triple bond holding the N_2 together — throws up the greatest obstacle to freeing the two atoms to react with other elements. In the new method, the molybdenum-bearing molecule cuts the triple bond and picks up both nitrogen atoms, attaching each to an intermediary chemical complex in readiness for further reactions.

The researchers designed the nitrogen-cleaving molecule with a novel structure that they thought "would display unusual reactivity, and in fact it does."

Conveniently, the reaction takes place in a cool solution of hydrocarbons at ordinary air pressure. "There are no other well-documented reactions that occur the same way, making this manner of N_2 cleavage quite interesting," Cummins says.

He believes that the new method's primary contribution may be simply to spark inquiry into other, related methods of cleaving nitrogen molecules.

"The work of Laplaza and Cummins has revealed many interesting prospects, most of which have been only aspirations, or paper chemistry, until present," says G.J. Leigh, a chemist at England's University of Sussex.

Having long tried to mimic nature's methods of nitrogen fixation, Leigh adds, chemists may now see in the work of Laplaza and Cummins a chemical reaction "that is radically different." *— R. Lipkin*

Quark matters: Birth of a strange dwarf

A white dwarf is a dead, collapsed star. Nuclear fusion reactions no longer fuel its glow. Electrons and atomic nuclei in its crust and core lie so tightly packed that all atomic structure is lost.

Researchers now propose that a fraction of these diminutive stellar corpses may harbor cores that include strange quarks as one of their constituents. The presence of such quark cores would stabilize these stars, allowing them to exist over a wider range of masses and core densities than possible for white dwarfs composed of just ordinary matter.

Normally, a white dwarf packs the equivalent of the sun's mass into a ball roughly the size of a modest planet, while neutron stars — the crushed relics of supernova explosions of giant stars — can have similar masses but diameters of 40 kilometers or less. "The strange dwarf fills the gap between ordinary white dwarfs and neutron stars," says Norman K. Glendenning of the Lawrence Berkeley (Calif.) Laboratory.

Glendenning and his collaborators describe this "possible new class of very dense white dwarfs" in the May 1 PHYSICAL REVIEW LETTERS.

The existence of compact stars containing strange matter hinges on the hypothesis that a quark nugget consisting of roughly equal proportions of up, down, and strange quarks may be more stable than an ordinary atomic nucleus, which contains only up and down quarks (SN: 3/4/89, p.138). Researchers have looked for strange matter in accelerator experiments and elsewhere but so far have come up with no unequivocal evidence either confirming or rejecting the hypothesis.

A strange dwarf consists of a tiny quark core surrounded by a hefty overlay of nuclear material, up to a few thousand kilometers thick. A thin layer of electrons surrounding the positively charged quark core keeps it out of direct contact with the crust of ordinary matter lying above it.

The nuclear material in the deep interiors of such stars can have a density up to 40,000 times higher than that found in typical white dwarfs, the researchers say.

Where could a strange dwarf's quark core come from? Glendenning and his colleagues speculate that if quark nuggets exist in the galaxy, they would readily contaminate any objects with which they come in contact. Over billions of years, enough of this material could accumulate in a main-sequence star to leave a core of strange matter when the star dies. *— I. Peterson*

Map unfolds for brain's vision areas

Thanks to advances in brain-imaging technology, scientists have taken the first step toward delineating the location and characteristics of a cluster of interrelated patches of brain tissue that orchestrate vision.

Until now, knowledge about these regions came almost entirely from monkey experiments that relied on invasive methods such as electrical stimulation of the living brain.

"We're at the threshold of understanding much more about the human visual cortex and its possible role in higher mental functions, such as language comprehension," asserts Martin I. Sereno, a neuroscientist at the University of California, San Diego.

Sereno and his colleagues used functional magnetic resonance imaging (MRI) to study the brains of seven volunteers, they report in the May 12 SCIENCE. Functional MRI creates images of brain anatomy and determines localized activity from measurable responses of the brain to a strong external magnetic field.

MRI images taken while volunteers viewed a slowly rotating semicircle revealed activity in the cortex, the brain's outer layer, that changed according to the angle of gaze registered by the retina. Images taken while viewing a thick ring that slowly expanded or contracted yielded information on cortical areas sensitive to the point in the visual field at which a participant's gaze was directed.

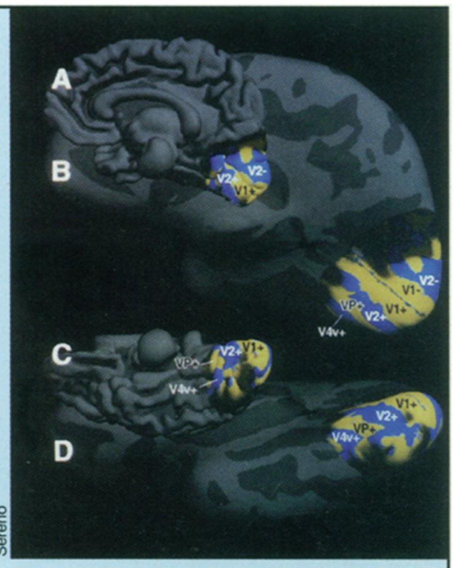
A computer program transformed MRI scans of each participant's brain from a bunched cortical surface to a flat expanse of tissue. Data from the two visual trials were then fitted into these flattened images, which allowed researchers to isolate all activated parts of the cortex.

The researchers mapped out five adjacent segments of the visual cortex by noting magnetic signal changes from one region to the next. The location of only one of those areas, the primary visual cortex, or V1, had already been traced in humans, Sereno says.

Humans and monkeys display a number of similarities in the shape and organization of these visual areas, he notes. However, mapped areas of the human visual cortex place far more emphasis on processing information from the center of gaze than do corresponding areas of the monkey cortex.

For some reason, the human visual cortex evolved a preference for extracting information from the center of the visual field when assembling elements of a scene, Sereno proposes.

Further MRI work may uncover links between the visual cortex and some types of linguistic ability, he adds. Part of the visual cortex not mapped in the current study lies just below Wernicke's area, a structure involved in speech and language comprehension, according to Sereno. *— B. Bower*



Blue and yellow patches designate mapped areas of the human visual cortex viewed from the side of a folded (A) and an unfolded (B) brain surface and from the bottom of a folded (C) and an unfolded (D) surface.