

Communication in silence

Victoria A. Fromkin

What the Hands Reveal About the Brain.

By Howard Poizner, Edward S. Klima and Ursula Bellugi. MIT Press: 1987. Pp.236. \$25, £22.50.

FOR at least 2,000 years, philosophers and scientists have attempted to understand the nature of the brain, the nature of the mind, and the relationship between the two. A continuing reason for studying human language has been the historical assumption that language is a 'mirror of the mind' or that "Speech is the only window through which the physiologist can view the cerebral life", as was suggested by Fournier in 1887.

The quotation from Fournier refers to speech because there has been a persistent, though incorrect, view which equates speech with language. Speech (production and perception) is behaviour, the use or performance of those who know a spoken language. Language is the abstract mental cognitive system which permits one to speak and understand. Language also underlies the ability of a deaf person to 'sign' and visually to perceive and understand the gestures of a signing person.

To equate speech with language is to obscure the nature of the linguistic systems which form the bases for all spoken languages and all the sign languages used by communities of deaf people throughout the world. As long as researchers concerned themselves only with spoken languages, there was no way to separate what is essential to the linguistic cognitive system from the constraints imposed, productively and perceptually, by the auditory-vocal modality; that is, there was no way of discovering what is the genetically determined linguistic ability of the human brain.

The research on American Sign Language (ASL; the main language of the deaf in the United States), reported in the book under review, reveals the essential similarities between sign languages and

Autumn books

Nature's Autumn Books supplement appears in two weeks' time, in the issue of 19 November. The books to be reviewed include *The Oxford Companion to the Mind* edited by R.L. Gregory, *Academic Freedom & Apartheid* by Peter Ucko, *An Urchin in the Storm* by S.J. Gould, *The Omega Point* by John Gribbin, *A View of the Sea* by Henry Stommel, *The Purpose of Forests* by Jack Westoby and Edward Harrison's *Darkness at Night*. Among the reviewers are Conor Cruise O'Brien, William Press, Philip Kitcher, Michael Berry, Owen Gingerich and John C. Marshall.

spoken languages. The authors show that ASL and spoken languages are subject to the same kinds of structural constraints, relate forms and meanings by means of the same kinds of recursive rules, and contain equivalent kinds of sublexical units. It therefore should not be surprising that, following brain damage to the left cerebral hemisphere, deaf signers should show deficits in sign language that parallel the language breakdown in similarly damaged hearing patients. The work discussed in this book, however, is the first carefully controlled investigation of deaf brain-damaged patients.

Poizner, Klima and Bellugi present the results of language and non-language (visual spatial) tests, together with cat-scans of the brain lesions of six deaf signers who suffered strokes to either the right or left cerebral hemispheres. Of major importance is the finding that the left-brain-damaged deaf signers who showed aphasia for sign language retained the capacity to process non-language visual spatial relationships, indicating that

the left hemisphere has an innate predisposition for *language* (not speech or the physical ways in which language is expressed). The patients with right-hemisphere lesions, however, showed the reverse pattern, reaffirming that it is the nature of the cognitive system that determines cerebral dominance or lateralization, rather than the perceptual system or the physical attributes of the stimuli being processed.

The book is the result of meticulous research and is a notable contribution to the understanding of brain and language. It provides the first strong evidence that the brain is equipped for language in any modality, and that the kinds of languages which can be acquired are not determined by the motor or perceptual systems but by higher-order brain mechanisms. It will be essential reading for anyone interested in the brain, language and cognition. □

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Genesis of genius

Chen Ning Yang

The Collected Papers of Albert Einstein, Vol. 1, The Early Years: 1879-1902.

Edited by John Stachel. Princeton University Press: 1987. Pp. 433. \$52.50, £32.90. Paperbound English translation by Anna Beck of the documents in Vol. 1 \$22.50, £14.10.

IT HAS BEEN rumoured for quite some time in the physics community that the editors of Einstein's *Collected Papers* have uncovered some hitherto unknown material about Einstein (1879-1955). The rumour turned out to be true and in the first volume of the *Collected Papers*, covering the period 1879-1902, which has just been published by the Princeton University Press, we read some of this fascinating new material, the most important of which is a collection of 51 letters to and from Mileva Maric (1875-1948) who was Einstein's classmate at the ETH (the Swiss Federal Institute of Technology in Zürich) for most of the four years 1896-1900 that Einstein studied there, and who later became Einstein's first wife, 1903-1919.

The volume is handsomely printed and consists of 142 annotated documents, nine editorial notes, a long (19 pages) annotated excerpt from Maja Einstein's 1924 draft of a "biographical sketch" of Einstein (Maja being Einstein's sister), a very useful collection of short biographies about some of the people whose names appear in the documents, and other supplementary material. It is clear that the editors intended this series of volumes,

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Scientist and philistine — Albert Einstein with his sister, Maja.

projected to number around 30, to be the definitive source of historical material about Einstein. If this first volume is the norm, they will succeed.

In this first volume, much is revealed about the young Einstein. A few examples will suffice. He was referred to by Maric thus: "my sweetheart has a very wicked tongue" (document 125), a fact borne out by Einstein's various remarks in several letters included in the volume. Einstein had great difficulty finding a job after his *diplom* at the ETH in 1900, which he attributed to poor reference letters from Professor H.F. Weber, his teacher