malaria Vaccines

SIR,—I am constrained to comment upon your leading article entitled "Malaria Vaccines on the Horizon" (1 February, p. 231).

The use of intact malarial organisms emulsified in Freund's complete adjuvant as an effective vaccine against infection with *Plasmodium knowlesi* in rhesus monkeys has been known since 1945.¹ This has been confirmed by a number of workers in both the U.S.A. and Britain since that time.²⁻⁶ The recent report by the Guy's Hospital group⁷

appears to be another confirmation of the phenomenon which was first reported by Freund *et al.* 30 years ago. While the single experiment highlighted in your article is indeed a contribution to the literature, it raises a number of serious questions. The experiment lacks adjuvant-only controls and the report intersperses five-year-old data from another laboratory⁶ and confuses the validity of the conclusions reached about the comparative effectiveness of merozoite versus schizont immunization. Therefore it is simply not true to say that "clearly vaccination with merozoites induces in monkeys a broader spectrum and a higher degree of immune response than any other method attempted until now."

In any case, the relative merit of that work ought to be judged against the progress that has been made by our group and improperly referred to in your article as being "only marginally successful, because the immune response thus obtained was limited to the same strain or antigenic variant of the plasmodium and even then was of relatively short duration."

Work by our group has yielded an effective lyophilized non-viable antigen which can be stored for long periods before use. The first report of this partially purified antigen as an effective vaccine against *P. knowlesi* was made in 1971. Subsequent studies have confirmed its efficacy^{8,10} and indicated the effects of further fractionation by sucrose gradient methods.¹¹ More recently advances in biochemical characterization¹² as well as quantification of the antigen have been made.

It is important to realize that our numerous subhuman primate vaccine studies (involving over 200 Rhesus monkeys in the past five years) have been conducted utilizing a two-injection schedule given at a 30-day interval and challenging with an intravenous parasite inoculum 250 to 20 000 times¹¹ the amount used by the Guy's Hospital group. This factor is of considerable importance with a virulent, 24-hour cyclic parasite such as *P. knowlesi*. In spite of this extraordinarily stringent test, our vaccine has proved to be 90% + effective. In a comparative experiment we are now using the extremely low challenge level of the Guy's Hospital group and expect to improve vaccine efficacy accordingly.

We are deeply puzzled by the statement concerning the "relatively short duration" of immunity induced by our vaccine. There are no data in any of our published reports which relate to this aspect. The facts are, however, that we have observed excellent protection against infection three years after vaccination when challenged with a so-called "heterologous variant". The data on this and other rechallenge experiments suggest strongly that, once immunized, the effect is essentially lifelong, at least in the simian host.

Another factor of importance is the use of Freund's complete adjuvant, which is unsuitable for human application. In this area we have found that adjuvant 65 when combined with B.C.G. is an effective replacement for Freund's. This was reported at a meeting held in Brighton in June 1974 and will soon appear in the scientific literature.¹³ Indeed, this fact, which you overlooked, was a major point in the *Medical Tribune* article to which a distorted reference was made in your article. In any case the use of quotations from the non-scientific press in a reputable journal seems highly questionable. Further, to extract and distort a quotation in the way you did in your article is reprehensible. My reference to "within a year or so" was clearly related to the testing of our vaccine system in *Aotus* monkeys with a human strain of malaria. The original *Medical Tribune* article unequivocally states that "vaccine developed . . . from the blood of infected monkeys will be tested in *Aotus* monkeys." There is much to be done before human trials are contemplated. It is curious that though the highly preliminary results of the Guy's Hospital group had been trumpeted in the *Medical Tribune* (17 July 1974, p. 22) with the headline that "Malaria Vaccine May Be Merely 'a Species Away'", you chose to ignore that exaggerated claim. I do not believe that the Guy's Hospital group would minimize the problems, nor do we. Scientists, however, cannot be responsible for journalistic licence.

There are many other points in your article which require comment, but, in brief summary, it is highly likely that the Guy's Hospital group and our own are working