

Supercomputing with a Cosmic Cube

The idea of a personal supercomputer—a desktop machine that speeds through millions of computations every second—appeals to many scientists and engineers. Whether simulating an electric circuit or tracking crystallizing molecules, such a computer could spend days dedicated to a single task. Researchers wouldn't have to scramble for the scarce hours of computer time available at a few supercomputer centers (SN: 9/29/84, p. 200). This dream now seems to be one step closer to reality with the recent unveiling of the iPSC family of computers from Intel Corp. in Bea-

verton, Ore.

Based on the "Cosmic Cube" concept developed at the California Institute of Technology in Pasadena (SN: 2/16/85, p. 104), Intel has packaged 32 microprocessors, connected according to the geometry of a six-dimensional hypercube, into a sleek, silver 4-foot tower sitting on a 2-foot base. Larger models contain 64 or 128 processors. These computers are up to 24 times more powerful than commonly used superminicomputers like the VAX 11/780 and achieve up to four-tenths of the performance of a Cray-1 supercomputer. But while a supercomputer costs as much as \$15 million, the iPSC computers carry prices that range from \$150,000 to \$520,000.

Intel took less than a year to design its

new line of computers after obtaining a license from Caltech last year. "I was surprised by how quickly they moved once they decided to do it," says Caltech's Charles L. Seitz, who spent seven years designing the computer architecture that led to the experimental Cosmic Cube computer in 1983. "You always like to see the things that you've babied along for so many years get spread around a bit."

This type of computer, called a concurrent computer because each processor independently works on a small portion of a much larger task, is only slightly harder to program than an ordinary computer. As a result of the Caltech research, says Seitz, Intel can also sell its machines with an operating system that "really works."

—I. Peterson

A 'lost and found' city in Peru gets new perspective

The recent expedition by four Coloradans to a "lost city" in the Peruvian Andes (SN: 2/9/85, p. 84) promises to pave the way for valuable scientific research. There were, however, two problems with initial reports of the discovery. Gran Pajatén, the ancient city that attracted so much attention, has been relatively well known for over 20 years and was not "lost." In addition, this will not be the first scientific study of the site; two Peruvian archaeologists published preliminary findings on Gran Pajatén in a monograph and a journal article in the late 1960s.

"Gran Pajatén is a legendary found city," says Daniel Buck of Washington, D.C., a former Peace Corps volunteer in Peru who has put together a list of 19 publications that have discussed the ruins since 1967. Buck and several others familiar with Peruvian archaeology provided SCIENCE NEWS with background information on the site.

"In 1963 Gran Pajatén was a lost city, but it's not anymore," says anthropologist Douglas Sharon of the San Diego (Calif.) Museum of Man.

Sharon was part of the first North American expedition to reach the site in 1964 and 1965. The cluster of buildings was named Gran Pajatén by expedition leader Douglas Eugene Savoy, an explorer from the United States. Over the next decade, Savoy was the main popularizer of the "lost city," writing about it in books and encouraging media coverage.

Savoy, Sharon and company were guided to the ruins by Carlos Torrealba, who was part of the first group to discover Gran Pajatén in 1963. Torrealba also guided last summer's expedition. He still lives in Patay, a village near Gran Pajatén. At Torrealba's insistence, the Peruvian government sent two archaeologists to the site in 1965 and 1966 for preliminary investigations, which led to the publication of a monograph and a journal article.

Since then, Gran Pajatén has appeared on several maps of Peru. The 1985 edition

Hotels Best is *La Libertad*, F. rooms fairly clean, bathrooms filthy; also *Hotel Sucre*, F. Recommended restaurants: *Caribe*, quite good, probably best in town, and *El Sol* (both on main square) and *Danubio*.

Buses Transportes Quiroz from Trujillo, US\$5, 8 hrs., at 1530, 1700, 1800, take warm clothing; Antisuyo to Trujillo three daily, US\$4, 10 hrs. There are also colectivos from Trujillo. Buses to Cajamarca, US\$1.50; to Casa Grande, US\$0.75.

From Huamachuco buses (Empresa Huancapata which start in Trujillo) run to Tayabamba (important ruins nearby), on the far bank of the Marañón, passing through the old gold-mining centres of Patay province, such as Parcoy and Buldibuyo. This journey takes a good 18 hours in "normal" conditions. Not far, but a time-consuming journey, from Patay itself (about 100 km. from Huamachuco) are the unique circular ruins of *El Gran Pajatén* (pre-Inca); ask at Tourist Office in Cajamarca for details. Also worth seeing in the Huamachuco area are *Laguna Sausacocho* (with Inca ruins, similar to those of *Vikashuamán*, near Ayacucho, nearby) and

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of *The South American Handbook* even recommends that visitors to the area check with a nearby tourist office for directions to the ruins.

"We never said we discovered the site," responds archaeologist Thomas Lennon of the University of Colorado in Boulder, a leader of last summer's expedition. "But it's tremendously difficult to get there; it's not an area a tourist could easily visit."

In his initial conversation with SCIENCE NEWS, Lennon had said that future work would mark "the first scientific investigation of the area." Last week he said that the Peruvian literature cannot be ignored. "I can't see myself as having said there was no scientific work before ours," he says.

News reports that the site will help to explain the demise of the Inca empire are "completely incorrect," adds Lennon. It has long been known that the Inca decline was tied to civil war and the introduction of deadly diseases by Spanish explorers.

There is disagreement, however, over the importance of the culture that once thrived at Gran Pajatén. "A full-scale investigation will be interesting, but of predominantly local significance," says Betty Meggers, a research associate at the Smithsonian Institution in Washington, D.C., who specializes in South American archaeology. "There is no indication that the culture at Gran Pajatén spread to other areas. The inhabitants of the city were probably the recipients of cultural innovations from Inca centers in southern Peru, not originators."

Notes Meggers, "The knowledge that re-

Left, a 1985 tourist handbook suggests checking out Gran Pajatén. Below, a 1981 map of Peru clearly designates the location of the "lost city."



sults from further work certainly won't be revolutionary."

Lennon sees broader implications for the site. It may provide insights into cultures that existed before the Incas in several regions of northern Peru, he notes. Savoy, who says he has found numerous other ruined cities in the area around Gran Pajatén, believes they were all part of a civilization, the Chachapoyas, conquered by the Incas. "Savoy's hypothesis is reasonable," says Sharon, but further investigation will provide better evidence.

Meggers adds that there are "incredible pre-Incan ruins" at higher altitudes in the Andes, which may reveal more about the past than Gran Pajatén.

"It's curious to me that of all the scientific work done in Peru, this recent expedition so captured the media," says anthropologist Thomas Patterson of Temple University in Philadelphia.

Comments Donald Montague, president of the South America Explorer's Club in Denver, "Gran Pajatén needed to be put in historical perspective after the first news reports. This is a bad way to start a new investigation, but the next chapter should be more edifying."

—B. Bower