

## Propellane: Quite a strain

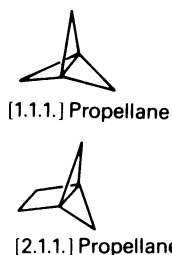
Chemists have synthesized a structure that is the most strained per carbon atom of any known organic compound stable at room temperature. The synthesis—reported in the Sept. 22 *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY* by Kenneth B. Wiberg and Frederick H. Walker of Yale University—has provided new insights into the nature of carbon-carbon bonds.

The highly strained molecule belongs to the chemical class “propellanes”—structures, composed of three “rings” joined by a common bond, that resemble propeller blades. The common bond that joins the rings is called the bridgehead-bridgehead bond. All three rings of the new structure are triangles and so are each composed of only one other carbon atom in addition to the two bridgehead ones. Therefore, the new structure is called [1.1.1] propellane.

The new propellane is highly strained due to the orientation of the bridgehead atoms in relation to the other atoms. Carbon atoms can bond to four other atoms. The most stable and effortless way for this to occur is for the bonding atoms to lie at the corners of an imaginary tetrahedron and for the carbon to be in the center of that shape. But in the case of [1.1.1] propellane, each bridgehead carbon and the atoms to which it bonds form inverted tetrahedra. Explains Wiberg, the new propellane is like “an inside-out umbrella.”

This highly strained, chemical inside-out umbrella is stable at room temperature, Wiberg says, because all structures to which it could decompose are even more strained. “It’s protected by the misery of all related compounds,” he says.

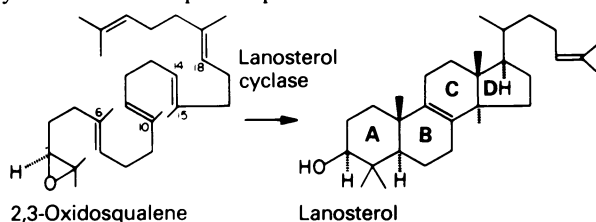
In research submitted to *JACS* for publication, Wiberg and colleagues also have studied another “propeller-blade” compound, [2.1.1] propellane. In addition, in research that has been accepted for publication in *JACS*, the scientists have investigated the strain energies of a whole series of small-ringed propellanes. Gathering this information on propellanes, work that has been funded by the National Science Foundation, is just a part of the general effort to learn more about carbon-carbon bonds, Wiberg says. Carbon is the very basis of organic chemistry.



## ‘Scofflaw’ enzyme helps to make steroid

Stanford University chemists Eugene E. van Tamelen and colleagues have discovered a heretofore elusive step in nature’s synthesis of steroids, a chemical class that includes certain hormones, drugs and precursors to vitamins. The discovery, reported in the Nov. 17 *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*, has enabled the team to devise the simplest known method of laboratory steroid production.

The Stanford team discovered how nature, in its synthesis of the steroid lanosterol from a precursor squalene molecule, defies the law of chemistry. According to those laws, a five-membered carbon ring should form instead of lanosterol’s six-carbon “C” ring (refer to the diagram). But van Tamelem and colleagues found that in the biosynthesis of that steroid, the enzyme lanosterol cyclase can hold two key carbon atoms very close together, forcing them to form the six-carbon ring. The discovery eventually could lead to improved production of steroids.



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## New programs for computer literacy

Christmas may do more to promote computer literacy than any other institution, if seasonal computer-system sales are any guide. But several universities are not satisfied with relying on holiday gift giving to upgrade the nation’s waning mathematical prowess.

Brown University, for instance, has just opened what it is billing as the “computer classroom of the future.” Explains Andries van Dam, its chairman of computer science, the experimental auditorium/laboratory has “workstations of unprecedented power”; each of the 18 units installed thus far (the school anticipates getting 42 more) has computing power equivalent to half of what the university’s mainframe system had 10 years ago. But what makes this program unique, van Dam says, is a complete “blurring of the boundaries” between the formal-lecture-followed-by-hands-on-laboratory-experimentation characteristic of most university science and engineering instruction. Here students interact with teachers via workstations so that lectures and interactive demonstrations are integrated.

Conceding that “we’re essentially in the Kitty Hawk stage of learning how to fly with this medium,” van Dam said Brown’s long-term goal is to have teachers throughout the university exchange their chalkboard and overhead-projector presentations for “courseware” integrating explanatory instruction with student experimentation at these workstations. Still to be developed, he points out, is the “courseware”—computer programming specific to each course—that encourages students to “think visually.” Points out van Dam, very-high resolution graphics are “a cornerstone” of Brown’s program.

Carnegie-Mellon University is developing a massive network of personal computers linking undergraduates with each other, their teachers and the university’s data repositories. On Oct. 20, CMU signed an agreement with IBM for the development of new hardware to be delivered by the fall of 1985. Each unit—probably costing on the order of \$750—will be “many times more powerful” than existing personal computers, according to Don Hale at CMU. He says the university expects to have created, by decade’s end, a network linking 7,500 computers—“perhaps the largest [personal computer] network ever.”

Drexel University in Philadelphia has gone a step further. It is requiring the acquisition of a computer for all incoming freshmen, beginning next September. Minimum specifications for these computers will be spelled out shortly after Christmas. Meanwhile, Drexel officials continue to scout the personal computer market. The school plans to purchase 2,000 in time for the 1983 school year.

And for the younger set, Champlain College in Burlington, Vt., offers a summer camp. Though not the only computer camp, it is the first and only one in the nation to receive accreditation from the American Camping Association. The traditional activities—sailing, tennis, soccer, horseback riding and the like—are all there. But the 10-to-16-year-old Champlain campers also spend half of every day at their individual computers. Two-, four- and six-week sessions cost about \$350 per week.

## News updates

- Despite attempts by environmentalists to undermine the credibility of Donald Hodel—a friend of Interior Department Secretary James Watt—the former deputy Interior Secretary received swift Senate confirmation as Secretary of Energy.
- In a 245 to 176 vote, the House struck MX-missile funds from the Pentagon budget (except \$1.7 million for missile research and \$715 million for development of an MX-basing system). Restoration of MX-production funds before Congress closes now appears unlikely, especially since Gen. John Vessey disclosed three of the military’s five joint chiefs of staff oppose “dense-pack” basing (SN: 12/4/82, p. 356).

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