tween basic research and applications based on it and of the need to narrow that gap.

"Basic research and academic institutions can flourish without central planning," he notes. "But with research directed to national needs, we need more centralized planning."

This is one reason Tal is looking forward to a possible reinstitution of a ministerial committee for science and technology, chaired by the prime minister. Such a committee was disbanded four years ago for internal political reasons, but now its reincarnation is being discussed. "The problems are such that we need it," he says.

Another problem the Israeli scientific community is facing is finding jobs for scientists immigrating to Israel. About 350 scientists from the Soviet Union alone immigrated to Israel last year. But there is a surplus of scientists in Israel even without immigration, and finding jobs for the newcomers is difficult. A special Center for the Absorption of Scientists (CAS) has been set up in Jerusalem to assist. Tal says he believes the center will be exempt from any budget cuts. □

Two hearts are better than one

Christiaan Barnard, performer of the first heart transplant, has done another first—implanted a second heart in the chest of a 58-year-old man to ease the strain on the patient's own diseased heart. One day after surgery, the patient was reported to be in satisfactory condition with both hearts beating at their own pace.

Barnard explained at a news conference following the five-hour operation at Groote Schuur Hospital in Cape Town, South Africa that though the right side of the patient's heart was normal, the left side had been practically destroyed by multiple heart attacks. The surgeons and his medical team bypassed the left ventricle of the patient's heart, cutting away about a third of the ventricle, and inserted a new left ventricle to relieve pressure on the older one. They then placed the new heart next to the right of the diseased heart with the atria and aortas from the two hearts stitched together. Each heart has its own pacemaker. According to Barnard, what the patient's older heart can't take care of, the new heart handles.

Barnard and his medical team are now watching for signs of rejection. "The beautiful thing," Barnard said at the conference, "is that if the new heart is rejected we can remove it, and the patient still has his own heart to keep him going." □

Hoopla, skepticism greet new engine

Can a pair of small town inventors still shake the foundations of the automobile industry—creating a simple modification for conventional engines that can make almost any car get two or three times better mileage, plus lasting longer and giving off less pollution?

Well, maybe.

The LaForce brothers, Edward and Robert, from Ambridge, Vt., caused a good deal of excitement in Washington last week by making claims like these before the Senate Commerce Committee. To back up their claims they conducted two highly publicized road tests, comparing the performance of a standard six-cylinder Hornet (which got about 19 miles per gallon in the tests) to one modified with their new technique (which got around 30 miles per gallon). Federal Energy Administrator John C. Sawhill told the committee the LaForce modification "seems to represent an important breakthrough." In private, associates of the brothers told the press that laboratory (dynamometer) tests showed the modified Hornet could get 44 miles to the gallon and that they were hoping for 100—someday.

Two modifications are involved: large, hard-to-burn fuel particles are separated through centrifugal motion in a funnel-shaped chamber, and valve timing has been modified to promote efficient burning. Recycled exhaust heat is used to break down remaining large particles.

Ralph Stahman, chief of EPA's Technology Assessment and Evaluation Branch told SCIENCE NEWS the LaForce brothers submitted an earlier version of their engine for official testing and that the results were "at best, so-so." He expressed skepticism about the currently publicized tests: on a steady 30-mile-an-hour test run, the standard Hornet should have performed much better than it did, he said, while the dynamometer test was unrealistic since it was conducted with negligible friction load. As for the valve-timing changes, a General Motors spokesman told SCIENCE NEWS that such modifications usually involve a substantial penalty in lost power.

An official EPA test of the new LaForce engine has been scheduled. □

Continent building: A theory rocked

Rocks as old as any yet found on earth have been discovered in a quiet river valley in southwestern Minnesota. Although the granitic and gneissic rocks are about the same age as similar ones found in Greenland two years ago (SN: 10/9/72, p. 374), the major investigator, Samuel S. Goldich, calls the discovery a breakthrough in geologic research.

Goldich, of Northern Illinois University in Dekalb, and Carl E. Hedge of the U.S. Geological Survey in Denver reported the finding in the Nov. 29 NATURE. Using rubidium-strontium and uranium-lead dating methods, the team calculated the rocks to be about 3.8 billion years old, plus or minus 100 million years. This makes the Minnesota and Greenland rocks 300 million years older than any other dated terrestrial rocks. Older moon rocks have been reported.

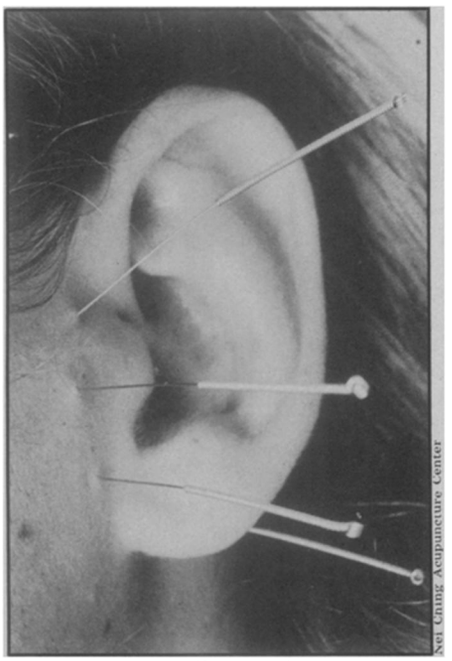
The significance of the research, Goldich says, lies in the find's location. Outcroppings of the rocks were found in a narrow band along the Minnesota River, exposed by glacial activity during the last ice age. The discovery of rocks this old in Minnesota may "cause the revision of the whole idea of how and when the continents formed," Goldich says. Until now, he says, the central core of North American continental formation was considered to be in Canada. But those rocks are a billion years younger. This implies that the central core may have been in a different, more southerly location, perhaps running from Minnesota to Wyoming. □

Giving acupuncture the needle

Incredibly enough, within a span of less than four years since American scientists brought news of acupuncture back from China, the ancient art has confounded the medical world, wooed many disbelievers into being stuck like pin cushions and, most importantly, relieved many people of pain or disability. Long considered to be a pseudoscience by Westerners, acupuncture in recent times has achieved wide public acceptance and has gained the respect of many scientists who now believe that the technique of inserting needles into various nerve centers to relieve pain has an aura of scientific validity.

Scientists at the National Institutes of Health have recently thrown a wrench into the works of acupuncture supporters by demonstrating under controlled conditions that acupuncture is ineffective in increasing tolerance to electrically induced pain. Interestingly, tolerance to the same electrical stimulus was markedly elevated under hypnosis.

"It must be emphasized," says Chohluh Li, senior author of the study,



Does the needlepoint hypnotize?

"that the investigation attempted only to deal with experimentally induced pain rather than pain of pathological or psychological origin. This, however, does not imply that acupuncture analgesia may not be effective under different circumstances including pain of pathological origin." One investigator closely involved with the study comments that, although studying induced pain reduced the scope of the study, it was necessary to control as many of the variables as possible, especially the pain stimulus which, in cases of clinical pain, is difficult to measure. Details of the study were released this week in a speech at the University of Miami.

Leading foes of acupuncture, including some physicians, attribute the technique's analgesic-anesthetic effects to a form of hypnosis similar to the calming effect that some doctors have on their patients. There is no evidence, however, that this hypnotic element played a role in the subjects' reaction to pain. To test this, a placebo-acupuncture was administered to all subjects with similar results—no increase in tolerance to pain. To investigate further the mesmerizing component of the acupuncturist-patient relationship, some subjects were engaged in conversation by the acupuncturist both before and after treatment. Again, no significant change in their pain threshold took place.

Although acupuncture in this study was not demonstrated to be a form of hypnosis, actual hypnosis performed by an experienced hypnotist proved to be extremely effective in increasing the pain threshold when compared to acupuncture and placebo-acupuncture. Another noteworthy result of the study, at variance with reports by other investigators, was that no significant change in brain waves, hematology and blood chemistry occurred following acupuncture.

Initially, 45 normal volunteers were screened for any physiological or psychological aberration that might prevent them from participating in the study. A medical doctor examined the subjects, and then a psychologist administered I.Q. and personality examinations which might have revealed any hidden tendency toward psychosis, paranoia or a covering up of pain Following these criteria, only 14 volunteers eventually participated in the study. All were Caucasian with an average age of 27, average I.Q. of 117, and all college graduates or undergraduates.

The experimental procedure was approximately the same for acupuncture, hypnosis and placebo-acupuncture. All volunteers underwent four experimental sessions, each lasting four to five hours. The first consisted of interviews and a psychological examination performed by Herbert Lansdell. This was followed by three other sessions during which the three experimental techniques were administered, all of which took place during several months.

Respiration, brain waves and heart action were monitored throughout each individual session. During the session, general neurological and physiological examinations were made, and four blood samples were taken at various times. Each subject was asked to lie down, and shortly thereafter a stimulating electrode was inserted through the skin near the eyebrow. Electric shocks of short duration were administered until the patient registered minimum pain sensation (MIP), described as a pin prick. The current then was increased until the maximum tolerance of pain level (MAP) was reached, a sensation described as a throbbing stab. Six values of MIP and MAP were obtained and an average taken.

After the initial baseline readings, acupuncture, hypnosis or placebo-acupuncture was induced and more MIP and MAP determinations were made.

Hypnosis was administered by Melvin Gravitz, a psychologist with expertise in hypnotic techniques, and acupuncture was performed by Ching-yuan Ting, a Chinese acupuncturist with 25 years experience. Placebo-acupuncture was performed by Li, a neurosurgeon though not a professional acupuncturist. Instead of placing the acupuncture needles in their correct spots in the hand and foot, he used only one needle and inserted it three to four centimeters from the designated spot.

Louise Wensel, a medical doctor who heads the Acupuncture Institute and Research Center in Washington, calls the NIH study "very unfair." "Acupuncture," she says, "can relieve a lot of pain and disability if done by a skilled acupuncturist." Wensel has reported relief of pain in better than 70 percent of her patients. "Optimally, acupuncture should be performed on a daily basis," she says. "Hypnosis can give temporary relief of pain, but acupuncture has relieved pain in some patients for over a year." Wensel stresses that acupuncture is not a form of hypnosis since it has been known to work on infants and on animals.

The medical director of the Acupuncture Center of Washington, Ralph Coan, also disputes the findings of the NIH study citing a 65 percent rate of improvement of some 7,700 of the patients he has seen in the last two years. He reports particular success with acupuncture in the relief of migraine headaches but also describes cases of reduced pain and swelling in patients with arthritis. Coan also questions the use of induced pain as a valid test of the efficacy of acupuncture.

In spite of its critics, the study is very revealing and may have far-reaching implications for the future of acupuncture. Though the study was limited in scope, hypnosis was clearly shown to be a significant aid in the relief of pain, while to the surprise of some investigators, acupuncture was not. However, because of variations between the reactions of individual subjects to acupuncture and hypnosis, it may well be that further studies might reveal other as yet unknown factors involved in pain.

Li's next study, in the planning stage at NIH, intends to deal with clinical pain of patients and may further enlighten the poorly understood mechanism of pain and its relationship to acupuncture.

"More research must be done on acupuncture," Li says, "because so few objective studies have been made and the prior successes of acupuncture analgesia-anesthesia and its potential usefulness warrant such an investigation."

—Gerald Schubert

Soyuz 16 in ASTP practice flight

The Soviet back-up crew for next July's bi-national Apollo-Soyuz Test Program, cosmonauts Anatoly Filipchenko and Nikolai Rukavishnikov, took off early Dec. 2 on the first of at least two warm-up flights for the Soviet half of the mission. Both U.S. and Soviet networks were tracking the spacecraft, as navigation practice for the critical rendezvous maneuvers to be followed when space vehicles from the two nations approach and dock in orbit. □