By John Pennington

Photography by the Author

With futuristic devices in a new mobile laboratory, prehistory detectives are making new discoveries about the past

Archeologist's $200,000,

THE atmosphere is pure science fiction. Dr. Kent Schneider stands in front of a machine covered with buttons and dials and switches. He tinkers with them as, on the face of the machine, a red light blinks. On a little green screen dots of light drift across, forming a jagged line which, in electronic code, describes the surface phenomena of a fragment of pottery made hundreds of years ago by Indians. At the flick of a switch the jagged line is copied by another machine onto a sheet of graph paper. Schneider is seeking to determine, through X-ray fluorescence, the elements of energy present in the pot-

Dr. Kent Schneider and his daughter, Deborah, with the mobile laboratory at an Atlanta site where Indians once lived.

Four-Wheeled Time Machine

tery. He is probing scientifically into the past.

Don Smith sits a few feet away in front of another machine, confronting dials, switches, levers and glass tubes. Chemicals and dry ice in two containers send off small clouds of vapor that disappear in seconds. Smith turns levers that send gases through chemicals that convert them to other gases. He too is probing the past, running the clock back through a benzene synthesizer. From his machinations come a vial of liquid that, with a little help, can tell time backwards in terms of years and centuries. The carbon 14 in it sends off emissions of light invisible to the naked eye, but which can be counted and timed electronically, telling the scientist approximately what year it was—long ago—that Indians had corn on the cob for dinner one evening on the west bank of the Chattahoochee River.

The studies are being conducted in a mobile van in an open field on the river bank no more than a hundred feet from the long-dead fire that scarred the corn cob now being tested. Schneider, a University of Georgia archeologist, has devised and built the mobile laboratory, the first and only one of its kind, to offer scientific archeological studies in the field.

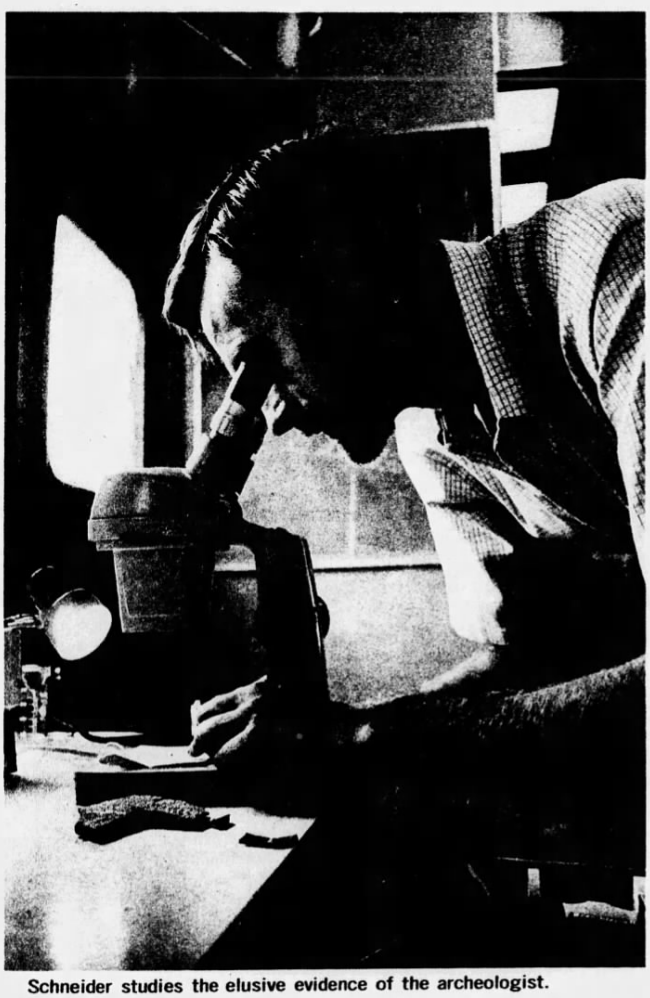
. The archeologist can look at a piece of pottery from the past, name it and date it by its design. Why X-ray pottery to determine its elements?

"How did this pottery get here?" Schneider asks. "The archeologist notices that pottery shards look the same from site to site. Where was it made? How did it get from here to there? From there to here? We'd like to know if pottery of the same design here came from another site, or from a dozen. What was the distribution of pottery? There may have been a site where pottery was made and traded. This is what the archeologist would like to find out."

ARCHEOLOGY is an inexact science that delves into the mysteries of the past. The archeologist is a prehistory detective. He wants to know what happened before history was recorded, and he digs and studies the elusive evidence he finds—skeletal remains, pottery shards, stone tools and weapons, organic matter.

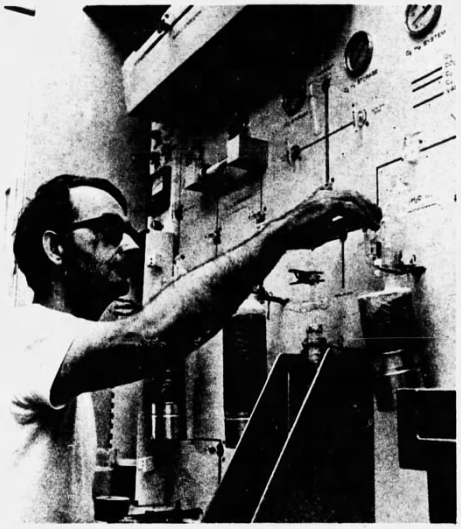
Schneider and his associates hope, with the mobile lab brought to an Atlanta archeological site recently, to offer quick, scientific validity to archeological interpretations in the field. The field stop was the first for the lab since it was completed. The site, in an open field on the Cobb County side of the Chattahoochee River not far from downtown Atlanta, was one being excavated by Larry Meier, who has been conducting an archeological survey for Cobb and Fulton Counties. Its official designation is 9-Co-151. In the language of the archeologist, 9 represents the state of Georgia, Co is Cobb County, and 151 is the chronological sequence of the discovery of the site in the county.

Meier found the site in March, 1971, and began an emergency excavation to salvage portions of it that were about to be destroyed by the installation of a sewer line for Cobb and Fulton Counties. He *(Continued on Page 24)*



Schneider studies the elusive evidence of the archeologist.

Jon Perkins and Ed Dittmar take a core sample for laboratory study.



Don Smith times the past with a benzene synthesizer.

Indians lived on the river hundreds of years

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discovered two levels of occupation—one about 600 B.C. and another, separated by sterile soil from flood zones, about 1300 A.D. In addition, he found a pottery style, in the later occupied zone, that has not been described previously.

WITH a crew of students from Atlanta high schools, Meier continued the excavation this summer "so the report will be complete, to give the emergency work validity." He has been assisted by Ray Lovelace, a graduate student at the University of Denver, and Ed Dittmar, a geology major at Emory University.

Meier has surveyed the banks of the Chattahoochee extensively. "The Chattahoochee has had a continuous occupation from Standing Peachtree Village (near Atlanta) to Suwannee Old Town in Gwinnett County," he said. "There is barely a stretch of the river that does not have an Indian village site. Not all of it was occuped at the same time, of course. Early Indians, hunters and gatherers, moved from one ecological area to another in search of food. Later, Indians practicing agriculture moved from one flood plain to another. Here at 9-Co-151 we have both, and a point in time where they overlapped, where the life-style changed from hunting and gathering to agriculture. For them, this was sort of like America going from the horse and buggy to automobiles. It was just that dramatic."

Into this kind of prehistoric drama, Schneider has moved with a big mobile laboratory, which officially is the "Mobile Archeological Environmental Laboratory" operated by the Geochronology Laboratory of the University of Georgia. I asked Schneider to explain "geochronology."

"Geo is the study of the earth," he said. "Chronology means time. We're timing the earth."

AND more. Schneider gave a walk-through tour of the lab and explained what it is capable of achieving for the archeologist. It has the benzene synthesizer for radio carbon dating, X-ray fluroescence for determing the elements of pottery and other materials, a coring operation to probe the earth beneath a dig and "tell the archeologist where his goodies are," and an "ultrasonic" device to clean pottery and ceramic materials without damaging them. Installed but still undergoing calibration tests is a machine for thermoluminescence dating, which will make it possible to date ceramic and other inorganic materials, which the benzene synthesizer cannot do. Soon Schneider will also have installed a microsample extraction system which removes organic materials and artifacts from soil which, in many instances, the archeologist would not otherwise see.

It was a prototype micro-

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The laboratory's coring device can "tell the archeologist where his goodies are."

Schneider and Larry Meier examine a strange pottery style.

(ADVERTISEMENT)

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(Continued From Page 24)

sample extraction machine, made of drums and mounted on an old milk truck, that got Schneider into the archeology laboratory business, resulting in the present lab. Schneider got the idea while teaching at Knox College in Illinois in 1966-68. A prominent archeologist, Dr. Stuart Struever of Northwestern University, had used the concept for several years, but by hand. His students used a tub and a screen and swirled soil in a creek to extract plant remains. "I used to have talks with Struever," he said. "We would talk about the new archeology, how it was moving to science and away from guesswork."

SCHNEIDER went to the University of Georgia in 1969 to work for his Ph.D. and went to Dr. Joe Caldwell with an idea: he wanted to build a prototype microsample extraction machine. His idea was that an archeologist on a dig got some plant materials to study, but had no idea how much he lost. Caldwell thought it a good idea and proposed that Schneider seek a grant from the National Science Foundation. He did, and got a $4,200 dissertation research grant which financed the machine. Then in May, 1970, Schneider met Dr. John Noakes, a University of Georgia specialist in radio carbon dating.

Noakes said to Schneider, "Your machine gets out organic stuff. That's what I date. Do you have room on your truck for the dating process?"

"What an excellent idea," Schneider said.

They put the extraction unit and a dating device on the truck and took it to a site near Chatsworth where Dr. David Hally was conducting a dig.

"The first sample we ran, the filter was loaded with beans," Schneider said. "Hally had been digging there a long time and hadn't seen anything like it. The beans were buried in clay. We got 30,000 beans eventually. The United States Department of Agriculture ran tests and found nitrogen and amino acids in the beans, which were 300 to 400 years old."

Next the makeshift lab went to an archeological site on St. Catherine's Island for microsample extraction and dating, after which Schneider and Noakes prepared a 78-page proposal seeking financial support to create a fully equipped archeological laboratory. More than 150 colleges and universities expressed an immediate interest in having access to such a lab; so did the U.S. State Department, which realized the value of sending a laboratory to countries where significant archeological research was going on, but from which artifacts and other materials could not be moved for testing.

The vehicle for the lab was donated by the Atomic Energy Commission, which gave to the university's Geochronology Laboratory a vehicle previously used for radioisotope training purposes. Some industries then donated equipment. Some equipment was purchased and money was found "to rerig" the lab. Schneider was hired by the university to work full time developing the lab. He worked on it for a year—from the summer of 1972, when the van was delivered, until this summer, when the first field trip was made to an Atlanta archeological site.

THE lab, which is valued at close to a quarter of a million dollars, had made three other stops previously—educational visits to Valdosta State College, to Wesleyan College, and to City of Athens schools.

Despite its obvious success thus far, a major obstacle confronts the laboratory, which is operated out of the university's General Research Department, of which Charles Douglas is director. The cost of operating the laboratory is approximately $1,000 a week, a figure that most current archeological digs, which traditionally operate on tight budgets, would not be able to meet. Schneider said that archeologists could include funds for the laboratory in their proposals for next season's excavations, but that leaves a big, inactive gap in the lab's schedule.

"We've had out-of-state invitations," Schneider said. "But Georgia's got an awful lot of archeology and we'd like to keep it here if possible."

In carbon dating, the organic material at left yields the small vial of liquid.