the future of family doctorings and its forthcoming reports on assessing teachers and their practices and on the academic content of general practice will be read with great interest.

The meeting also heard some frank comments on the amount of teaching that trainees received in the hospital posts of their courses. The audience appreciated, however, that this difficulty was not peculiar to trainees, reflecting to an extent the service needs of the hospitals. Nevertheless, if the comments in the conference were at all representative, then uncomfortably many hospital posts in the scheme still seem to be orientated firmly towards hospital specialist training. Another comment was that during their time in hospital trainees had too little opportunity to maintain contact with their fellow trainees or with general practitioners. This wish for regular contacts during the longer courses was widely supported, a fact which also emerged in a B.M.J. series on vocational training centres published last year. If a course starts with a period in practice (and few programmes do) and the relations established there are maintained afterwards, this can underpin a training which may otherwise all too easily deteriorate into a rather aimless succession of hospital and practice posts.

What did the conference achieve? Its vitality certainly justified the R.C.G.P.'s initiative in sponsoring the project. But it also showed that able young doctors have faith in the future of general practice, seeing it as a positive career rather than one at which they have by chance arrived. Furthermore, they value vocational training, provided that the course programme is flexible and there is strong personal contact with general practice throughout. Undoubtedly the balance to be struck in the next few years between available teachers and the numbers of young graduates wanting training must be right if standards are not to fall and the purpose of vocational training thus destroyed.

Detecting Sickle Haemoglobin

The increasing awareness of sickle cell disorders and of the sickle cell trait has led to a recent proliferation of techniques for the detection of sickle haemoglobin (Hb S). The available methods fall into three categories dependent on the abnormal physical properties of Hb S. Firstly, electrophoresis reflects the net positive charge resulting from the replacement of glutamic acid by valine in the Hb S molecule. Secondly, the sickling test depends on the distortion of the red cell's membrane associated with the linear polymerization of Hb S molecules in deoxygenation. Thirdly, solubility tests are based on observations that deoxygenated Hb S is relatively insoluble in phosphate buffers of high molar concentration.

Haemoglobin electrophoresis will detect, according to the method employed, concentrations of Hb S as low as 5% and false negative results should not occur except below these concentrations. Levels of this magnitude may be encountered in overtly sickled bloods or after transfusion of normal recipients with blood containing Hb S, but people with sickle cell disorders are unlikely to have levels below 25%. Other haemoglobins such as Hb D and Hb G have a similar mobility to Hb S under routine conditions of electrophoresis and may give false positive results unless additional tests are employed. In summary, haemoglobin electrophoresis is a reliable and sensitive technique which gives information on relative concentrations of haemoglobin fractions. However, special apparatus and experience are required for it, and the preparation of the haemolytes and buffers necessary for it may be a serious disadvantage where technicians are lacking.

The sickling test is performed by incubating blood with a powerful reducing agent on a microscope slide. The rate of sickling is partly determined by the concentration of Hb S and will occur more quickly with sickle cell disease than with the trait. The test is simple and reliable when carried out by someone with experience of it and with appropriate controls. If experience or controls are lacking, there are risks of inaccuracy. The reducing agent may be either bacterial or chemical, and a 2% solution of sodium metabisulphite is most commonly employed. Under routine conditions sickling is specific for the 6–valine substitution and is confined to Hb S and the much rarer Hb C Harlem. The speed of sickling may give some indication of the concentration of Hb S present.

Though the decreased solubility of deoxygenated Hb S was investigated 20 years ago, it was not used in a diagnostic test until recently. The first commercially available solubility test was reliable but expensive. Later came many reports of similar solubility tests for which the reagents can be easily and cheaply made in routine laboratories. All include high molar phosphate buffers, dithionite, and saponin. A. Cook and A. B. Raper used a 2–4 M buffer for detecting Hb S, and Raper suggested an additional test with a 1–8 M buffer to distinguish AS blood, which is soluble, from SS, which is not. R. G. Huntsman and colleagues described a single test allowing differentiation of AS and SS genotypes by centrifuging the blood-buffer mixture, when soluble haemoglobins remained in the buffer and the insoluble Hb S separated to the surface as a dark red band. The solubility tests have the advantages of rapidity, simplicity, reliability, cheapness, and an obvious end point. They are also suitable for automation.

The choice of test must depend on the specific needs of the situation. If the exact genotype is required, electrophoresis is the method of choice, but for screening a population, when cheapness, reliability, and the capacity for handling large numbers are the primary requirements, the solubility test or some automated form may be preferred.

1 British Medical Journal, 1971, 2, 763.
5 The Journal of the Royal College of General Practitioners, 1972, 22, 79.