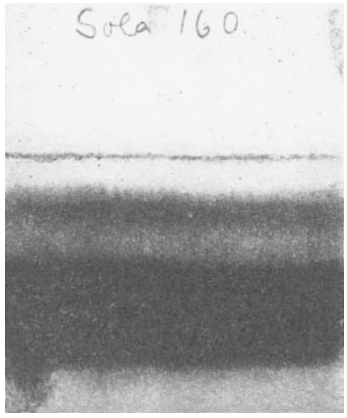

Fig. 1. Hanging paperstrip electrophoresis of hæmoglobin of Tibetan with 5·6 per cent F and 4·1 per cent A_2. *Tris* buffer, *p*H 8·9, stained with 'light-green'

135/95, and the serum cholesterol 119 mgm. per cent.

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HISTOLOGY

Neurokeratin Network of Myelin Sheaths

The recent communication of Tewari and Bourne[1] on the neurokeratin network of peripheral nerve fibres is valuable not only for its intrinsic content but also because it validates the histological procedures, findings and arguments derived therefrom, by which it was concluded that neurokeratin formations are part of the architecture of the nerve fibres and not artefacts[2,3]. It is sad to think that Nageotte[4], who saw the structures in peripheral nerve fibres described by me[2,3] and by Tewari and Bourne, looked on them as artefacts. One of the strongest anatomical arguments against the notion of artefact is that the disposition of neurokeratin in spinal cord axons and in the preterminal axons found in spinal cord, in brain stem and in cerebral and cerebellar cortices is quite different from that characteristic of peripheral nerve trunks, even although the material examined was fixed and prepared for sectioning under strictly comparable conditions in all instances.

Work in progress shows that not only the disposition, but also the amount, of neurokeratin varies in different parts of the nervous system. This can be shown optically by using the falgic acid staining process described elsewhere[5]. In this process sections are stained first with acidified acid fuchsin and then with a very dilute solution of light green. Acid fuchsin can combine with one, two or three molecules of light green to form red, violet or blue compounds, respectively; these have been named the falgic acids. The red compound is formed where acid fuchsin is most abundant, the blue where it is least so. Thus the relative uptake of acid fuchsin (relative erythrophilia) of tissue elements can be determined by colour. Neurokeratin is erythrophilic and the falgic acid method shows that it is present in great density in spinal cord axons, somewhat less so in peripheral and least in the axons of the white matter of the cerebral and cerebellar cortices, and indeed in fine medullated fibres everywhere. These latter fibres are therefore difficult to display by the falgic acid technique.

Nevertheless, the essential feature of this technique can be used to make such fine fibres clearly visible as well as showing the markedly erythrophilic types of axon. The falgic acids are formed by the union of one or more molecules of light green with the amino-groups of acid fuchsin, one molecule of light green uniting with one of these amino-groups. The acid fuchsin, already attached to basic elements of the tissue by its sulphonic groups, behaves as a 'trivalent' base towards the acid light green. Other acid dyes can replace light green in this type of combination. In particular, violamine 3*B* can be used; the red, violet and blue colours produced by the falgic acid technique are then replaced by red, purple and deep violet, respectively. If sun yellow *G* be mixed with the violamine solution, the erythrophobic tissue elements are stained yellow, giving a very good contrast with the elements coloured by the 'faviolic acids', as we may call them. This shows the finest nerve fibres and is a very simple technique for the display of both dendrosomatic and axonic parts of neurones. It gives a picture equivalent in detail shown to that provided by MacConaill's acid fuchsin–lead hæmatoxylin method[2], but it is free from the risk of the formation of precipitates which that method entailed. By it the staining properties of neurokeratin can be used for a demonstration of the presence of medullated fibres, and for an assessment of the relative amounts of neurokeratin present in different fibres.

Details will be published elsewhere when the work has been completed. Meanwhile it would seem that the descriptions of the structure of myelinated fibres should be drastically revised in current text-books, notwithstanding the apparent discrepancy between the findings of optical and electrical microscopy.

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