South Rehabilitation Corp., both in Baltimore. For example, when shown the word "common" spelled backwards as "nommoc," N.G. read out "com." However, she made errors on "mon," even though the latter part of the word had been presented to her left side, where normally spelled words were always recognized.

N.G.'s performance suggests reading and spelling rely on representations of words in the brain positioned according to the central point of a string of letters, the researchers assert in the July 19 NATURE. To further illustrate this notion, they observe that when they added letters to the right end of a word, N.G. had an easier time reading it. For instance, she was much better at recognizing "contrast" in the word "contrastiveness" than at simply reading "contrast."

N.G.'s impairment is "unexpected and potentially informative," writes psychologist Stuart Sutherland of the University of Sussex, England, in an accompanying comment. But its true meaning remains baffling, he concludes.

If words are mentally positioned by their center point, Sutherland asks, why are those same words more easily lifted from memory by their first letters? While this tendency may help explain why a person more easily recognizes the left side of a word, he says, it offers no aid in deciphering why a string of letters is easier to recognize as a word if extra letters are added on. *– B. Bower*

# Open mind may help close rad-waste lid

The United States should revamp its "rigid" approach to assessing, designing and building a high-level radioactive-waste repository, according to a "position statement" by the National Research Council's Board on Radioactive Waste Management. Otherwise, this independent advisory board warns, permanent-storage efforts may stall, raising the prospect that spent nuclear power-plant fuel could continue to accumulate indefinitely in surface storage depots.

Without giving specific examples, the 34-page report released July 18 characterizes storage rules set by the Environmental Protection Agency (EPA) and the Nuclear Regulatory Commission (NRC) as excessively prescriptive and detailed. Such rules include NRC's requirement that planners assume all storage canisters will last no more than 1,000 years, says Charles Fairhurst of the University of Minnesota at Minneapolis, the board's vice-chairman.

The lifetime of copper canisters apparently far exceeds that NRC cap. If the Energy Department (DOE) could use such actual lifetimes, Fairhurst says, it might cut the cost and effort now spent designing and testing superfluous barriers. Regulations like this and others governing groundwater movement and radioactivity leakage could sink the program, warns the report.

The report also suggests current regulations encourage the "unsound" use of geophysical models to predict the performance of proposed sites. Trying to exact an "impossible" level of certainty from these models, the report charges, oversteps the limits of the models, current geological knowledge and site data.

Permanently burying high-level wastes deep underground remains untried as yet, notes Fairhurst. Yet, by law, DOE must do this, and it is focusing on a site within Nevada's Yucca Mountain for its first repository (SN: 1/6/90, p.11). Under present rules, Fairhurst says, DOE's task is like designing an airplane "without ever flying a prototype."

The position paper urges that DOE be allowed to "design (and improve the design)" as it proceeds with waste containment. By that approach, DOE would publicly accept some degree of uncertainty as normal for a new and complex technical undertaking. This shift should enable the project to weather likely surprises without causing the public to lose faith in the work, says Frank L. Parker of Vanderbilt University in Nashville, chairman of the board issuing the report. He cites such surprises as the pressurized brine discovered unexpectedly in New Mexico at an intended repository for wastes from nuclear weapons plants (SN: 3/19/88, p.188).

The report also recommends that EPA narrow its requirements imposed on DOE's waste facility to only a maximum public radiation dose, and let DOE choose how to meet that dose limit.

Robert R. Loux, executive director of Nevada's Nuclear Waste Project Office in Carson City, finds in the proposals a disturbing, "amoeba-type standard." A repository has to meet public health and safety requirements, Loux says. "We don't just mold and blend the criteria along the way. It's just not the way things are done." *–P. L. Weiss*

# Self-made molecules do the double twist

Since the 1950s, when scientists uncovered the molecular structure of DNA, the double helix has symbolized biological phenomena as minute as a fruit-fly's eye and as grandiose as evolution. No wonder some chemists focus on making molecules to interact with such celebrity biochemicals or mimic their structures.

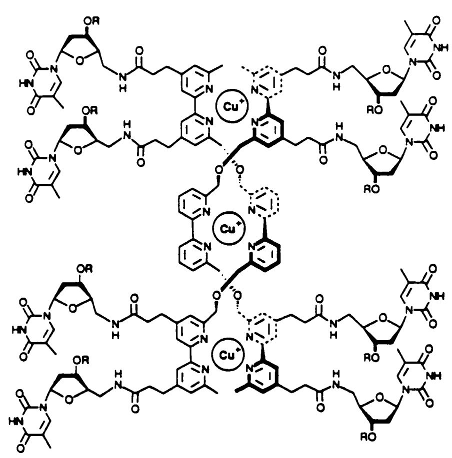
In the July 26 NATURE, Jean-Marie Lehn of the Université Louis Pasteur in Strasbourg, France, and co-workers describe how they coaxed molecular segments to self-assemble into double-helical molecules with DNA-like appendages.

Several years ago, Lehn and other coworkers first reported making the frameworks that underlie these new, more complex molecules. Their twisty frameworks begin as pairs of pyridine molecules (benzene-like hexagonal rings containing a nitrogen atom) joined like Siamese twins and linked to other pairs via short organic 'spacer' units. Chains of these linked pyridine twins spontaneously braid into double helices around copper ions.

In their latest work, Lehn and his coworkers integrate biologically important molecules such as the nucleoside thymidine – part of one of DNA's four nucleotide building blocks – into the helical backbone.

Though nucleosides reside within DNA's double-helix backbone, they point out from the double-helical spine of Lehn's new synthetic structures. In a commentary that accompanies the report, chemist and artificial-helix maker Edwin C. Constable, of the University of Dundee in Scotland, describes the synthetic molecules' structure as a "curious 'inside-out' analogue to that of DNA." Unlike DNA, which overall carries a negative charge, Lehn's compounds are positively charged.

The new synthetic structures offer a means for studying how natural and lab-made double helices form and bind to other molecules, such as DNA. Constable speculates that double helices built around heavier metals, such as ruthenium or platinum, might bond to specific portions of nucleic acids, permitting researchers to "eavesdrop" on, say, drug-DNA interactions. These structures might even serve as light-activated "molecular-mines" that could destroy malfunctioning regions of DNA, he told SCIENCE NEWS. *– I. Amato*



Lehn/Nature

*Structure of Lehn's artificial double helices with thymidine molecules springing from some of the pyridine rings.*