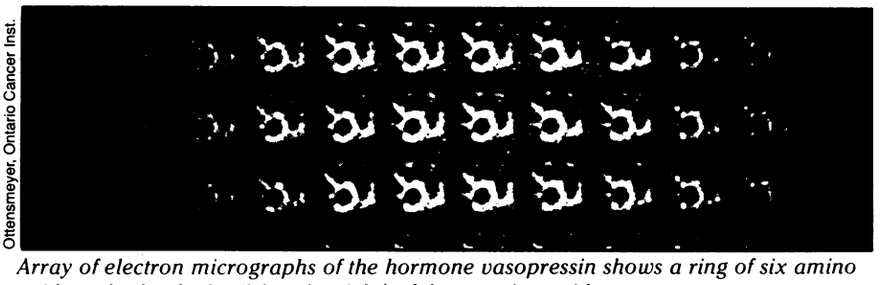

Ottensmeyer, Ontario Cancer Inst.

Array of electron micrographs of the hormone vasopressin shows a ring of six amino acids and a hooked tail (on the right) of three amino acids.

preted as different views of a DNA coil making approximately 1.75 turns within the nucleosome.

The scientists display the images in vivid colors — for example, the phosphorus of the DNA coil is rendered orange-red, the protein "bead" is yellow and the background is blue. Ottensmeyer says, "Although the technique is still in its infancy, results are very very exciting." He concludes, "The future looks bright and colorful." □

The food supply: Don't be fuelish

Powering vehicles with fuel derived from grain has become a technologically, if not economically, practical proposition. While on the surface the conversion into ethanol fuel of such clearly renewable resources as corn, sugar cane, sorghum and beets may seem a sensible answer to the energy shortage, a sobering concern has arisen. Will this approach take food out of the mouths of hungry people to put fuel into automobile tanks?

At a symposium on future food-fuel conflicts, agricultural economists compared predictions of the impact of agricultural biomass energy programs on food supplies. The speakers pointed out that fuel from food crops is a relatively minor part of the proposed energy plans. While the U.S. potential for biomass energy in the next 20 years is likely to be up to 20 percent of 1979 U.S. energy consumption, grain comprises only 4 percent of that potential, and other food or feed crops, such as sugar, represent far less potential, says Wallace E. Tyner of Purdue University.

Grain's conversion to a gasoline substitute however, makes it the most immediate biomass fuel material. "Grain alcohol should be thought of as a small component of our energy system, and as an opening wedge to prepare the ground for larger biomass sources, such as silage crops and wood," says Folke Dovring of the University of Illinois at Urbana.

Corn is currently the most practical feed and food crop in the United States for conversion to fuel. Speakers disagreed on the extent to which the corn crop could be increased by bringing into production land currently idle. Tyner says 2 billion gallons of alcohol could be produced with less corn land than was diverted from production in 1978. Milton L. David of Development Planning and Research Associates, Inc., in Manhattan, Kan., predicts, however, that bringing idle land into use would add direct production costs and produce environmental damages. Another difficult factor to predict is how much land would be switched to corn from other crops, such as soy beans and wheat. Such changes would depend in part on corn prices. According to Dovring, within three years, if current investment plans materialize, grain alcohol production could make an impression on the grain market.

David predicts a 1 billion gallon ethanol program (equivalent to 1 percent of gasoline consumption) will require 5.4 percent of current corn acreage, or, Tyner calculates, 2 million acres of new land in corn production. The cost of alcohol from corn would range from $1.21 to $1.55 per gallon, depending on the size of the production plant, Tyner estimates. Considering the increasing price of gasoline, Tyner says, "Even if alcohol from corn is not quite economic today, it will be within 18 months." Simulations of market conditions predict 1 to 2 billion gallons of ethanol could be produced in the United States without raising corn and soy bean prices. Increasing that ethanol production to 4 billion gallons would increase corn prices only 6.6 percent, says Marilyn Herman of the U.S. National Alcohol Fuels Commission. David agrees that the economy can handle a 4-billion-gallon program. "Beyond that, it's anybody's guess," he says.

Increased corn prices would affect the diet of meat-consuming populations, because most U.S. corn is used as feed rather than food. "Use of feed grains for alcohol involves trade-offs in the price and quality of meat, poultry and dairy products, but [does] not directly [involve] the issue of food for starving humans, at least at low to moderate levels of alcohol production," Tyner says.

Governmental policies that encourage or discourage crop use for fuel production can influence dramatically the market and the distribution of crops into food and fuel. Janos Hrabovszky of the United Nations Food and Agricultural Organization warns that such a policy must be flexible, adjusting to developing market conditions. □

A French ear on Jupiter

An astronomical telescope is a multipurpose device, often focused not merely on stars but on planets, moons, asteroids, gas clouds, comets and more. In France, however, about 200 kilometers south of Paris, some 8,000 square meters of the pine-dotted countryside around Nançay is now the site of a telescope dedicated almost entirely to the study of a single planet: Jupiter.

It is a radiotelescope, consisting of 144 helical antennas, each several meters high, electronically linked together to form the equivalent of a single huge instrument. The primary goal of the array is the long-term monitoring of the powerful decametric radio emissions that make Jupiter the strongest planetary beacon in the solar system. Built by the Group for Decametric Radio Astronomy of France's Meudon Observatory, the facility began operating in January of 1978, when only half of its antennas were connected. Now the entire array is on the job.

It is by no means the first Jupiter-only radiotelescope to be built. In the three decades since Jupiter was discovered to be a radio source, "probably several dozen" such devices have been constructed, according to James Warwick of Radiophysics Inc., one of the first researchers to "listen" to the giant planet. But the French group, Warwick notes, has "significantly advanced the state of the art."

Describing the instrument in the forthcoming ICARUS (43:399), André Boischot and colleagues assert that four qualities are necessary for such a device: wide bandwidth, to cover the full range of frequencies; high time and frequency resolution, to measure subtle but often critical changes in the emissions; high sensitivity, for detecting the signals' weaker components; and long tracking time — the ability to keep Jupiter in view for many hours each day. Previously built installations, according to the authors, have all been limited in one or more of these areas. An array in Tasmania, for example, offers excellent resolution, but can only pick up Jupiter for about five minutes at a time. A facility at Oulu, Finland, scores moderately well in most categories, but has a bandwidth of only 2 megahertz.

The new French instrument, by comparison, covers a band from 10 to 120 MHz, more than sufficient to cover the roughly 10-to-40-MHz Jovian emissions detectable from earth. Though the device cannot be physically rotated, the electrical phase of its individual antennas can be shifted — the equivalent of steering a single, dish-type antenna — in a way that allows the planet's signals to be recorded for as long as 10 hours a day, about the time it takes Jupiter to turn once on its axis. (It was the