

# Hooked handedness and the brain

It's usually pretty easy to figure out—in right-handed people the left hemisphere of the brain is specialized for language abilities and the right hemisphere is specialized for mental imagery and spatial relationships. This rather straightforward criss-cross probably holds true for 99 percent of all right handers, but the situation is not so easy to figure out for left handers. When information on cerebral specialization first started to come out, it was not known whether the brain organization of left handers was just the same or just the opposite of right handers. Now it is known that about 60 percent of left-handed individuals have language functions in the left hemisphere and visuospatial functions in the right (the same as right-handed individuals). The question now is, how do you determine which left handers have what kind of hemisphere specialization?

Jerre Levy and Marylou Reid of the psychology department at the University of Pennsylvania in Philadelphia have come up with what they call "a simple measurement which, in association with handedness, can reliably predict which hemisphere is predominantly linguistic and which primarily 'spatial' in the left-handed and occasional right-handed writer who is an exception to the normal relationship." The simple test has to do with writing styles. Left-handed writers, in addition to having two possible types of hemisphere specialization, display two distinct hand postures in writing. Most can be clearly classified as having either the "hooked" position, in which the hand lies above the line of writing, or the common right-handed position, in which the hand lies below the line of writing. The inverted or hooked position, say the researchers in the Oct. 15 SCIENCE, indicates that the usual crisscross relationship between hand and brain is not present. This finding is based on tests of 73 university students (left- and right-handed males and females who used either the normal or hooked writing posture). The 24 left-handed inverted writers proved to have left hemisphere specialization for language and

right for spatial abilities. Noninverted left handers had the opposite brain organization. Hemisphere specialization in all subjects was measured by more traditional verbal and visual tests.

The hooked writing position has usually been explained as a learned adaptation to the necessity of writing from left to right in our culture, but this may not be the case. Some right handers are hooked writers. Also, Hebrew writing proceeds from right to left. If the learned adaptation theory were correct then right-handed Israelis would be expected to use the hooked position. They don't, but many left-handed Israelis do. This suggests that the hooked position may be related to hemisphere specialization rather than to learning and, as the researchers suggest, may be a good indication of the type of specialization.

This "simple, rapid and reliable" test for specialization in left handers adds another interesting bit of information to the growing body of data on the workings of the human brain. Much additional research is needed to clarify the causes and consequences of this specialization. □

# High energy for heavy element

Bevalac sounds like something that might be a substitute for prune juice, but actually its most recent function has been to supply you with the iron you need—if you are an experimenter in nuclear physics, that is. Bevalac is a heavy-ion accelerator located at the Lawrence Berkeley Laboratory. It was made by joining a smaller ion accelerator, the Superhilac, to the Bevatron, which was, a quarter century ago, the world's most energetic proton accelerator, but which has long since been surpassed for proton use. The idea was to produce a machine that could accelerate heavy ions (atomic nuclei) to what, for them, are very high energies. Last week it did it for iron.

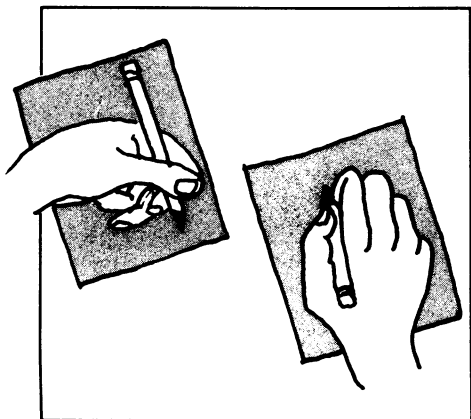
With an atomic number of 26 and an atomic mass of 56, iron is about a quarter of the way down the periodic table. Iron nuclei completely stripped of their electrons were accelerated to energies of 106 billion electron-volts, or a little more than two billion electron-volts per nuclear particle, which is the way heavy-ion experimenters tend to compare things. This is the highest energy for the heaviest element yet. Elements as heavy as xenon have been accelerated in the Superhilac alone, but to energies only in the millions of electron-volts.

Iron is particularly significant because it is believed to play an important role in a number of astrophysical processes, and laboratory studies to check such hypothe-

ses will be possible with high-energy iron nuclei. According to an LBL announcement: "At the time the beam was achieved, there were approximately a dozen experimenters from around the world ready to use the first high-energy iron beam ever known to science." □

# Energetic gammas: A steady source

For a few years now astrophysicists have been trying to explain what sort of occurrence could yield the bursts of high-energy gamma rays that are recorded several times a year from various directions in space. Now gamma-ray astronomy has a steady source to contend with too. In International Astronomical Union Circular 2992 (Oct. 7) R. D. Wills of the European Space Technology Center at Noordwijk, the Netherlands, reports that the European Space Agency's satellite COS B has detected "a high-energy, gamma-ray excess above the emission from the galactic disk consistent with a localized source. . . ." The location is galactic longitude  $136^\circ \pm 2^\circ$ , galactic latitude  $+1^\circ \pm 2^\circ$ , or more or less in the plane of the galaxy. In gamma rays above 70 million electron-volts energy (corresponding to a wavelength around a tenth of a milliangstrom), the source emits about two millionths of a photon per square centimeter of detector per second, and the average of 30 hours' observation showed the flux to be constant. The weak X-ray source 3U 0258+60 lies within the error limits of the gamma-ray source's location, but whether there is a relation between the two remains for further observation to determine. □



Hooked hand (left): Clue to the brain.

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