

suggests. Innovation after innovation pouring out of our \$2 billion research effort and the consequent great medical advances may have been blighted by serious disorganization.

Hospitals have too long occupied a place apart from the community, he says. The medical school and the university need to join with the medical practitioner, the teaching hospital, the community hospital, the insurance prepayment plans and the Government to attempt to develop, on an ongoing basis, programs that will improve practical health services for people.

Many of the health problems can be solved only in a larger context than medicine alone.

Dr. Benton H. Goodenough, vice president in charge of labor relations, Pacific Maritime Association, says "health is bargainable." Management and labor can sit down together on the same side of the table and use all their efficiency to create a profitable system for everybody, Dr. Goodenough believes.

#### CRYOGENICS

### Lowest Temperature Yet

A common pin dropped on a table from a height of one-eighth of an inch generates about 10 ergs of energy, obviously a miniscule amount.

That 10 ergs raises temperature, and even that tiny amount is "much too much" to be allowed in the experiment during which Dr. Arthur Spohr of the Naval Research Laboratory reached the lowest temperature yet achieved—within less than a millionth of a degree of absolute zero.

The previous low had been about 1.3 millionths of a degree above absolute zero, which is 459.7 degrees below zero F. Although three-tenths of a millionth of a degree seems like an insignificant change, it is very important to scientists studying atomic nuclei because even such a slight decrease in temperature in this range results in decided changes in some of the physical properties of matter.

**One of the most important** changes is that, as the temperature gets colder, the magnetic pole of each atomic nucleus becomes more aligned with all other nuclei. The drop of three-tenths of a millionth of a degree means that instead of only about one percent of the nuclei being aligned, 15 percent of them have poles pointing in the same direction.

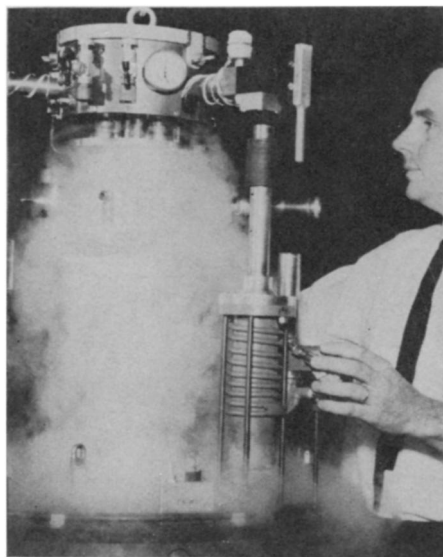
At room temperature, atomic nuclei have dancing magnetic poles that point in one direction, then another in random motions.

The experiments in which the record low temperature was produced were

preliminary to developing an apparatus for studying the interaction of forces between aligned atomic nuclei. Dr. Spohr, with assistant Edwin Althouse, used two techniques, including one known as nuclear cooling, to reach the record low temperature.

This method was first demonstrated in 1956 at Oxford University by Dr. Nicholas Kurti and Dr. Spohr, using apparatus requiring two stages.

The first stage consists of a paramagnetic salt, cerium magnesium nitrate, cooled to a temperature of about 200 thousandths of a degree above absolute zero by a magnetic cooling technique. Using this salt made it possible to reach a lower initial temperature than had been obtained elsewhere with other materials.



Navy  
Dr. Spohr and lowest temperature rig.

The second stage, during which the record low temperature was obtained, is connected to the first by heat-conducting copper wires.

An intense magnetic field applied to the second stage generates heat that flows up the copper wires to the first, which is cooler at this step in the procedure. The link between stages is then broken, and the magnetic field at the site of the specimen—a bundle of copper wires for the NRL experiment—reduced to zero, causing further cooling.

A magnetic field is used to cool materials through a process known as "adiabatic demagnetization," which prevents the production of energy generated when the magnetic poles of atomic nuclei change direction.

#### FOREIGN RESEARCH

### CIA Damage

American social scientists working overseas have always had trouble with politics. Before a sociologist or an-

thropologist could get to work, he had to convince his subjects he was not an arm of U.S. foreign policy—specifically military policy. It wasn't always easy, since the Defense Department did, in fact, support much of the research.

When Camelot, an Army-financed study of social conditions in Chile, broke into the news in 1965, social scientists found their positions more tenuous than ever. The Chilean press shouted intervention and the United States reacted by placing military studies under State Department review.

**But the Camelot** furor waned—in this country at any rate—and when Senators began drafting a bill setting up a National Foundation for the Social Sciences (SN: 2/18), they apparently did not think they had to shut out military funds.

The new foundation would greatly expand and support research in all the social sciences, and in addition would provide a civilian umbrella for foreign studies. Besides, the foundation would need some of the money the Defense Department spends annually on such research—roughly \$10 million—so a section allowing any Government agency to contract for research in the new foundation was drawn into the bill. The contracts could make up 25 percent of the foundation's yearly budget. That was last year.

Then, in February, Central Intelligence Agency links with students and universities, through supposedly independent foundations, came to light. The effect on foreign research has been predictably disastrous. Scientists are meeting with reluctance, subtle forms of resistance and sometimes outright cancellation of their projects. The heat is particularly strong in Latin America.

"We must be aware," said sociologist Myron Glazer last week in testimony before the subcommittee which is considering the bill, "that we face a crisis of credibility overseas."

**A professor** at Smith College, Dr. Glazer had done his own analysis of student political attitudes in Chile and almost failed at the task. Even before Camelot and the CIA disclosures, Dr. Glazer and his co-workers had been accused of representing U.S. intelligence. They very nearly lost all cooperation because of the false rumors.

Since February, the entire U.S. academic world has come under suspicion. A joint Brazilian-Cornell University project was dropped by the Brazilians though they did not suspect their American colleagues of CIA connections, reports the June 23 issue of SCIENCE, in an analysis of the CIA aftermath. In another case, an American scientist was encouraged by his associates in Peru and Chile to drop