to use the recombinant genes because I believed that they would increase the possibility of introducing beta-globin genes that would be functionally effective, and would impose no additional risk to the patient...." The patients thus far have shown neither any benefit nor harm from the treatment.

Cline resigned as chief of the UCLA Division of Hematology-Oncology when charges of misconduct were made earlier (SN: 11/1/80, p. 278), but he maintains his faculty position. Although no NIH funds were used for Cline's travel to Israel and Italy or his clinical experiments there, NIH money had been used at UCLA in the preparation of the genetic material.

The NIH action represents the first case in which an individual investigator has been required to get prior NIH approval for recombinant DNA experiments when such approval is not generally required, and also the first case in which an investigator at an institution with a "general assurance" approved by the NIH needs to get prior approval for each protocol using human subjects. In addition, it is the first time the institutes of NIH have been asked to reconsider existing grants in light of a conduct report. □

Rapid diagnosis of legionellosis

Although legionellosis (also known as Legionnaires' disease) affects 125,000 persons in the United States annually, early diagnosis of this life-threatening pneumonia is not possible unless physicians take biopsy specimens, which they are often reluctant to do, and unless labs have the equipment to analyze the specimens for *Legionella,* the bacteria that cause the disease. Thus, scientists are looking for less invasive, easier methods of diagnosing the disease early, such as identifying antigenic material from *Legionella* in patients' body fluids (see p. 361).

Now such a diagnostic technique may have been found by Richard B. Kohler, assistant professor of medicine at Indiana University School of Medicine in Indianapolis. As he reported at the Third International Symposium on Rapid Methods and Automation in Microbiology in Washington last week, the technique consists of using radioimmunoassay to identify *Legionella* antigen in the urine of legionellosis victims. When the method was performed on a handful of legionellosis patients, it detected the bacterial antigen as often during the first three days of illness as later on. And once the patients got antibiotics for the disease, the antigen disappeared from their urine.

A limitation to this diagnostic approach, however, is that it can detect antigen in urine from only one species of *Legionella* — *Legionella pneumophila* — not from others that can also cause legionellosis. □

Drug therapy for gallstones

Gallstones (crystallized bits of cholesterol in the gallbladder) are no small problem. Ten percent of all Americans, and one-fifth of those over 40 years of age, have them. Gallstones in turn often lead to upper abdominal discomfort, bloating, belching and food intolerance and sometimes to more serious problems such as acute or chronic inflammation of the gallbladder or cancer of the gallbladder. The only treatment available has been surgical removal of the gallbladder.

Now a relatively safe and often effective drug therapy for gallstones has been found — a natural bile acid present in the gallbladder called chenodeoxycholic acid. The news was reported in New York at the recent meeting of the American Gastroenterological Association.

Ten years ago Leslie J. Schoenfield, director of gastroenterology at Cedars-Sinai Medical Center in Los Angeles (then at the Mayo Clinic in Rochester, Minn.), and several of his colleagues found that chenodeoxycholic acid could dissolve gallstones. Because of this discovery's potential value, the National Institute of Arthritis, Diabetes and Digestive and Kidney Diseases decided, in 1973, to fund a $10 million, multicenter trial to determine how safe and effective chenodeoxycholic acid might be as a gallstone drug. First Schoenfield and other scientists participating in the trial performed research to learn more about how gallstones are formed and dissolved. Then they demonstrated the safety of chenodeoxycholic acid in experimental animals. In 1976 they enrolled 916 gallstone patients in the clinical trial. One group of patients got 750 mg of chenodeoxycholic acid daily, another group got 375 mg daily and a third group got a placebo daily. All the patients were then followed for two years, with the last patients completing two years of follow up in August 1980.

The results of the clinical trial suggest that chenodeoxycholic acid is safe for humans. For instance, loose bowel movements occurred in 41 percent of patients getting the 750 mg dose, but the diarrhea was mild. And while the drug was able to mildly raise blood levels of cholesterol (a heart disease risk factor), it did so in only 10 percent of patients who took 750 mg of it daily. Chenodeoxycholic acid totally dissolved gallstones in 14 percent of patients who took the 750 mg dose, and partially dissolved gallstones in 27 percent of patients who took that dose. There was somewhat less efficacy among patients who took 375 mg of the drug daily—a total gallstone dissolution in 5.2 percent of patients and a partial gallstone dissolution in 23.6 percent of patients. In contrast, very little gallstone dissolution took place among placebo patients—a total dissolution in only 0.8 percent of patients and a partial dissolution in only 10.2 percent of patients. Thus, Schoenfield and his colleagues conclude that chenodeoxycholic acid at 750 mg daily "has a role in treating appropriately selected patients with cholesterol gallstones," provided those patients understand the potential benefits and risks of the drug as compared with those of surgery or of physician observation without treatment.

The FDA will now evaluate the results of this trial as well as pending applications from drug companies eager to market chenodeoxycholic acid in the United States. Meanwhile, Schoenfield and his colleagues are undertaking yet another trial — to see whether chenodeoxycholic acid can prevent the recurrence of gallstones among patients for whom the drug has already dissolved gallstones. And further down the road, another natural bile acid found in the gallbladder — ursodeoxycholic acid—may turn out to be just as effective as chenodeoxycholic acid in dissolving gallstones but with fewer side effects. Preliminary clinical results indicating that this might be the case were reported at an American Chemical Society meeting in Atlanta in April by Ashok Kumar Batta of the New Jersey Medical School in Newark. □

Beta-endorphin as arthritis culprit

Of all the peptides in the brain that produce psychological or behavioral effects, beta-endorphin is one of the most intriguing—and controversial. It may or may not relieve depression and schizophrenia, depending on which studies one cites; it may relieve pain; if may be involved in the body's regulation of heat and maybe even in the body's preparation for a food shortage. Now beta-endorphin has been implicated in rheumatoid arthritis and other arthritis diseases, Charles W. Denko of the Fairview General Hospital in Cleveland reported last week in Boston at the annual meeting of the Arthritis Foundation.

Denko and his colleagues have found that levels of beta-endorphin were significantly lower in both blood and joint fluids from patients with rheumatoid arthritis, osteoarthritis, gout and other rheumatic diseases than in blood and joint fluids from healthy persons, and especially low in the blood and joint fluids of patients with chronic and extremely painful arthritis, notably rheumatoid arthritis.

Denko foresees these findings benefiting patients with arthritis diseases. For instance, beta-endorphin might eventually help ease arthritis sufferers' disease processes and pain once the price of producing the substance is lowered and it has been approved for clinical use by the Food and

Drug Administration. Scientists at the University of California at San Francisco already have managed to make beta-endorphin with recombinant DNA techniques, promising that it can eventually be manufactured economically (SN: 5/17/80, p. 309). More immediately, the findings might lead to more effective psychotherapy for arthritis patients, notably improving their outlooks on life, thus raising their beta-endorphin levels and improving their health. There are reasons to believe that such psychotherapy might be in the offing. First, preliminary findings from Denko and his colleagues show that persons have higher beta-endorphin levels on those days when they feel good about life than on those days when they are pessimistic. Second, some studies by other scientists have shown that rheumatoid patients with a more positive self-image and outlook on life have a better prognosis than do those with a more negative view. "It is the power of the mind over the body," Denko says, "and we now think it may be mediated by endorphins." □

Sea seeps: It's a gas

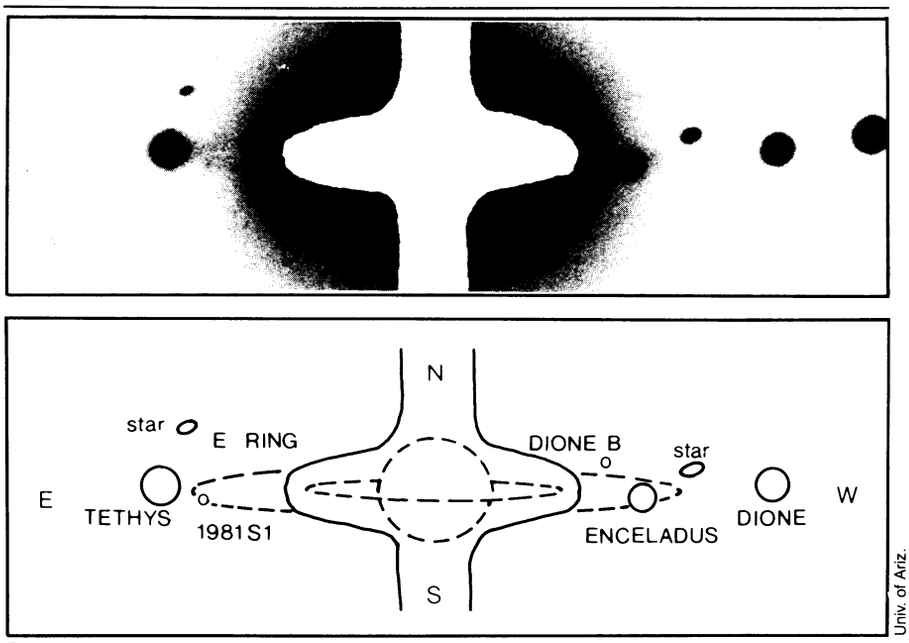
The research ship *Melville* recently came into port with more evidence that methane gas is escaping from seafloor vents on the East Pacific Rise — a region where the ocean floor is drawing apart and molten rock is rising to fill the gap.

The latest methane discovery was reported by Harmon Craig of Scripps Institution of Oceanography in La Jolla, Calif., who was co-chief scientist for research during the *Melville*'s nine-month voyage. The methane was found in water samples collected above the East Pacific Rise near Latitude 20 degrees South, off the coast of Bolivia. An earlier methane discovery was reported in 1979 by Scripps's John A. Welhan and Craig after the deep-diving submarine *Alvin* (SN: 1/12/80, p. 28) collected water samples directly from seafloor vents near Latitude 21 degrees North on the Rise. While conventional petroleum wisdom holds that most naturally occurring gas is organic in origin — formed when the complex mixture of subsurface organic matter called kerogen decomposes first to heavy oil, then to light oil and finally to gas — researchers say the methane in the seafloor seeps is nonbiological in origin.

Welhan says it could form from high-temperature chemical reactions within the rising molten rock near the seafloor surface. Others support the theory of Cornell University's Thomas Gold, which states there is a sizeable portion of abiogenetic methane gas that was trapped deep within the earth at its birth that is released through certain escape routes (SN: 4/25/81, p. 267).

Welhan's conclusion: "It is premature now to say whether the gas is coming from deep within the earth or coming from near-surface reactions." □

Saturn's crowded satellites



Recent studies have found at least three of Saturn's moons to be sharing their orbits with other satellites (SN: 5/30/81, p. 341). This remarkable photo, a negative print of an image made with the 1.54-meter telescope at the University of Arizona's Catalina Observatory, shows two of the planet's established satellites along with one each of their co-orbital companions. At left is Tethys, and the faint spot about a quarter-inch from it at about 4 o'clock is 1981 S1, current designation for a tiny moon that precedes Tethys by about 60° in its motion around Saturn. (Another satellite, not shown, trails Tethys by a similar amount.) At far right is Dione, preceded in its own orbit by a single known companion, dubbed Dione B, which appears as the dim spot just above and to the left of Enceladus. Also shown is Saturn's faint E-ring, which one research team has suggested may be populated by ice particles generated from Enceladus by meteorite impacts (Enceladus orbits almost exactly at — or even within — the E-ring's outer edge). The photo was taken April 1 by S. M. Larson and J. W. Fountain.

Would EMPs induce nuclear meltdowns?

There are some who probably view Demetrios L. Basdekas as a rabble rouser. He is a Nuclear Regulatory Commission safety engineer who worries that electromagnetic pulses (SN: 5/9/81, p. 300) from nuclear weapons — especially those detonated in the upper atmosphere — spell a significant and potential hazard to nuclear-power plants across the nation. And in his worst-case scenario he envisions a nuclear meltdown — the potentially catastrophic melting of a nuclear-reactor's fuel, which could lead to a breaching of its containment vessel and the eventual venting of lethal quantities of radioactive gases into the atmosphere.

This is a problem that has concerned Basdekas since 1976, when he testified about it before Congress. "But nothing happened," he says, "not visibly, anyway." So in 1979, despite a lack of obvious support from inside his agency, "I decided to stick [out] my neck still further," he says, "and I wrote the President." That got results. Among them were interviews with representatives of the National Security Council and independent consultants hired by the government to review his claims. Last year NRC decided to study the problem.

A dictum prohibiting NRC from requiring power plants to withstand the effects of nuclear war had posed a stumbling block to NRC's considering whether to even review a potential need for hardening, or protecting against, EMP, explains Bill Morris, director of NRC's current EMP study. But he says there is a growing concern that potentially hazardous EMP's might occur outside the nuclear-war theater where other radiation effects would predominate. This means NRC may, in the future, make nuclear-plant owners build in some EMP hardening. And whether it does could depend on results of the study now underway by Sandia Laboratory and Boeing Aerospace Corp. The study is trying to anticipate how a typical nuclear plant would respond to EMP and whether it would have difficulty safely shutting down.

If all backup power for a nuclear plant were killed by EMP, core-cooling might be impossible — leading to a meltdown. A 1977 government study found that unlikely. Basdekas doesn't. By year's end, the NRC study will try to decide. □