NIH

Research through gloves demonstrated in maximum containment lab at Fort Detrick.

laboratory in its barracks-like building. It is the first U.S. facility certified for maximum safety requirements (P4) described by the National Institutes of Health guidelines. The National Institute of Allergy and Infectious Diseases, which operates the facility, expects recombinant DNA experiments to begin there by April 1, after a week of "dummy" experiments.

The facility is "essentially a box within a box," John Nutter, NIAID chief of specialized research and facilities, told reporters. Scientists manipulate materials in gastight cabinets by reaching into attached heavy rubber gloves. Within the cabinets are a microscope attached to a TV screen, a refrigerator, animal cages and access to an ultracentrifuge. All material leaving the interconnected cabinets is either steam sterilized or chemically disinfected.

The one-room laboratory containing the cabinets, as well as nearby rooms, a hallway and a staircase, is also sealed. The area will be under negative air pressure, so air would leak in through any break, not out. All people entering the area change into uniforms resembling surgical suits, and they shower as they leave. Materials leaving the area will be sterilized or disinfected. Nutter says the set-up provides "redundancy in safety."

In the first months, Martin and Wallace Rowe of NIAID, will do an experiment intended to help evaluate bases of concern over recombinant DNA research. They plan to insert DNA from polyoma virus (a mouse virus that can cause tumors in newborn rodents, but does not infect human cells) into bacteria and then feed or inject the bacteria into mice. Martin and Rowe will examine whether that viral DNA is transferred from bacteria to mammals, providing an indication of whether various types of recombinant DNA might spread throughout a population. A similar experiment is already in progress at Porton Downs, England.

After completion of that risk-assessment experiment, the P4 facility will be available to visiting scientists. NIH will soon make an announcement inviting applications. Another maximum containment facility for recombinant DNA research is also being readied in a mobile unit at NIH in Bethesda, Md. Finally, plans are underway for a more extensive national biological containment facility of P3 and P4 laboratories at Frederick to be operational in about two years. □

East coast booms: Pick a theory

Nobody just accepts the government's word anymore. In January, the Department of Defense bestowed the Naval Research Laboratory with the task of finding a cause for the mysterious East Coast rumblings heard from early December to mid-February. Dutifully, the NRL checked out all the possibilities: nuclear explosions, meteorites, winter lightning, methane bubbles, Russian laser attacks. On March 3, they released a summary of their 151-page report. Based on a theory by Harvey H. Hubbard and Domenic J. Maglieri of the National Aeronautics and Space Administration, the NRL blamed a combination of unusual weather and supersonic military aircraft that caused sonic booms to travel 50 to 200 miles. Past experience, notably similar events in Florida several years ago, and good correlation between flights, temperature inversions and strong winds satisfied the NRL that they had found the cause. They issued the summary, dusted their hands, sat back and that was that.

That wasn't that. On March 8, the Federation of American Scientists issued a press release saying, "The [FAS] charged today that the Naval Research Laboratory had erred in ascribing the cause of the booms...." The Concorde is the culprit, FAS says. In a press conference March 15, FAS director Jeremy J. Stone elaborated. The JFK-bound Concorde makes a turn near Cape Sable, just south of Halifax, Nova Scotia. The turn causes a "superboom" — shock waves from both sides of the turn focused at the same spot. Stone correlated most of the East Coast booms with French and British Concorde arrivals and departures. And, with some elaborate mathematics and help from IBM physicist Richard Garwin, he accounted for a few more by hypothesizing "hyperbooms." Hyperbooms, he says, are shock waves that travel faster than the Concorde and reach the coast as much as an hour and fifteen minutes before the plane. The hypothesis is based on the fact that sound waves travel faster in warm air. Garwin said the shock wave from acceleration will travel into the very thin and much warmer thermosphere, speed up and be reflected back to earth. By bouncing and gaining speed, it arrives before the plane. Not only that, but all these postulated bouncing booms could be "doing something to the thermosphere." Though NRL did attribute similar events in Nova Scotia to the Concorde, Stone says they didn't look far enough for an East Coast-SST link.

Meanwhile, the man with the measurements, William Donn of Lamont-Doherty Observatory, says the booms are "unequivocally, not the Concorde." Neither are they weather-enhanced military booms, he says. They are either "direct booms from close-in planes in a series of exercises" or "something entirely different." Donn has several reasons for his strong statements. Foremost, he says, is that the sounds detected by the Lamont, Charleston and Wilmington stations all originate in the south. And they are different from SST signals the station has picked up since the start of the flights, he says. Second, the bouncing hyperbooms would dissipate in the thin thermosphere. "[Stone] just made his hypothesis without listening to the physics of it." As for NRL's theory, Donn says there was no unusual weather, particularly in December, to support it.

The NRL plans to look at Stone's theory, and Presidential Science Adviser Frank Press will recommend an independent review. In the meantime, theories are booming. □

Smoking and memory

"Caution: Smoking may be hazardous to your ... memory." No one is about to stick that warning on cigarette packs as yet, but there is reported evidence that nicotine can impair both short-term and delayed memory. The results come from a UCLA study reported in the February AMERICAN JOURNAL OF PSYCHIATRY.

UCLA researchers divided 23 "habitual smokers" into two groups and tested each on a series of 75-item, free recall lists containing professions, names, animals, vegetables and minerals. The subjects were first tested before smoking anything and found to be roughly equivalent in free-recall learning ability. (Tests consisted of an experimenter reading the list at a rate of one word every one to two seconds, then giving the volunteers three minutes to recall as many words as they could.)

Three recall tests were administered immediately after each member of one group smoked a filter cigarette with 1.5 milligrams of nicotine and those in the other group smoked a nicotine-free cigarette (subjects were not told which type they were smoking). Two days later, 16 of the subjects returned (eight from each group). All were then asked to recall as many words as they could from the tests two days before.

The researchers found in the first experiment that those in the non-nicotine group, on the average, recalled substantially more words than did those in the other group. "Short-term memory for verbal materials was significantly hindered by the smoking of cigarettes containing nicotine," report psychologist John P. Houston, psychiatrist Murray E. Jarvik and graduate student Nina G. Schneider. The findings corroborate some results of research reported in 1975, according to the UCLA group.

However, in contrast to previous findings, Houston and his colleagues found that after two days, "smoking cigarettes containing nicotine was associated with significantly poorer, rather than better, delayed recall. ... There does not appear to have been much change in the relative performance levels of the nicotine and non-nicotine groups across the two-day retention interval." □

Rockfest 9: A bigger name, a bigger game

This was the year they made it official: The ninth in the series of annual Lunar Science Conferences, or "rockfests," which began shortly after the Apollo 11 astronauts returned their precious samples of the moon to earth, was expanded into the Lunar *and Planetary* Science Conference. More than a mere blue-pencil exercise, the change betokened the far bigger game that the nearly 700 participants have been playing in recent years. Not just "where-did-the-moon-come-from" (a question yet to be resolved), but "what's-the-whole-story?"

Oh there were still some of the rock-by-rock autopsies that characterized the early gatherings ("Petrology of Apollo 12 Olivine-Pigeonite Mare Basalts 12007, 12015, 12043 and 12072"). But this year, the scientists assembled at the NASA Johnson Space Center in Houston seemed to be pushing the moonrocks — and other finds — toward their real potential in both space and time, relevant from the sun to the outer planets and from future mission plans back to hundreds of millions of years before the solar system was born.

The origins and pre-origins of the solar system, in fact, were a key topic, even though much of the most exciting work is still in its infancy, often depending on a relative handful of researchers probing tiny fragments of fragments from such objects as the Allende meteorite (which ironically reached the earth in the same year as the first Apollo moonrocks).

The key is certain isotopes, found in such meteorites in minuscule quantities, for which it is possible by painstaking analysis to calculate the amounts of other isotopes from which they presumably decayed. In recent years, researchers such as Robert Clayton of the University of Chicago and Gerald Wasserburg of California Institute of Technology have found that some samples contain more of the decay products than can be explained by the amount of the "parent" isotopes believed to have existed in the nebula from which the solar system condensed. One startling conclusion has been that earthlings may be looking at material which "set" *before* that condensation. In other words, pre-solar grains.

Since that realization, a few scientists have embarked on the difficult next step of figuring out how such anomalies might have formed. It is a complex task — working backward step by step through various known (and unknown) nucleosynthetic processes in an attempt to figure out a scenario that could have produced the growing list of anomalies now in evidence.

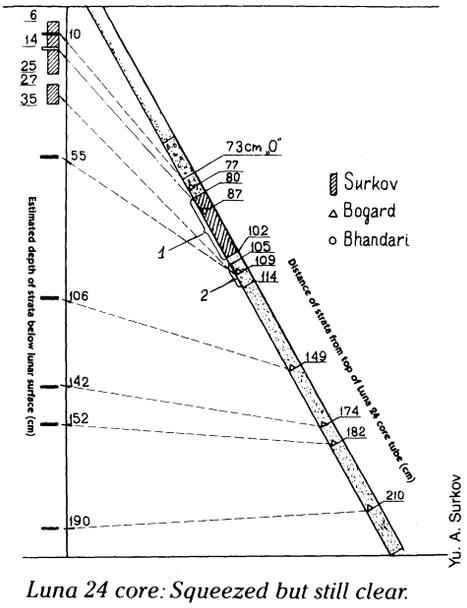
A concept that has attracted a number of proponents, including the University of Chicago's David Schramm, is cataclysmic indeed: The solar system, Schramm and others argue, may have formed as the result of the passing shockwave of a nearby supernova. This relatively quick, high-temperature event could have accounted for some of the present anomalies (though some scientists maintain that other anomalies imply parent isotopes born in slower types of processes).

But the path to the truth is more tortuous still. ("It'll probably drive us crazy in the next few years," says one of the seekers.) One of the most cited anomalies, aluminum 26, suggests an origin about two million years before the solar system condensed. Others, however, such as iodine 129, point back 100 million years or more, suggesting that more than one pre-solar event may be leaving its traces around.

It may also be that not all such events played a direct part in making the solar system happen. Edward Anders, also of Chicago, reported xenon anomalies in samples of the 1969 Murchison meteorite that, he says, almost certainly indicate the presence of a red giant star of unusually low mass. Sidney Niemeyer of the University of California at Berkeley added to the pre-solar quest with the finding that iodine-xenon ages in certain meteorites (known as IAB) seem to correlate almost perfectly with the nickel content of the meteorites' metal phases. "This," he says, "is the first instance of a systematic relationship between any property of a meteorite class and the I-Xe ages."

Meanwhile, despite all the meteorites — and planets (see next week's SN) — the rockfest participants were far from forgetting earth's moon. Most of the Apollo moonrocks are still unopened, and the most recent arrival — the drill core from the Soviet Luna 24 robot — seems to unearth new surprises at every turn. One Soviet researcher announced that it had yielded the "first discovery" among lunar samples of titanium, silicon and aluminum in their reduced (metallic) forms.

U.S. researchers have raised the possibility that the Luna 24 core might also include, in its uppermost layer, material ejected from a crater on the moon's far side. No farside material exists in the Apollo samples, and scientists would love to get a look at some. Although it is possible that the farside crater's "ray" of ejected material may have missed the Luna 24 site, the chance of finding out now seems brighter with a Soviet rockfest report that the topmost material from the site still seems to be on top in the core sample, judging from its high gamma-radiation level. There have been worries in the United States that the core might have mixed up the original strata, but Yuri A. Surkov, head of the Planetary Study Laboratory at Moscow's Vernadsky Institute of Geophysics, says that the strata, while compressed, apparently are still in order.



Luna 24 core: Squeezed but still clear.

Looking to the future, many of the rockfesters were glum over NASA's dim view of the proposed Lunar Polar Orbiter, a geochemical mapping satellite intended to expand the narrow swaths of Apollo orbital data and the earth-based studies that are limited to the moon's near face. Thomas Young, NASA's director of lunar and planetary programs, says that the LPO is "not in the present strategy" and that the agency will probably not even seek initial funds to build it "for at least five years."