

Lynch stresses that in this case, as in the case of the neutral object found in May, the SLAC-LBL physicists are not making a flat-out claim of naked charm, but the characteristics and behavior of the new particles seem to fit what theory prescribes for nakedly charmed particles.

This is especially true, he says, of their decay modes. They decay by the so-called exotic channel, which involves a different combination of two measurable characteristics (electric charge, and strangeness) from that involved in the normal channel, by which uncharmed particles decay. □

the water, and restlessness of animals.

* * *

A National Research Council panel last week issued a study calling reliable earthquake prediction "an achievable goal" for the United States within 10 years, provided a national commitment to a long-term research program is made now. Such a program would require "several times the current annual expenditures for prediction research," the report concludes.

The panel calls for increased study of how people would respond to earthquake predictions, and suggests creation of a formal evaluation panel to advise public officials on predictions. Also, the panel concluded, "earthquake prediction now looks so promising, and its social consequences are potentially so profound," that an advisory unit should be established to advise the new White House Office of Science and Technology Policy in such matters. □

China earthquake largest in series

Perceptible motion of the giant plates of the earth's crust has apparently set off this year's series of more than a half-dozen major earthquakes, including last week's temblor near Peking. That quake, measuring 8.2 on the Richter scale, was the largest to occur anywhere in the world since 1964.

Though the exact plate movements are hard to determine, some seismologists say the African and Indian continents have moved noticeably northward over the last several months, setting off a series of quakes along a rim stretching from Italy (quake on May 6) to the islands north of Australia (the New Hebrides was shaken Aug. 2 by a quake measuring 6.9). The first of this year's series of major quakes was in Uzbekistan, USSR, on April 8, and measured 7.0 on the Richter scale.

The Chinese quake, on July 28, was by far the largest of the series and took place in the most densely populated area. Though casualty figures were not released by the Chinese government, diplomats in Peking estimated the death toll in the hundreds of thousands. The industrial city of Tangshan, some 100 miles southeast of Peking, was reportedly flattened by the quake and more than 125 aftershocks of Richter magnitude 4.0 or greater were counted in 48 hours.

Perhaps the most disturbing aspect of the aftershocks has been that their centers seem to be progressing northward toward Peking. The area affected by the quakes contains some 20 million people, many of whom have been sleeping in the open to avoid collapsing buildings. Dependents of foreign diplomats began leaving Peking over the weekend, after being requested by Chinese officials to stay away for at least a month.

Though Chinese seismologists had seen some signs of an impending quake near Peking, they were unable to pinpoint its time as they had apparently done in Liaoning last year (SN: 7/26/75, p. 55). They had only been able to say a major quake should occur before 1980. This week, however, continuing ominous signs—including unusual restlessness among animals in the Peking zoo—led the scientists to warn that more strong quakes in the area are likely soon.

In a program broadcast on Shanghai radio, Chinese seismologists said they may see "very obvious" signs foretelling a quake, but that these may often be misread. "Earthquake forecasting in our country has made great headway," the

program said. "Instances of accurate and relatively accurate forecasts increase each year." However, the scientists admitted that due to the complexity of the phenomenon, such forecasting remains "in a primitive state at present."

The Chinese use basically the same indications of an impending quake as those used in the West: changes in local magnetic, electric and gravitational fields, bulging of the land, changes in subterranean water level and chemical content of

No vacation for DNA issue

There hasn't been a dull moment in the field of recombinant DNA research since California biologists stumbled onto the gene-grafting enzymes four years ago. This summer seemed to hold a refreshing potential for quiescence, following the release in June of long-awaited formal guidelines to govern the field and considering, as well, the traditional vacation-time lull. All is far from quiet, however, and there has been, during the past three weeks, an attempt to patent the new techniques and a barrage of letters between congressmen, an environmental group and the White House.

Stanford University and the University of California have applied jointly for a patent on certain recombinant DNA techniques. (Nobody is saying which ones right now.) The application is pending; processing takes several months.

Although details from Stanford's technology licensing office are necessarily scanty at this point, the basis for the patent application seems to be the ground-breaking research done by Stanford biologist Stanley Cohen and by Herbert Boyer at the University of California at San Francisco. They first demonstrated in 1973 that restriction enzymes could be used to transfer gene sequences.

The patent, according to Stanford's technology licensing manager, Niels Reimers, would cover only commercial uses of certain basic recombinant techniques and only in the United States. These commercial applications might include large-scale production of biologically active substances, such as insulin, hormones or antibodies, by genes transplanted to bacteria. Cohen, Boyer and both universities say they will assign any royalties from commercial use of the techniques to fellowship and research.

The first public discussion of the pre-

viously quiet intention to patent recombinant DNA techniques surfaced at the Miles symposium in June (SN: 6/19/76, p. 389). Some scientists worried that the patents would limit research, lead some industries to seek less-safe but patent-free techniques or inhibit industrial use.

The first concern is groundless, Reimers told SCIENCE NEWS, since research uses would not be patented. Second, the patents would apparently cover such key steps that "less-safe, patent-free" approaches are unlikely. And patents, Reimers says, would probably increase, not decrease, industrial safety and applications. A pharmaceutical company is more likely to spend large sums to develop an application if some exclusivity is assured, he says. Participating companies, moreover, could be required by patent provisions to adhere to the NIH guidelines for safe containment of recombinant organisms. Adherence is now voluntary for all those not receiving NIH funds.

Concern over industry's freedom from regulation led Senators Edward Kennedy (D-Mass.) and Jacob Javits (R-N.Y.) to send a letter to President Ford. In it, they urge an "executive directive and/or rule-making" to assure compliance throughout the research community—a task, they imply, Congress would undertake if the White House doesn't. The senators praised the NIH guidelines as "a responsible and major step forward."

That praise was not evident in a second set of letters from volunteers at the Friends of the Earth, a national environmental organization, to Kennedy, Javits and several other congressmen and to NIH Director Donald S. Fredrickson. In their letters, Francine Simring and Lorna Salzman formally requested that NIH "cease and desist" funding recombinant DNA research

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or building projects for that purpose. They also requested that a moratorium on the research and a congressional inquiry be initiated to provide an "open, national setting for unbiased and unhurried examination" of the risks and benefits.

They base their "cease and desist" request on NIH's release of guidelines prior to release of an environmental im-

pact statement. Simring calls this a "glaring example of cart-before-the-horse tactics," a circumvention of public input and an "a priori assumption that the work would go ahead, thus violating the spirit as well as the letter of the law."

Bernard Talbot, NIH administrator, says that according "to the letter" of the National Environmental Policy Act, the impact statement probably should have been

filed first. But, he says, there was considerable public input during preparation of the guidelines and Fredrickson wanted to release the guidelines as soon as possible to replace the less stringent Asilomar guidelines, and to provide greater protection for the public. An environmental impact statement will be released on Sept. 1, he says, and public input will be used to revise and update the guidelines. □

Mammography: Controversy heightens

The risks of low-dose X-ray screening for breast cancer—mammography—may actually outweigh the benefits for women under age 50, two groups of scientists headed by Lester Breslow of the University of California at Los Angeles and Arthur Upton at State University of New York at Stony Brook reported to the National Cancer Institute on July 19 (SN: 7/31/76, p. 70).

Their reports received widespread newspaper and television coverage. Not unexpectedly, they have triggered concern if not alarm among the 129,000 women under age 50 who have been screened by the technique at 27 centers set up by the NCI and the American Cancer Society in 1972. Many of the 121,000 women over age 50 who have been screened also fear that the results pertain to them. Still other women with pending appointments at the centers have canceled them out of fear.

To counter these reactions and to better inform women on the issue, NCI Director Frank Rauscher Jr. and Guy R. Newell, deputy director of NCI, met with the press and some 400 women on staff at NCI on July 29. Ample evidence was presented to allay undue fear. But Rauscher and Newell agreed that the issue is highly complex and controversial even among scientists in the field, and that the scientific facts just aren't all in yet so that a rational judgment can be made.

First the values of mammography were clarified. The technique can definitely lower breast cancer death rates in women over age 50, according to the only mammography study to date, that of the Health Insurance Plan of New York during the 1960s. Also, preliminary data from screening 250,000 women at the 27 centers since 1972 suggests that mammography can detect breast cancers in women under that age whereas other techniques cannot. Of the 804 cancers detected to date, 223 have been in women under age 50, and of the 223, almost 50 percent were detected by mammography alone, not by palpation. "That is a substantial figure," Rauscher declared.

The risks of mammography were then put into perspective. Rauscher and Newell reemphasized what Upton had estimated. The average American woman has a 7 percent chance of getting breast cancer in her lifetime. One mammogram would increase her risk to 7.07 percent, 15 mam-

mograms would increase her risk to 8 percent, and 100 mammograms would double her risk from 7 to 14 percent.

But no definitive judgment about the benefit-vs.-risk ratio for women under age 50 can be made until more scientific information becomes available, Rauscher and Newell agreed. More information on the benefits and risks should become available in September when another group of scientists headed by NCI pathologist Louis Thomas reports to the NCI. Rauscher implied that he will make some recommendations after that, and that they will be based on the reports of all three working groups of scientists. Meanwhile, the decision to have or not have mammograms is up to American women, and women at the July 29 meeting asked some crucial questions to help them decide on their own, at least until Rauscher takes a stance. For instance, might a routine chest X-ray present breast cancer risks? Newell replied that it probably would not since it contains an even lower X-ray dose than a mammogram does, 70 millirads versus one rad. Another question: What is the lag time between X-ray exposure to the breast and breast cancer? Answer: Ten years at least, and that is one reason why the risks of mammography are probably greater for younger women than for older women.

There was one vital question that no one asked at the July 29 meeting, however. Why was routine mammography for women under age 50 set up in the first place since the only study of its value, the New York HIP study, had shown no benefits for women under age 50? Rauscher did partially answer this question by pointing out that mammography was becoming more sensitive in the early 1970s, and that hopes were great among a number of scientists that it would still prove itself useful for younger women. Also, he said, there was no evidence in 1972 that low doses of X-rays to the breast can cause cancer.

But there was evidence that high doses could. Even then, John C. Bailar III, editor of the JOURNAL OF THE NATIONAL CANCER INSTITUTE, recalls, a number of scientists did not approve of the idea of routinely screening women under age 50 with mammography. So why did the scientists pushing it win out over those who did not want it? As Bailar told SCIENCE



Patient prepping for a mammogram.

NEWS: "I have been 20 years in cancer research, and I have never come across anything as fiendishly complicated as this area. It involves pathologists, surgeons, mammographers, radiation physicists, radiation biologists, public health experts, other specialists. I suspect that these groups never got together in a way that perhaps they should have to hammer out their common problems."

Bailar admits though, that the evidence against X-rays to the breast has been building primarily since the screening centers were set up in 1972. It was he, in fact, who brought the increasingly incriminating evidence to the attention of Rauscher. Rauscher then set up three working groups of scientists last October to study the evidence in greater detail and to decide whether it applied to routine mammography of women under age 50.

The strongest indictment of X-rays to the breast to date, in Bailar's opinion, are study results reported by Upton's group on July 19. Women who had tuberculosis 30 or more years ago were, in those days, given repeated fluoroscopy of the chest to follow the course of their treatment. The radiation dose amounted to about 7.5 rads of X-rays per diagnosis, and the patients received an average accumulation of 1,215 rads. The women have now turned out to have a much higher incidence of breast cancer than the general population. Also, all their breast cancers are on the side of the chest that was bombarded by X-rays. "To me that really nails it down," Bailar asserts. But would an accumulation of 25, 50 or even 100 rads of X-rays from routine mammography in younger women also trigger breast cancer eventually? There is the rub, the yet unanswered question. □