system in health and disease remains an enigma, but it is not one which simplistic expositions on the pharmacological actions of sodium cromoglycate can do much to resolve. The concept of mast-cell stabilisers may have narrowed perspectives in this important field of research activity—perhaps the term should be discarded.

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Left hand, right hand

Why are some of us left-handed? Suspicions about such individuals run deep in folklore and philology.¹ Dexterity (from the Latin *dextra*, right hand) is an admirable trait quite different from being sinister (Latin *sinister*, left). Left-handedness is illegal in Albania. While this may appear to be an excessive desire for conformity on the part of a totalitarian government the collective prejudice is nourished by morsels of truth. Left-handed people are overrepresented among populations of psychotics and epileptics—a finding that may be relevant to the causation of these conditions.² Left-handedness by itself, however, is of no clinical significance since almost all left-handers are otherwise (in a statistical sense) normal.

As human behaviour has become more complex lateralisation of cerebral function has been accentuated. The bilateral symmetry of the brain has been modified both structurally and functionally. The region between the primary auditory cortex and Wernicke's association area for speech is recognisably larger on the left in most fetuses from the 20th week of intra-uterine life. Similarly, though both cerebral hemispheres are concerned during speech, the increase in blood flow in Broca's area for speech on the left is greater than on the right. The evolution of the neural substrate for language must have been both complex and vital for evolutionary survival, so its lateralisation might be expected to be genetically specified. Around 95% of right-handed individuals have left cerebral dominance for speech—so the choice seems not to be arbitrary. By analogy, the advancing complexity of voluntary hand function may have demanded similar lateralisation. The proximity of the language centres to the centres for preferred hand function cannot be accidental and should be (but has not

been) a fruitful area for research by developmental neurobiologists.

One way in which left-handedness may arise is from some disturbance of development of the left hemisphere in an individual genetically destined to be right-handed. Examination of the function of the non-preferred hand might allow an estimate of the proportion in whom this switch has occurred. In an ingenious extension of this suggestion Bishop has recently argued that since the lateralisation of the disturbance is likely to be arbitrary more right-handers will have become left-handers than vice versa simply because most people are initially right-handed. Thus, study of a group of children with particularly poor function of their non-preferred hands should show an increased representation of left-handers, an increased incidence of potentially damaging events in their past, and more cognitive impairment. Any such group of left-handers with particularly poor function of their right hands should also have the same proportion of left-handed relatives as a group of right-handed children (and a lower proportion than a group of left-handed children with good function of their right hands). These expectations were realised in a study³ which, though small, is particularly convincing because the second and third predictions were valid irrespective of whether the preferred hand was the left or the right.

If these observations can be repeated elsewhere in a larger study more emphasis in the future will have to be given to proficiency with the non-preferred hand. Do the left-handers found in increased proportion among children with poor reading ability⁴ have more right-handed clumsiness than left-handers who are proficient readers? How efficient is the switch in hemispheric lateralisation, and does the efficiency depend on sex or the timing in development? Does a poorly performed switch explain the increased proportion of left-handers among generally clumsy children? The claims for "mixed laterality" (when the preferred hand and the preferred foot are not on the same side) as a sign of neurological dysfunction will become more convincing when examined in the light of these findings.

Finally, if some individuals can switch more efficiently than others, what effect does this have on the language function? Can we, for example, predict recovery in right-handed aphasics by studying their proficiency with their left hands? The specification of cerebral asymmetry is of great importance in human behaviour and should no longer be regarded as the province of eclectic psychologists.

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Do fetal movements reflect fetal wellbeing?

Interest in fetal movement is as old as the written history of mankind: "The children struggled together within her," referring to Rebekah's twins (Genesis xxv, 22). The specific interest of the physician has an equally long history; Hippocrates¹ believed that the fetus began moving 70 to 90 days after conception and maintained that male fetuses moved more vigorously than females. Soranus of Ephesus² (first

century AD), while agreeing that fetal movements were associated with a normal pregnancy, doubted whether their vigor was related to the sex of the fetus. Raynalde,³ in his 1545 translation of Röslin's early sixteenth-century work *Der Swangern Frauen und Hebamen Rosegarten*, noted that the absence of fetal movement was a sign of intrauterine death. Paré (1634)⁴ taught: "By what signes it may bee knowne whether the childe in the wombe bee dead or alive. If neither the Chirurgian's hand, nor the mother can perceive the infant to move. . . ."

Inquiring about fetal movements must therefore rank as one of the first specifically diagnostic questions that doctors ever posed. But only in the past decade or so has an association been suggested between the amount of fetal movements experienced by the mother and fetal wellbeing. The usual suggestion is that the mother should record the number of movements her fetus makes over 30 minutes or one hour; if they decrease below an agreed limit the mother reports to her doctor.

Such a form of self-assessment poses several questions. Firstly, is every movement made by a healthy fetus appreciated by the mother? Sadovsky *et al*⁵ used an electromagnetic device to detect fetal movements and reported that on average mothers were aware of 87%—but the range was 64% to 100%, suggesting relatively poor perception on the part of some women. Ultrasound scanning methods showed⁶ that the fetus spent 10% to 20% of its time in movement—but the range was from 1% to 90%. If fetal breathing movements were included then one or other form of fetal activity occupied at least 20% of the time. Two years later, however, the same workers⁷ considered that as little as 10% of the time spent in movement or breathing activity was compatible with fetal health. Unfortunately mothers cannot perceive fetal breathing movements, so less than 10% of any observation period may be occupied by fetal body movements; if Sadovsky and co-workers are correct and, for example, a given mother appreciates only 70% of these movements, then 7% or less of any observation period will be occupied by perceived fetal activity. In practical terms, a mother asked to note fetal movements for three periods of 30 minutes each night might experience six minutes or less of activity; her vigilance would have to be keen and her stopwatch to hand if other matters were not to cause her to miss some movements. It may not be the time spent in movement which is clinically meaningful but their number⁸; nevertheless, the constraints regarding the strength of fetal movement and the degree of maternal perception would still apply.

What degree of patient compliance might be expected with a request for a daily record of fetal movements? In one report⁹ 61 healthy women who subsequently delivered live, normal infants were asked to record the number of movements their fetuses made daily between 9 am and 9 pm from 32 weeks' gestation to delivery. This should have yielded at least 3400 records for analysis; only 1654 were reported, suggesting that patient compliance is relatively low even in a group presumably volunteering to help.

Finally, at what lower limit of fetal activity should the clinician be alerted to intervene? The worst case would presumably be the complete absence of fetal activity over as long as 12 to 24 hours. A recent study⁹ of 67 patients who had not experienced fetal movements for at least 12 hours found that 55 of them subsequently experienced fetal activity and delivered live, normal infants one to 10 weeks later. The other 12 patients had either meconium in the amniotic fluid or an abnormal unstressed or oxytocin-stressed cardiotocogram and were delivered of live babies within 24 hours. Even this

result begs the question in some degree—if left in utero these infants would possibly still have survived; one had a five-minute Apgar score of five and another of six, but the remaining 10 infants had a score of eight or nine. Conversely, Payne *et al*¹⁰ have recently described a fetal death at 34 weeks with no preceding change in fetal movements.

A mother and her fetus are always together and any simple, daily observations she could make that had clinical importance would obviously be extremely useful. Even so, the practical utility of recording fetal activity seems doubtful.

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⁴ Paré A. By what signes it may bee knowne whether the childe in the wombe bee dead or alive. In: Johnson T, transl. *The workes of that famous Chirurgian Ambrose Paré*. 24th book. *Of the generation of man*. London: T Cotes and R Young, 1634:913.

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Care of children in chronic renal failure

Twenty-six children were known to be under treatment for end-stage renal failure in Europe in 1968. By 31 December 1979 this number had increased to 1469—those still alive out of a total of 2175 patients registered by the European Dialysis and Transplant Association.¹ Some 261 of the survivors were being treated in the United Kingdom, a rate of 19.9 patients per million children. Six of the 28 countries contributing to the European Dialysis and Transplant Association register were treating more than this, with Switzerland the leader at 28.5 per million. The difference is almost certainly the result of a rather slow British start in the early 1970s, since new patients are being taken on at remarkably similar rates in the six countries leading the table (France, Italy, Netherlands, Switzerland, United Kingdom, and West Germany)—around three or four patients per million. (The remarkable figure of 9.7 per million achieved by Israel is thought to reflect the transfer of children from other countries for treatment.) As younger and younger children are being treated, the rate is expected to stabilise at about five or six per million, leading at equilibrium to a constant population of around 800 to 900 children under the age of 15 being treated at any one time in the United Kingdom.

Sick children require specialised paediatric care if their special needs are to be met, and in 1974 the British Paediatric Association endorsed a report² by the British Association for Paediatric Nephrology recommending that dialysis and transplantation facilities for children should be provided in a