

Shrapnel Halts Hunt for Long-Lost Greek City

By DENNIS M. HIGGINS
Of The Inquirer Staff

A Second World War bombardment has defeated—for the time being, at least—efforts by archeologists to pinpoint the site of Helice, a long-lost Greek city destroyed by the very god it worshipped.

While it is generally agreed that Helice's ruins lie between the mouths of the Selinus and Cerynites Rivers on the north coast of the Peloponnese, 100 miles west of Athens across the Gulf of Corinth, they never have been found.

Unfortunately, the Germans occupied the area during the war, and the area was subjected to a sustained shelling by the Allies.

Bursting shells sprayed

shrapnel over and into the ground and this metal is causing the problem today, according to Dr. Froelich G. Rainey, director of University Museum of the University of Pennsylvania.

It seems that the rusting shards make the cesium magnetometer, a sophisticated underground probing device, go as haywire as a geiger counter in an atomic pile.

Last month, a Penn team headed by Dr. Elizabeth K. Ralph, associate director of the Applied Science Center for Archaeology, failed to find Helice. Their magnetometer was jammed by underground iron pipes, wires supporting grapevines in nearby vineyards and metal reinforcing in ce-

ment posts.

Archeologists are a determined lot, and Dr. Ralph will be on hand in September when Prof. Harold Edgerton, of Massachusetts Institute of Technology, tries again.

Dr. Edgerton will employ a "mud penetrator" off the coast to try to find some trace of the city that was destroyed by an earthquake and subsequent tidal wave in 373 B. C. In a few terrible minutes, Helice's people, temples and other buildings vanished without a trace.

The next day, 2000 Achaeans from neighboring towns, arrived to recover the dead. They found only a few pieces of wood and stone.

Helice (pron. HEL-ee-ky) flourished in Greece's Classic Period as the largest city in Achaea and a political and religious center. It was the home of the Heliconian Poseidon, worshiped as the god of the sea and the "earth-shaker," who caused tremors with his trident.

It was one of the dozen Ionian towns established by the Athenians when they colonized the Peloponnese's north coast, then called Aegialeia. The Ionians took the Poseidon cult with them when they, in turn, settled in Asia Minor.

After the catastrophe, Greek sailors told historians that a huge bronze statue of the Heli-

conian Poseidon was still visible beneath the waters of the Gulf of Corinth, holding a sea-horse in its hand.

Dr. Rainey particularly is interested in finding and unearthing Helice since it is the mother city of Sybaris, the ancient Greek colony in the land of the Etruscans, near the toe of Italy's "boot."

Last October, Dr. Rainey

said, with guarded optimism that the cesium magnetometer's electronic probe found "very large structures, 100 meters in length" below a road in the middle of a plain in Calabria.

Sybaris was sacked by the neighboring Greek city of Croton, in 510 B. C. Ironically, it, too, later disappeared from sight in an earthquake and tidal wave.

L. Hamilton



DIG BY ELECTRICITY—Dr. Matthew W. Stirling (seated), research associate of the Smithsonian Institution, operates resistivity equipment in Mexico.

ARCHAEOLOGY

Explore by Electronics

► AN EXPERIMENT in archaeological exploration with earth resistivity equipment, generally used by highway engineers for determining subsoil conditions, has just been completed in Mexico.

Dr. Matthew W. Stirling, research associate of the Bureau of American Ethnology of the Smithsonian Institution, Dr. Froelich Rainey, director of the University Museum, University of Pennsylvania, in Philadelphia, and Matthew W. Stirling Jr. report in Expedition, 2:19, 1960, on the work done in the region, Cerro de las Mesas, 40 miles south of the city of Veracruz.

This region contains large groups of man-made mounds. It is apparent from the sizes of the mounds and the amount of labor that went into building them that this area was one of the most densely populated and highly civilized in the New World more than a thousand years ago.

The instrument used by the archaeologists in their explorations, the Michimho, is an earth resistivity instrument manufactured by Associated Research, Inc., in Chicago. It measures the electrical conductance of the soil to a depth of about 90 feet. It is portable and weighs 25 pounds.

The Michimho is connected by four wires to four metal pins driven into the ground at equal intervals along a straight line.

An alternating current passes between the two outer pins and a voltage is thereby induced across the two inner pins giving a measure of the average electrical conductance of the soil between these two pins to a depth equal to the space between them.

If the pins are set three feet apart the average conductance of the soil is measured between the two inner pins from the surface to a depth of three feet.

The scientists first tested the instrument

on some stone monuments found in 1941 that had been reburied. These were used because it was known that solid stone has practically no conductance, and this should register on the instrument.

After taking readings, both around the monuments and away from them, the scientists found that the buried stone monuments did give a lower conductance reading. However, the difference in the readings between spots close to the stone and away from the stone varied as the pins were moved closer together or farther apart.

After hundreds of measurements, the authors state there is no conclusive proof of the method. Although many objects were found, others may have been missed. However, given a large enough mass of stone and the most favorable spacing of the pins, it is certainly possible to locate such objects.

Although the purpose of the work was to test the resistivity equipment, some archaeological finds were made. Artifacts in the form of offerings were found in the trenches dug by the scientists in the mounds.

In many of the trenches, burials were found without accompanying materials as if the burials themselves were offerings. This seems to confirm the belief, suggested by earlier finds on the site, that human sacrifice was practiced by the ancient people who built the mounds.

• Science News Letter, 78:215 October 1, 1960

SOCIOLOGY

Bleeders' Long Life Span Creates Social Problem

► INCREASING the life span of hemophiliacs has created social problems for these victims of "bleeders' disease."

This is pointed out by Dr. Alfred H. Katz of the University of California at Los Angeles Medical School. Dr. Katz has just received a \$24,357 grant from the Office of Vocational Rehabilitation for a study of these problems.

A generation or two ago the majority of hemophiliacs did not reach adulthood. But modern techniques of transfusion and use of blood derivatives have made it possible for most of them to live to adulthood and thus be faced with the necessity of earning a living.

Many young adult hemophiliacs do not have sufficient education or specialized training to give them stable occupation because of broken schooling from their illness. However, hemophiliacs can be trained to hold jobs that do not involve great physical exertion or hazards.

Dr. Katz will make a nation-wide survey of the vocational situation of hemophiliacs, the types of positions they have been able to hold, employer attitudes, special arrangements for medical care, transportation and other practical problems.

"Our aim is not only to make it possible to train more hemophiliacs for employment through state vocational rehabilitation services, but to induce employers to make more effective use of this pool of manpower," he says.

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SOCIOLOGY

Juvenile Delinquents Have Values of Adults

► THE VALUES that often govern the adult world may in reality be the same as those of juvenile delinquents—even though the latter may commonly be pictured as rebels against society.

Three major values seem to underlie the behavior of juvenile delinquents, says Dr. Gresham M. Sykes, a criminologist and sociologist, from Dartmouth College, currently a visiting professor at the University of California, Los Angeles.

They are: adventure, the search for kicks; exploit, a contempt for work coupled with a taste for luxury; and aggression, a forceful toughness as a symbol of manhood.

The same values have traditionally made up the code of the aristocratic leisure class, Dr. Sykes believes. As the enjoyment of leisure has spread to the rest of the population, and work has lost much of its status as a calling, the "aristocratic" values have been accepted by much of our entire society.

Adventure, exploit and aggression are not part of society's official and respectable code, but these "subterranean values," as Dr. Sykes calls them, play a large if unpublicized role in the American value system.

Most adolescents, whether wealthy or not, are members of the leisure class, freed from the earlier domination of parents but not yet working or married. Juveniles are therefore particularly apt to adopt leisure class values, although whether these values will lead to delinquency will depend to some extent on their living conditions and attitudes toward work and school.

• Science News Letter, 78:215 October 1, 1960

RADIO

Saturn Radio Waves Show It's Cold on Planet

► CLEAR RADIO WAVES from the planet Saturn and from a remote, gas-surrounded dying star have been measured for the first time. The University of Michigan's head of radio astronomy, Prof. Fred T. Haddock, reported the University's pioneer measurements to the 13th General Assembly of the International Scientific Radio Union in London.

The scientists used the University's 85-foot radio telescope. The data showed Saturn's atmospheric temperature is minus 283 degrees Fahrenheit. The gas-surrounded star—called planetary nebula, New Galactic Catalog 6543—is 3,000 light years away.

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HORTICULTURE

Tracers Seek Cause Of Brown Core in Pears

► USING RADIOACTIVE "TRACERS" that map chemical action, Oregon State College researchers are trying to determine how carbon dioxide given off by pears during storage causes the fruit core to turn brown.

Radioactive carbon isotopes may be able to trace the carbon dioxide pattern of attack in the fruit. So-called brown core in pears has become a problem in recent years with the widespread use of sealed plastic bags for storing pears through the winter. The sealing slows down respiration or oxidation of the fruit and thus prolongs its life.

The big problem is that the carbon dioxide builds up in the bag. Pear packers have solved the problem, in part, by punching holes in the plastic bags to permit some escape of carbon dioxide, but this shortens storage life of pears by about one month.

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FORESTRY

Natural Root Grafts Form "Tree Society"

► MANY FOREST TREES join themselves together through natural root grafts, forming a "tree society" in which the members can in effect support one another, but they can also compete strongly for the available nutrient supply.

Theodore T. Kozlowski, a University of Wisconsin forester, and John H. Cooley, a U. S. Department of Agriculture research forester, found such grafts common with several Wisconsin evergreens and broad leaf trees. But the natural grafts take place only between roots of the same species, with possible rare exceptions, they said.

The natural grafts result in an actual union of the tissues of the trees, permitting sap to pass from one tree to another, the researchers said. Roots as small as an eighth of an inch in diameter form natural grafts, and the unions usually take place

where roots are growing more or less at right angles with each other.

The findings of the two men also suggest that wind sway helps to promote grafts on trees growing in soft ground or bogs.

Where trees of different species grow close together, the roots may mingle but grafting ordinarily does not take place. Even when growth pressure in the mingling root is great, a bark layer stays between the roots of the different species.

Mr. Kozlowski and Mr. Cooley said this natural root grafting brings up new questions in forest management and disease control. Diseases such as oak wilt, as well as parasitic diseases, can spread from one tree to another through the root grafts. And weed-killing chemicals applied to kill specific trees may also kill nearby trees by traveling through the joined root system. The researchers said that new disease control practices will have to be adjusted to these chain effects.

In their studies, the two foresters found natural root grafts on sugar maple, red maple, yellow birch, paper birch, balsam fir, eastern hemlock, northern white cedar, pin oak and bur oak.

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PSYCHOLOGY

Porpoise Locates Food With Built-In Sonar

► THE PORPOISE is remarkably good at "seeing with its ears," Dr. W. N. Kellogg of Florida State University in Tallahassee reported in Chicago to the American Psychological Association.

The porpoise has a built-in "sonar" which scores from 98% to 100% correct in locating objects, Dr. Kellogg said.

In one experiment he tested the animal's ability to distinguish between available food fish and other fishes blocked off from him by an invisible barrier of plate glass. Unerringly, the porpoise would go to catch and eat the free fish and never try to reach the equally attractive fishes behind the glass barrier. In 202 tries not one error was made.

The porpoise sonar, Dr. Kellogg said, works on the same principle as the sonar of the Navy. The animal emits trains of sound-pulses. The echoes of the sound-pulses are later picked up by the animal after they are reflected back by the various objects in the water. The porpoise can distinguish between various fishes by the patterns of echoes reflected by the fishes.

In many ways, Dr. Kellogg said, the porpoise sonar is superior to the best that man has yet been able to devise. Navy scientists and other research scientists are studying the porpoise sonar in the hope of improving the Navy instrument.

In order to prove that the porpoise does not depend on smell or taste to find his way to the available fishes, Dr. Kellogg devised another experiment. The porpoise was required to swim through one of two doorways or openings in a submerged net of one-eighth-inch wire. One of the doorways was blocked by an invisible barrier of heavy transparent plastic. The porpoises were 98% correct in picking the open doorway.

• Science News Letter, 78:216 October 1, 1960

IN SCIENCE

ICHTHYOLOGY

Prize Musky, Like Tree, Reveals Age by Its Rings

► A FISHERMAN can tell the age of his prize musky by counting the rings in its vertebrae, in its fin bones or on its scales, according to Leon D. Johnson, fishery research biologist for the Wisconsin Conservation Department.

The vertebrae of a cooked muskellunge are easy to separate, Mr. Johnson said. The circles on the ends of the vertebrae can be counted as year rings, much as the rings on a stump are counted to tell the age of a tree. The rings will be more evident after the bones have dried for a time, than on the fresh vertebrae.

A microscope is needed to count the rings in a cross section of the fin bones, after sawing off cross sections of the dried fins about the thickness of cardboard with a jeweler's saw. Light bands in the fin bone show the winter growth and dark bands the summer growth in the rings in the bone.

A microscope will be needed to count year rings on the scales. There is a wide summer growth and a narrow winter growth, the latter showing up as a thin line marking one annulus, or one year of growth.

Mr. Johnson warned that sometimes, if food becomes scarce during the summer, the musky may lay down a false year ring, and in very old muskies, the growth may become so slow and the rings placed so close together that it is hard to count them.

According to the U. S. Fish and Wildlife Service, the average musky (*Esox masquinongy*) is three and one-fourth feet long and weighs about 15 pounds. The biggest catch on record was over five feet long and weighed 70 pounds, four ounces.

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PSYCHIATRY

Mental Hospital Aged Increase Alarming

► THE PROPORTION of older persons in mental hospitals is increasing at "a disturbing rate," the Senate Subcommittee on Problems of the Aged and Aging reports. One out of three patients in public mental hospitals is 65 or over.

Sen. Pat McNamara (D-Mich.), chairman of the Subcommittee, said in releasing the report, "By 1970, it is estimated there will be a 34% increase over 1959 in the number of aged patients in mental hospitals."

He asked for more investment in community mental health facilities and in research and training programs. Otherwise, present trends will burden taxpayers and bring a tragic end to thousands of the aged, the Senator said.

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Richard This is from the "Pennsylvania Gazette" the University Alumni magazine. I have asked for additional copies for you. James Day

Special guests for the occasion included Dr. Charles H. Patton, president, American Dental Association; Dr. George A. Coleman, trustee of the University of Pennsylvania; and members of the faculty of the School of Dentistry.

According to Drs. Kabnick and Hudson, committees of Dental alumni will call on New York area alumni to participate in the campaign which is one of the most ambitious ever attempted by a school of dentistry.

Museum Goes 'Underground'

A NEW TYPE of underground probe, designed to reveal the location of archaeologically valuable material, is now under development at the University of Pennsylvania Museum. Richard Linington, a recipient of the honors degree in physics at Oxford University, will do research for the project. The probe will operate on an echo sounding principle similar to that now used in the seismograph. This method will be a completely new approach to the problem of underground surveying in archaeology.

Linington used an electrical probe with success this past summer at a dig in the south of France. The bronze age site, which dates to 3000 B.C., was located in the midst of a valuable French vineyard. Permission had been granted to break ground in only one area. Five thousand test readings allowed the archaeologists to locate and plot two overlapping neolithic areas. The use of the newly devised measuring instrument made it possible to show exactly where the areas overlapped, without digging. When digging was started, it was found that the overlap had been located exactly.

Another instrument, the proton magnetometer, used to measure the magnetic field at an archaeological site, helped to uncover a Roman town in Oxfordshire, England. A total of 8,000 test readings over a 200,000 square foot area enabled the archeologists to trace the plan of the town, ditches, and buildings.

The proton magnetometer is especially useful in locating old cooking sites because the burning of the fuel causes the burned material to become lightly magnetic, it was stated. Soil

near the surface of the earth has relatively high magnetism, while rock layers have considerably less. Burned material located in the upper layers will produce a measurable variation in the earth's magnetic field.

The electrical resistance method of discovering underground archaeological objects has been used for the past 10 years. The proton magnetometer has been employed only within the last two years.

Linington, one of the very few people with experience in both physics and archaeology, has directed two Roman villa excavations, two medieval excavations, and a bronze age excavation in England.

The University of Pennsylvania Museum, which is carrying on major excavations at several different sites around the world, will have many excellent opportunities for experimentation in the field. Surveys of this type have recently been concluded at Cerro del las Mesas, state of Vera Cruz, Mexico, and are currently being carried on at Tikal, Guatemala.

Linington's investigation is supported by a National Science Foundation grant to the Museum.

Penn Players To Do Shaw

A WORK of George Bernard Shaw's will be produced for the first time in Irvine Auditorium the nights of November 11 and 12 when the Pennsylvania Players perform "Caesar and Cleopatra." The play is expected to draw a large number of alumni, as well as parents who will be at the University for Parents' Weekend.

In the leading roles in the play are Susan McCosker, Philadelphia, as Cleopatra, and John M. Fink, Philadelphia, as Caesar. In all, there is a cast of 50.

Miss Kathleen Quinn is the director.

Eye-Surgery Instrument

A REVOLUTIONARY new eye-surgery instrument, which employs the split-second use of super-powerful beams of light instead of the traditional delicate scalpel, has been obtained by the Hospital of the University of Pennsylvania with funds contributed by former patients.

The \$13,000 instrument, known as a light coagulator, will serve primarily for the treatment of some patients with the condition known as detached retina, in which the inner layers of the eye's retina become separated from the outer, or pigment, layer.

The retina is the sensitive membrane of the eye which receives the image formed by the lens and is connected with the brain by the optic nerve. "Blind spots" occur in the patient's vision wherever this separation of the retina's layers has occurred.

During the past year patients suffering from retinal detachment have contributed to a special fund to enable the Hospital's department of ophthalmology to make the purchase.

According to Dr. Harold G. Scheie, professor and chairman of the department of ophthalmology of the University's School of Medicine, the light coagulator will enable physicians to correct some cases of detached retina which could not be treated by conventional surgical methods without loss of vision or possibly the eye. Dr. Scheie added that it may be possible to treat certain intraocular tumors with the coagulator which at times will permit an eye to be saved that would otherwise have to be removed.

A Course in Nepali

A COURSE in introductory Nepali, the native language of Nepal, will be offered beginning February, 1961 by the South Asia Regional Studies Department of the University. The course will be conducted by Mr. T. W. Clark, a visiting lecturer from the School of Oriental and African Studies of the University of London.

The South Asia Regional Studies Department also plans to have Clark give an introductory lecture course in the history, culture, and contemporary conditions in Nepal. Clark is being lent to Pennsylvania by the University of London for one semester. He has had considerable educational experience in Bengal and has been honored with the "Order of the British Empire."

The Nepalese program at the University will be under the direction of Dr. W. Norman Brown, professor of Sanskrit.

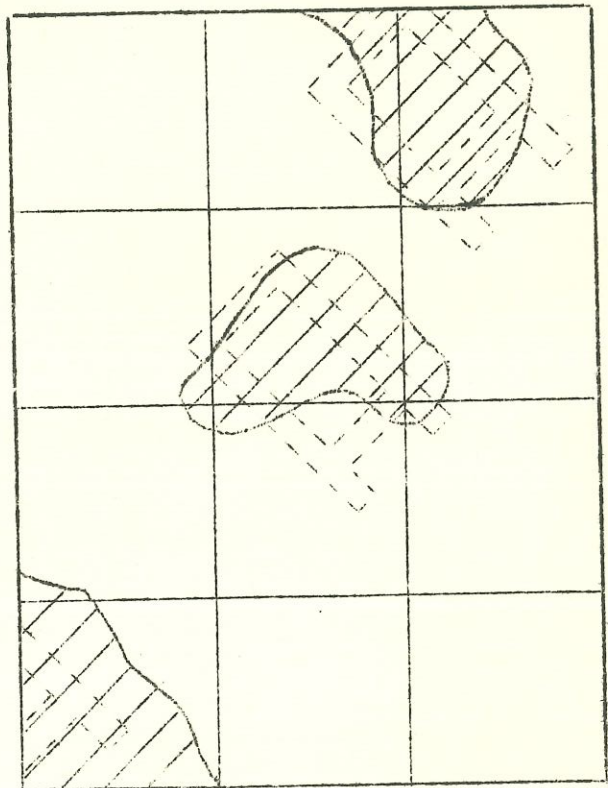
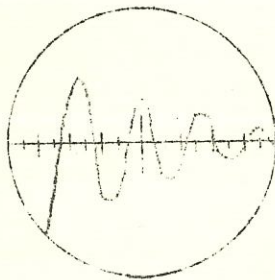
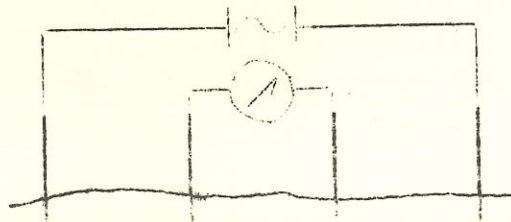
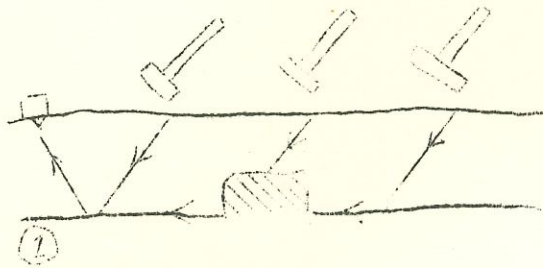
Publicity

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Dr. Froelich G. Rainey
University Museum

BULLETIN

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Editors: Christopher Jones
Edwin C. Buxbaum
Iris Morowitz

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The cover design represents three archaeological techniques being developed by The Applied Science Center for Archaeology. They are all used in discovering buried archaeological features. (1) is the seismograph, (2) is the resistivity apparatus and (3) is the oscilloscope showing the proton precession of the proton magnetometer. The map is a representation of instrument data plotted on a grid revealing the location of buried features.

Cover Design by Hamilton Carson

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1962-1963

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NEWS and NOTES by the Editor

The 1963 Season of the Tikal Project in Guatamala will begin on the first of February, and continue until May. Dr. William Coe, Christopher Jones, and Karen and Jack McGinn will be there for the whole season. Hattula Moholynagy will return to Philadelphia in March. Work will continue on the pre-classic structures of the North Acropolis, and investigation of "Twin Pyramid" groups, Late Classic "palaces," and an architectural survey will begin.

Anthropology 712, (Practicum in Ethnological Fieldwork), a new seminar under Dr. Ruben Reina, required of graduate students in social anthropology, had an enthusiastic beginning this Fall Term. The long-range plan of individual research into acculturation processes among ethnic groups of Philadelphia was initiated by studies of Chinese, Greeks, Cubans, Dutch, Germans, and Ruthenians. The many problems of actual fieldwork experience provoked interesting arguments and discussions on method. The course will be the most worth-while one on the curriculum to those who wonder if they will become good fieldworkers in anthropology.

The Applied Science Center for Archaeology (the "Techniques Lab") is building up its bibliographical index in its large and expanding section of the Museum basement. See Janet Flamm if you have any new information on archaeological techniques of any sort. Mr. Wailes' Problems of Archaeology (Anthropology 718) is now busy exploring the possibilities. Already mysterious wooden stakes and electrodes are beginning to appear on the Museum courtyard lawn.

The Department of Anthropology's project in the Peten, Guatamala, directed by Dr. Reina, is continuing strong. Father Edward O'Flaherty and Marcella Mazzarelli returned in August from a summer's work in two separate communities in the Peten. After the close of the Tikal project, Christopher Jones will spend a summer in the community of Dolores, Peten, studying community identity and image, with the help of funds from the Department.

Several graduate students in Anthropology have received funds for research. Joan Katcher has a NIMH pre-doctoral grant to assist her graduate studies. Martin Gelman received a NIMH pre-doctoral research grant, to study psychopathology and culture. A third NIMH Grant is helping Joan Koss in her study of Puerto Ricans of Philadelphia. Gülbün Coker's study of the gypsies of Philadelphia is being assisted by funds from the Anthropology Department.

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M. J. BECKER

A REUNION of seven men who made a



SMITH WILLITS WILLIAMS BALDERSTON BRECHT TAYLOR McDONOUGH

By EDWARD B. SHILS
Associate Professor of Industry

The date: February 12, 1960.

The place: The Faculty Club of the University of Pennsylvania.

The guests of honor: Past and present chairmen of the geography and industry department.

The occasion: A reunion.

ONE evening last February the Faculty Club was aglow. Preparations had been completed for a dinner meeting. Seven chairs awaited the guests of honor—all of the past and the current chairmen of the geography and industry department. These were the men who had provided leadership in the department from 1912, the first

year of its existence, to the present time. The entire faculty of the department was assembled to honor these men—to listen to their reminiscences and to learn of the part each had played in molding the department.

Time passed; people wandered into the room where the dinner was to be held. Sounds of conversation, friendly debate, and swells of laughter soon filled the room. Then greetings, called across the room: "Hi, Joe!—Hello, Al!—Here I am, Canby!"

"Al" and "Joe" are rather common names—we admit that "Canby" is just a bit unusual. But these are very uncommon men. The geography and industry department is unique in that every one of its chairmen is active and

very much occupied with various duties. For instance:

Dr. J. Russell Smith, the first chairman.

J. Russell Smith is 86 years of age. He spent much of the evening wandering tirelessly back and forth across the room, greeting old friends and associates. He has spent all of his years in brisk activity. In 1912 he became the first chairman of the geography and industry department; in 1919 he left the department to assume new duties at Columbia. Even in his early years Dr. Smith was hard to hold down.

By 1908, the first three courses in "Industry" had made their appearance. It was Dr. Smith—the man who



FELLOW NEWSLETTER

AMERICAN ANTHROPOLOGICAL ASSOCIATION

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ASSOCIATION AFFAIRS

What journals do you read?

The flood of information and documents coming across any of our desks is nearly overwhelming. It is so great that there seems little time to do much more than glance at journals and file them away, "to be looked at some other time." But that other time is hard to find. So hard, in fact, that it might perhaps be more pertinent to ask: Do you read any journals?

This problem is far from an individual one. It is one which is threatening the viability of science itself. Or, so the President's Science Advisory Committee has stated. In a report entitled, *Science, Government, and Information* (Superintendent of Documents, Government Printing Office, 25 cents) the Committee in January of this year, referring to science as a whole, stated that there was a danger that scientists were replicating at great cost findings which were already available, and engaging in specialized inquiries which were mutually inconsistent, for no other reason than their lack of awareness of published results in adjacent fields, and even in their own fields.

While this danger may be greater in fields larger than anthropology, it is a matter of concern to many in anthropology also. The Publications Policy Committee, about to issue its final report, has considered this danger in detail. It has also considered the fact that increasingly articles of general interest to anthropologists are appearing in a large number of specialized journals within the field and outside it. All of us could cite examples. How many of these journals do you read, or even glance at? Obviously, the average reader is in need of help.

For this reason the Committee has recommended, among other things, that the Association take steps to keep track of and publish a list of those articles of some general significance which appear in specialized anthropological journals and in other fields, such as sociology, biology, culture history, etc. The idea is that it should be more than a list. Someone who has read an article of particular significance should comment on it, as he would to a colleague, giving some indication of why it is significant. Something on the order of a "chatty column" is what the Committee had in mind.

The NEWSLETTER would like to inaugurate such columns as soon as possible. Would you be interested in becoming a regular contributor? Obviously, to make the coverage systematic, it will be necessary to promise to cover certain journals, and to submit regular columns. At the

start, let us say, two columns per year, six months apart. The columns would be signed, and would gradually, it is hoped, appear on a regular schedule, so that certain fields and journals would be covered regularly in certain issues. Every effort would be made to publish columns upon receipt.

If you read certain journals at all regularly, would you consider contributing such a column? In this way, with very little additional effort, you could perform a much needed service for the whole profession. This is the first call. If you are interested, please write. S.T.B.

Request From the Book Review Editor

Many readers of the *AMERICAN ANTHROPOLOGIST* are concerned, as is the Book Review Editor, over the frequently excessive time lag between the publication date of a book and the date the review appears. One of the several causes of this delay is particularly open to change by members of the Association: in contrast to commercial publishers, university presses, even the best and most active of them, ordinarily do not send review copies until requested to do so, and even then they may delay or even refuse until pushed by special claims or appeals. Thus the review editor frequently is unaware of the existence of a book which should be reviewed until ads appear or, occasionally, until he sees it cited in an article. This may cause a delay of several months or a year.

Any reader of this who publishes through a university press, or who hears that his university's press is publishing a book of anthropological interest, can hasten the appearance of a review and ease the task of the Book Review Editor by instructing the press to send a review copy on or before the publication date to: William C. Sturtevant, Book Review Editor, American Anthropologist, Bureau of American Ethnology, Smithsonian Institution, Washington 25, D. C.

Yearbook of Physical Anthropology

The American Association of Physical Anthropologists voted at the May, 1963, meetings to resume publication of the *Yearbook*. Dr. Jack Kelso was appointed as editor and Dr. Gabriel Lasker will share the editorial responsibilities. Dr. Lasker was the editor of the *Yearbook* from 1945 to 1952. It is hoped that two volumes can be assembled and published within this coming year; one volume to cover the period from the last *Yearbook*, published in 1952, through to 1962, and one volume to cover the current year of 1963.

To accomplish these objectives cooperation is needed from

all interested persons. Anyone who has suggestions for articles to be considered for republication in their entirety, or who has papers of his own which have been published since 1952 and would be suitable, is urged to write or send reprints (2 copies, please). It is hoped that articles from journals published outside the U.S.A. will be submitted. All correspondence should be addressed to Jack Kelso, Department of Anthropology, University of Colorado, Boulder, Colorado.

MEETING CALENDAR

- July 26-27** Linguistic Society of America summer meeting, Seattle, Washington.
- Aug. 5-10** III Congress of Peruvian History, Lima, Peru. Subjects include the European invasion, the Colony and the Viceroyalty. Program Chairman: Dr. Luis E. Valcarcel, Circulo de Estudios Historico-Militares, Paseo Colon, Lima.
- Aug. 20-26** XVII International Congress of Psychology, Washington, D. C. For information write: American Psychological Association, 1333 16th St., N.W., Washington 6, D. C.
- Aug. 24-25** Society for the Study of Social Problems, annual meeting, Los Angeles, California.
- Aug. 26-29** American Sociological Association annual meeting, Los Angeles, California.
- Aug. 27-31** Ecological Society of America annual meeting, Univ. of Massachusetts, Amherst. Deadline for abstracts was May 1. For information write Program Chm. Robert B. Platt, Dept. of Biology, Emory Univ., Atlanta 22, Ga.
- Aug. 28-31** American Society of Human Genetics annual conference, Amherst, Mass. For information write Dr. W. J. Schull, Univ. of Michigan, Ann Arbor.
- Aug. 29-Sept. 4** American Psychological Association annual meeting, Philadelphia.
- Sept. 4-7** American Political Science Association annual meeting, New York City. For information write the Association, 1726 Mass. Ave., N.W., Washington 5, D. C.
- Sept. 16-21** Latin American Conference for the Study of Arid Regions, Buenos Aires, Argentina. Held under A.A.A.S. and U.N.E.S.C.O. auspices. Study sessions include agriculture, water economy, human problems. Resumes (limited to 500 words) in Spanish or Portuguese of work related to arid lands in Latin America should be sent by June 30 to the Working Committee of the Conference, Cervino 3101, Buenos Aires, Argentina. For information circular No. 1 write Mrs. Eileen B. Ferguson, Geochronology Laboratories, Univ. of Arizona, Tucson, Ariz.
- Oct. 24-26** African Studies Association sixth annual meeting, Francis Drake Hotel, San Francisco. For information write the Association, 409 W. 117th St., NYC 27.
- Oct. 25-26** Society for the Scientific Study of Religion, Annual Meeting, Cambridge, Mass. Those desiring to submit papers relating to conscience and the varieties of mysticism should submit abstracts to the Society office, 409 Prospect Street, New Haven 11, Conn. Deadline is Aug. 1.
- Nov. 1-2** American Indian Ethnohistoric Conference, Newberry Library, Chicago. Joint meeting with Society for the History of Discoveries. Papers dealing with early exploration in the Trans-Mississippi West and northern N.A. Papers defining terms and concepts particularly welcomed. Write Program Chairman Wilcomb E. Washburn, Curator, Divn. of Political History, Smithsonian

Inst., Washington 25, D. C. Local Arrangements Chairman is William T. Hagan, Dept. of History, North Texas State University, Denton, Texas.

Nov. 21-24 American Anthropological Association 62d annual meeting, San Francisco, Calif. Deadline for titles and abstracts is June 1. Abstracts must be no longer than 150 words, typed double-spaced in triplicate on standard-size paper, separate from any other communication. They should be sent to the Program Chairman, Bernard J. Siegel, Rm. R315-B, Edwards Building, Medical Center, Stanford University, Stanford, Calif.

Dec. 26-31 A.A.A.S. annual meeting, Cleveland, Ohio. Anyone interested in presenting a paper on Archaic or Paleo-Indian cultures in the New World should submit title and brief summary to George Agogino, Assoc. Prof. of Anthropology, Baylor Univ., Waco, Tex.

Dec. 27-29 American Folklore Society, annual meeting, Wayne State University, Detroit.

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Mar. 20-22 Association for Asian Studies sixteenth annual meeting, Washington, D. C. For information write the Association, P.O. Box 606, Ann Arbor, Mich.

Mar. 20-22 Northeastern Anthropological Conference, fourth annual meeting, McMaster Univ., Hamilton, Ont. All are invited. Conference Chairman is Frank G. Vallee, Dept. of Sociology, McMaster Univ.

Aug. 3-8 VII World Congress of Anthropologists and Ethnologists, Moscow, USSR. (See announcement in May NEWSLETTER.)

International Union of Prehistoric and Protohistoric Sciences, United States, 1964

The Permanent Council of the International Union of Prehistoric and Protohistoric Sciences will hold its biennial business meeting in the Southwest the second week of September, 1964. The Permanent Council was invited to the United States by the United States representatives, Robert J. Braidwood, Robert W. Ehrich, James B. Griffin and Hallam L. Movius. The invitation was sponsored by the Society for American Archaeology, the American Anthropological Association and the Archaeological Institute of America. While there are some 185 members of the Permanent Council it is estimated that between 80 and 100 will probably attend. The individual members are representative archaeologists from the several countries who are associated with UNESCO. One of the primary purposes of the visit is to give many of these archaeologists their first glimpse of American prehistory, American archaeologists and museum collections.

It is hoped that a fair number of universities, colleges or museums in the United States will take advantage of the presence of these scholars and schedule them for lectures or perhaps to teach their specialties during the fall semester. A list of the potential visitors to the United States as members of the Permanent Council may be obtained by writing to James B. Griffin, Museum of Anthropology, University Museums Building, Ann Arbor, Michigan.

RECENT MEETINGS

Society for American Archaeology and American Association of Physical Anthropologists

Some copies of the abstracts of papers presented at the 1963 meetings are available. To obtain one send \$1.00 to Robert H. Lister, Dept. of Anthropology, Univ. of Colorado, Boulder.

Society for International Development, April 4-6

Eighteen persons came to the anthropology breakfast, called by SID to consider "the role the traditional disciplines should play in development." Included were the Executive Secretary for SID, Andrew Rice. Eight were anthropologists, the others included a psychiatrist, an employee of the Agency for International Development, representatives from the Foreign Agricultural Service, U.S. Department of Agriculture, the Peace Corps, United Nations, and World Council of Christian Education.

The Society for International Development itself is an international, non-profit organization formed in 1957, concerned with the promotion of research and publication in the area of social and economic development in the emerging countries. Membership is international and includes anthropologists, political scientists, engineers, businessmen, administrators, and others concerned with development. A journal is published, called the *International Development Review*.

The theme of this year's conference was "What Makes Development Happen." Major addresses were by UN Secretary General U Thant and U.S. AID Chief, David E. Bell.

At the anthropology breakfast itself, Andrew Rice said that the Society's concern was in trying to find ways of tying in anthropologists more closely in the area of international development in such a way that whatever special knowledge and skills anthropologists have could be used to help "make development happen." He specifically asked whether there was a particular role for anthropologists to play in development. Anthropologists who were present urged that comparative research be carried out in areas which have been the recipients of American aid; that anthropologists be involved from the very beginning on the development team drawing up plans for a country or region, and then remain with the team in the operational phase. Another suggestion was that anthropologists should increasingly turn their attention to political problems in the area of development.

The non-anthropologist AID representative reported some successful instances of working with anthropologists on teams, but cautioned, on the basis of experience, that being an anthropologist does not automatically make an individual more broadminded as a team member.

Although the breakfast did not spell out how anthropologists could help, or even if anthropologists were decisive on a development team, there seemed to be consensus that anthropologists could make a contribution. The unresolved problem seemed to be in defining what role anthropologists could play, and in what areas, so that they could have the maximum impact on "developers."

Just what contribution anthropologists can make to "international development" is not clear. What is clear is that those in the business of international development believe they share some common interests and objectives with anthropologists. Fellows interested in this area can get more information from Andrew Rice, Executive Secretary, Society for International Development, 1720 Rhode Island Avenue N.W., Washington 6, D. C. Philip Singer.

PROGRAMS OF ANTHROPOLOGICAL INTEREST

The Applied Science Center for Archaeology

The successful application of radiocarbon dating has opened the way for the acceptance of other techniques growing out of the unprecedented developments in the fields of nuclear physics, electronics, chemistry and the engineering sciences. But there is one fundamental difficulty. Techniques developed for industrial, commercial, or military purposes, as a rule, can be adapted to archaeological purposes only with

extensive experimentation and considerable cost. ASCA, which was established at the University Museum in Philadelphia about three years ago with a grant from the NSF, attempts to co-ordinate information about such techniques and to experiment with and develop certain of them which, at the moment, appear to be most readily applicable. What it hopes to do is to discover techniques developed by industries and commercial laboratories that are applicable to archaeology and to make the necessary adaptations through experimentation.

Even this requires financial and technical aid from the industrial firms. In fact, the NSF grant has provided funds primarily for field and laboratory testing with some assistance in purchasing laboratory equipment and in technical and clerical staff salaries. This basic support has made it possible to obtain and use effectively the substantial financial and professional assistance of companies, individuals, and other foundations in the development of new instruments.

An information center with a card file of reference to "Scientific Aids for Archaeology" is now established to include reports of analyses (chemical and otherwise) of ancient objects, lists of laboratories where various facilities are available, results and methods of dating techniques, field survey reports and methods, and other new techniques which may apply to archaeology. The Center is also collecting books and publications in this field. It is, of course, open to all archaeologists and will supply any reasonable information upon request. However, it is in its early stages and is by no means a complete file on what is now taking place.

Experiment with, and development of electronic instruments for underground exploration is at present one of the primary tasks of ASCA. As a beginning, work is proceeding on resistivity, seismic, magnetic, sonic, and metal detectors. Two of these types, resistivity and magnetic, are well-proven instruments. The Gossen Company, in Germany, makes a light-weight, inexpensive and sturdy resistivity instrument which ASCA has tested extensively at Tarquinia and Sybaris, in Italy, with very satisfactory results. Three of the instruments are now in the laboratory and can be loaned to other institutions or archaeological expeditions wishing to utilize them. The Littlemore Scientific Engineering Company, Oxford, England, makes an excellent proton-magnetometer, which was also tested at length in Italy with notable success at Sybaris where archaeological "anomalies" were detected to a depth of as much as 5 meters. Since it is an expensive (\$2-3000) and relatively delicate instrument, the laboratory owns only one which it can lend under rather special circumstances. A second and related magnetic instrument called a "gradiometer" has been constructed here in Philadelphia for the laboratory, and will soon be tested in the field.

A new sonic device, constructed by Grey McLaughlin for the laboratory during the past year, is still in a highly experimental stage. Basic research required to perfect such an instrument is now being undertaken for the laboratory by the Petty Geophysical Co. in San Antonio and also through collaboration with the Texas Instruments Co. in Dallas. In essence, a high frequency pulsed wave is sent into the ground and reflected from underground (archaeological) features so that they can be detected on a cathode ray screen. If successful, this will be a much more versatile instrument for archaeological surveying than the resistance or magnetic types.

Finally, the laboratory is also working on a transistorized metal detector, designed to have greater sensitivity than the military devices presently available.

Various types of power drills can be used to test anomalies

detected with the electronic instruments. At Sybaris, drills have been most useful in probing archaeological anomalies and in recovering potsherd samples in stratified deposits up to 8 meters in depth.

Elizabeth Ralph, Associate Director of ASCA, who has been working on refinements in the radiocarbon dating method for some years, is now also working with the thermoluminescence method of dating pottery, assisted by Mark Han, also of the laboratory. Progress is being made with the alpha counting phase of the project, and with the detection of very weak glow curves.

Henry Michael is conducting a dendrochronology project which is connected with refinements in the radiocarbon method (fluctuations in the atmospheric C-14 inventory in past times) but which may also result in more accurate dating for Egyptian archaeology. A sensitive tree growth record worked out with the logs from the great tomb at Gordion, in Turkey, suggests that it is possible to apply dendrochronology in Egypt.

Various applications of chemical, metallurgical, and physical techniques for analysis and identification are being explored by A. E. Parkinson and Mark Han. For example, the "spectronal" is being used for trace analyses of metals (bronze objects from Iran and the bronze age wrecks off Turkey); the electron microscope is being used to determine whether it is possible to detect fake gold objects; the ultrasonic decontaminator has been used for cleaning bronzes, pottery, and other delicate objects; experiments are being made with a polarograph and the emission spectrograph; and the intention is to establish soon a more ambitious project in the study of the origin and development of metals, in collaboration with Cyril Smith of M.I.T. and Robert Maddin of the University of Pennsylvania.

Instruction in most of these scientific techniques for graduate students in archaeology is available in a course being taught here by Bernard Wailes.

The primary purpose of ASCA is to co-ordinate and to develop the use of scientific techniques in all fields of archaeology. Thus, it depends upon the entire professional staff of the University Museum and their current research in the field, as well as upon related research being carried out in other centers such as those in England and Italy. Moreover, direct working relations have been established with the Leric Foundation in Rome, the Tree-Ring Laboratory in Tucson, the Research Laboratory for Archaeology and the History of Art at Oxford, and the physics, chemistry and metallurgy departments in the University of Pennsylvania, the Sun Oil Company Laboratories, the Texas Instruments Company, the Petty Geophysical Company, and the Technical Laboratory of the Museum in Cairo. Since technical applications are expanding so rapidly, it is important to avoid duplications and to collaborate as much as possible to test specific new instruments and techniques quickly. ASCA is anxious to exchange information and to assist archaeologists from other institutions when that will expedite the development or conformation of any of these applications. The staff welcomes inquiries and suggestions.

Froelich Rainey, Director.

FELLOWSHIPS AND GRANTS

Australian National University Research Scholarships

Applications are invited from post-graduate students with capacity for research for scholarships in Anthropology and Sociology including Oceanic Linguistics. Scholars will normally enroll for a Ph.D. degree, the course for which extends over three years. A scholarship is initially awarded for two years but will normally be extended for the whole period

of the approved course. The basic scholarship allowance is £A950. Married scholars with children receive additional allowances for dependents. A grant will normally be made towards travel costs.

Application forms and further particulars are available from E. P. Thomas, Institute of Advanced Studies, Australian National University, Box 4 G.P.O., Canberra, A.C.T., Australia, or from the Australian Embassy, 1700 Massachusetts Avenue, Washington, D. C., U.S.A. Applications should reach the University by 30th April or 31st October in any year, although special consideration may be given to applications at other times. Scholarships may be taken up any time after award, subject to agreement of the head of department concerned.

Fulbright Awards for Europe, Near East, South and East Asia

Applications are now being received for awards under the Fulbright-Hays Act for 1964-5. Lecturers in anthropology are desired in Israel (Hebrew University, African or Asian studies); Japan (Tokyo University of Education); Norway (Univ. of Oslo); Pakistan (Univ. of Peshawar); Philippines (Univ. of Philippines or Silliman University, Asian studies); and United Kingdom (University of Oxford). Research awards in anthropology are listed for Italy (Rome, Milan, Turin, or Florence) and Turkey. Lecturers in archaeology are specified for awards in Pakistan (Peshawar) and research awards in archaeology are listed for Iran (Iranian studies), Pakistan (Indus valley archaeology), and Turkey. Applications can be submitted for research in any field in Austria, Denmark, Finland, Germany, Greece, India, Philippines, Spain, and Thailand. To apply, or obtain details, write Committee on International Exchange of Persons, Conference Board of Associated Research Councils, 2101 Constitution Ave., Washington 25, D. C. Please note that the deadline is August 1.

ACLS Fellowships and Grants

The Council's programs are designed to advance research in various humanistic fields. Included are linguistics, archaeology, cultural anthropology, folklore, aesthetics and musicology. Applicants for the following programs are required to have the doctorate or its equivalent and to be citizens or permanent residents of the U.S. or Canada. Applicants must state highest academic degree, citizenship, position, field, proposed subject of research or study, and type of award when applying.

Fellowships, not to exceed \$7,000, are intended primarily for the provision of free time, although travel and certain other expenses are allowable. Support of dependents may be included. Fellows must be able to devote at least six continuous months to full-time work on the project, during a period of two years from July 1, 1964. Maximum tenure is twelve months. **Deadline is October 15.**

Study Fellowships are designed to assist young scholars in the above fields to enlarge their range of knowledge by study in fields outside their areas of present specialization. Recipients must devote at least six uninterrupted months to full-time study. Those who wish may hold their fellowships at the Center for Advanced Studies at Wesleyan University, Connecticut, or the Center for Advanced Study in the Behavioral Sciences. Maximum tenure is twelve months. Stipends will not exceed \$7,000. Applicants should state age, professional qualifications, and proposed program of study. **Deadline is October 1.**

Grants-in-Aid, limited to \$2,000, are intended to advance specific programs of research in progress by paying for per-

sonal travel and maintenance away from home in order to gain access to materials, research or clerical assistance, and materials. **Deadlines are September 30 and February 15.**

NSF Senior Postdoctoral Fellowships

The primary purpose of these awards is to enable scientists who have held the doctorate at least five years to engage in study or research which will increase their competence, either in their specialty or in a related field of science. Citizens of the U.S. who have achieved recognized stature as scientists are eligible. Stipends are of a salary-matching type, based upon "salaried income." Certain other expenses are also allowed. Applicants must submit a plan of study and research which will enhance the applicant's competence. Tenure is normally 9 or 12 months, but periods of 3 months to 15 months are available upon adequate justification. Fellows are required to devote full time to scientific study and/or research at an appropriate nonprofit institution in the U.S. or abroad. These fellowships are not designed to support the preparation of materials for publication. Apply to Fellowships Section, Division of Scientific Personnel, National Science Foundation, Washington 25, D. C. **Deadline is October 7.**

TEACHING AIDS

The Teaching of Anthropology and Resources for the Teaching of Anthropology, by David G. Mandelbaum, Gabriel W. Lasker and Ethel M. Albert (Editors), 2 volumes. Berkeley and Los Angeles: University of California Press, 1963. 607 pp. and 277 pp., respectively, plus indices. (Also published as *Memoirs* 94 and 95 of the American Anthropological Association.)

These long-awaited volumes, recently mailed to all members of the Association, are a comprehensive set of suggestions for the teaching of anthropology in colleges, junior colleges, and graduate departments. Written by outstanding scholars, the essays in the Teaching volume cover basic courses, physical anthropology, cultural and social anthropology, courses on regions and civilizations, archaeology, linguistics, and applied anthropology. A special section discusses relations with the social sciences, biological sciences, humanities, professions, public health, and law and government. Ethel Albert, Robert Ehrich, Verne Ray, and Margaret Mead contribute perspectives on anthropological teaching. The Resources volume contains a survey of catalog listings, a survey of student enrollments and teachers of anthropology in California, an essay on personnel resources, audio-visual teaching aids, teaching aids in physical anthropology, library problems, and a long basic list of books and periodicals for college libraries. These volumes are available to non-members only from the University of California Press. Orders cannot be filled by the Executive Office of the Association.

Paperbound Books in Anthropology and Related Fields in Print (U.S.A.), Winter-Spring, 1963, compiled by Nathalie F. S. Woodbury. To appear in *Current Anthropology*, October 1963.

This new list of 1,000 titles is presented under the headings General, Biology and Evolution, Language, Folklore, Art, Technology, Archaeology, Social Anthropology (including general, modern industrial society, race relations, primitive and peasant societies, and religion), and History (contemporary and secondary accounts). Tear sheets will be available from *Current Anthropology*, 1126 E. 59th Street, Chicago 37, Illinois.

NDEA Language Materials

The Office of Education has recently released a publica-

tion, entitled Completed Research, Studies, and Instructional Materials, List No. 2 (OE 12016, available from the Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C., 20 cents) which lists materials produced so far under Title VI of NDEA. The publication lists the items under four main headings—studies and surveys, methods of instruction, specialized materials for the commonly taught languages and for the "neglected" languages. Supplementing the bibliographical information is an indication of where and how the items can be obtained.

NEW TRAINING PROGRAMS

Applied Anthropology and Museology

The Anthropology Department at the UNIVERSITY OF WISCONSIN-MILWAUKEE will institute a graduate program leading to the M.A. beginning in September. The program will offer a concentration in museology and applied anthropology. The museology concentration will offer intensive theoretical and practical training in museum methods in an anthropological context. The Department will work in close cooperation with the Milwaukee Public Museum and its staff anthropologists, Stephan Borhegyi and Robert Ritzenthaler, who will become adjunct members of the Department. The applied anthropology concentration will be directed by James Silverberg and Nancy Lurie, who will join the Department as Associate Professor this fall. Plans are being drawn for internship training in applied anthropology in the field as part of the new program. Students interested in either phase of this new Master's Program should communicate with Robert Howard, Chairman of the Department.

Anthropology

Three students each summer will receive field-work training in a new research-training program organized by the Department of Sociology and Anthropology of the UNIVERSITY OF NORTH CAROLINA. Work will be conducted among the Indians of Ruperts House, James Bay, Canada, under direction of a training supervisor. The four-year program, financed by a grant from the National Institute of Mental Health, is designed to enhance the research competence of students who receive degrees in anthropology. Prior to going into the field, students will attend a one-semester seminar on field-work methods. After returning from the field they will register for another seminar in which they will examine their experiences and report on research carried out. The field supervisor will be Professor Harriet J. Kupferer of the Department of Sociology and Anthropology, Woman's College of the University of North Carolina, Greensboro. Inquiries should be addressed to John J. Honigmann, Department of Sociology and Anthropology, University of North Carolina, Chapel Hill, North Carolina.

REQUEST FOR ASSISTANCE

I have been entrusted by the heirs of the late Dr. C. G. Jung with the editing of his correspondence, and I should be most appreciative if anyone possessing letters would communicate with me at the address below; either originals (which will be returned immediately upon being copied), or photocopies (any expense incurred in making copies will be refunded). It is not intended to publish material of a strictly personal nature, and correspondents may indicate whether any parts of the letters should for the present be withheld from publication.

Dr. Gerhard Adler
Bollingen Foundation
140 East 62d Street
New York City, 21

JOURNALS AND SERIES

Oceanic Linguistics

This periodical was created at the request of the Panel on Research Needs in Pacific Languages of the Tenth Pacific Science Congress. Its object is to provide competent information and better communication across national boundaries on current research bearing on languages of the Oceanic area, defined as including Malayo-Polynesian (Austronesian), Papuan and Australian languages.

Oceanic Linguistics will be published twice a year. The materials published will consist of articles in the nature of surveys, especially of the state of research in a given field of interest to Oceanic Linguistics; news of current research, publications, and other pertinent activities. The periodical is edited by George W. Grace, with the assistance of an Editorial Advisory Board consisting of J. C. Anceaux, Bruce Biggs, Arthur Capell, Ernesto Constantino, James C. Dean, Isidore Dyen, Samuel H. Elbert, Andre Haudricourt, Hans Kahler, T. W. Kamil, Ernest Lee, Cecilio Lopez, George B. Milner, E. M. Uhlenbeck, Elmer Wolfenden and Stephen A. Wurm.

Volume I, No. 1 (Summer 1962) contained an article on Oceanic Linguistics at the Tenth Pacific Science Congress, by Stephen A. Wurm, reports on individual research activities, and current bibliography.

Yale University Southeast Asia Studies

The following publications have been announced in the Cultural Report Series:

Ambonese Adat: A General Description—Frank L. Cooley (No. 10, \$4.00).

Indonesian Language and Literature: Two Essays—S. Takdir Alisjahbana (No. 11, \$1.75).

In the Bibliography Series *Furnivall of Burma: An Annotated Bibliography of the Works of John S. Furnivall*, by Frank N. Trager, has been published. It is No. 8 (\$1.75). Also issued is a special publication, *Indonesia: Perspective and Proposals for United States Economic Aid. A Report to the President of the United States, by the U.S. Economic Survey Team to Indonesia* (\$4.50). Orders for these publications and earlier titles in print should be directed to The Cellar Book Shop, 18090 Wyoming, Detroit 21, Mich. (exclusive distributors).

Bulletin of the Institute of Ethnology Academia Sinica (Number 13, Spring 1962) contains a number of articles of interest to anthropologists:

Major Problems in the Culture History of Southeast Asia—Kwang-Chih Chang.

Don-So'n and Its Origins—Richard Pearson.

Pasemah Megaliths: Historical, Functional and Conceptual Interpretations—James L. Peacock.

Ethno-History of South China: An Analysis of Han-Chinese Migrations—C. C. Lamberg-Karlovsky.

Concentric Conformity in Ancient Khmer Kinship Organization—Kevin O'Sullivan.

The Analyses of the Myth of Shooting Suns—Hen-Li Lin.
The Kinship Organization of the Take-Bakha Bunun—Chi-Chien Chiu.

Stone Bark Cloth Beaters of South China, Southeast Asia and Central America—Shun-Sheng Ling.

An Index of the *Bulletin* Numbers 1-10 (1956-60) is available from the Institute, Nankang, Taipei, Taiwan, China. English summaries are given at the end of each article in Chinese.

Other recent publications of interest include:

Chahar and Dager Mongol Bureaucratic Administration: 1912-1945, by David F. Aberle, HRAF Press, 421 Humphrey St., New Haven, Conn.

Bibliography of Indonesian Peoples and Cultures, by Raymond Kennedy (a reprint), HRAF Press.

Annotated Bibliography of Afghanistan, by Donald Wilbur (new, revised edition), HRAF Press.

Aspects économiques et sociaux de l'industrialisation en Afrique, by P. Dethine, Centre de Documentation Economique et Sociale Africaine (CEDESA), 42, Rue du Commerce, Bruxelles 4, Belgium. A bibliography of 726 items, partially annotated.

l'Urbanisation de l'Afrique noire: son cadre, ses causes et ses conséquences économiques, sociales et culturelles, by P. Verhaegen, CEDESA (above). A bibliography of 2544 items, cross-indexed.

GRANTS AND FELLOWSHIPS AWARDED

Social Security Administration announced grants for research and demonstration in 1962. Among them was a grant to the Wisconsin Winnebago Business Committee, Franklin Park, Ill., for a study entitled "Contribution of Community Development to the Prevention of Dependency." The project directors are Nancy O. Lurie and Helen Miller. More recently it announced a grant to Oscar Lewis for a study of the culture of poverty among Puerto Rican families in Puerto Rico and New York City.

ACLS has awarded one of its first study fellowships to Dell H. Hymes for study in the history of science and scholarship. Grants in aid of research have been awarded to the following:

Edward P. Dozier, Collection of field data among the Rio Grande Pueblo communities of New Mexico.

Thomas A. Sebeok, Portraits of linguists by linguists: contributions to the history of linguistic science from the dawn of the 18th century to the present day.

Michael M. Ames, Religion, social structure and social change in Ceylon.

Kwang-chih Chang, Research on the prehistoric and early historic archaeology of China, especially the social basis for the Shang and Chou mythology and art.

William J. Gedney, Comparative Thai linguistics.

Thomas R. Williams, An ethnological survey of the North Borneo-Kalimantan native peoples.

Robert Austerlitz, Gilyak lexicon and text.

Sidney W. Mintz, the social history and ethnology of the Caribbean Islands.

The *National Science Foundation* has awarded the following postdoctoral fellowships for study or research at the places indicated:

Bernd Lambert, American Museum of Natural History.
Edward E. Calnek, Musée de L'homme.

Oswald Werner, Indiana University.

Marshall D. Sahlins, Center for Advanced Study in Behavioral Sciences.

Daniel J. Scheans, University of Vermont.

The *Social Science Research Council* has awarded predoctoral training fellowships to the following:

Thomas H. Charlton (Tulane), Research in Mexico on the archaeological and ethnographic settlement patterns in the valley of Teotihuacan.

- F. T. Cloak, Jr. (Wisconsin), Research in Trinidad on the diffusion and adoption of culture traits.
- Thomas G. Harding (Michigan), Research in Australia and New Guinea on cultural adaptation and interrelations in Melanesia.
- Leighton W. Hazlehurst (Berkeley), Research and completion of a dissertation on family organization and urbanization in a northern city in India.
- Paul Hockings (Berkeley), Completion of a dissertation on social roles in the contemporary cultural adaptation of the Badaga of southern India.
- Elizabeth Hopkins (Columbia), Research in Uganda and completion of a dissertation on the development of a modern African legal system.
- Murray J. Leaf (Chicago), Research in India on Sikh social organization and behavior.
- John S. Matthiasson (Cornell), Research on Baffin Island on Eskimo adjustment to Canadian law.
- Jon R. Morris (Northwestern), Research in England and Kenya on the cultural ecology of the Rift Valley highlands.
- Sue Denman Roark (Berkeley), Research in Peru on a peasant market system.
- Martin Gary Silverman (Chicago), Research in the Fiji Islands on the development of local organization in the resettled Banaban-Gilbertese community.
- A postdoctoral fellowship has been awarded to James L. Gibbs, Jr., for training in psychometric and clinical methods of personality assessment.
- A faculty research fellowship has been awarded to Floyd G. Lounsbury for a linguistic and sociological study of systems of kinship.
- Grants for research have been awarded to:
- David W. Ames, Research in Nigeria on the social position and role of the musician among the Ibo and Hausa peoples.
- Creighton Gabel, Analysis of materials from the Lochinvar Mound, Northern Rhodesia.
- Jane M. Murphy, Research in Nigeria on the changing role of women.
- George E. Simpson, Research in Nigeria on religious cults in Ibadan.
- Louise E. Sweet, Ethnographic research in London and Bahrain on the present status of traditional economic patterns.
- Eugene A. Hammel, Research in Yugoslavia on unilateral ritual kinship.

NSF has announced the following grants since last September:

- R. J. Miller, Isolation and Integration of Two Communities in India.
- W. Deshler, African Agricultural Patterns.
- S. H. Riesenber, Megalithic Structures of Ponape.
- L. M. Hanks, Ethnographic Survey of Southeast Asia.
- R. E. Bell, Caddoan Archaeology.
- J. V. Murra, Provincial Inca Life.
- R. H. Thompson, Modern Tzotzil Cosmology and Prehistoric Maya Civilization.
- R. S. Macneish, Tehuacan Archaeological Investigations.
- F. Johnson, Radiocarbon Chronology for Tehuacan.
- M. L. Moss, The Morphology of the Primate Pelvis.
- J. L. Caskey, Animal Bones of Ancient Troy and Lerna.
- R. J. Braidwood, The Appearance of Food Production in Southwest Asia.
- P. Phillips and S. Williams, Archaeology of the Upper Tensas Basin, Louisiana.
- G. L. Trager, Language of the Taos Indians.

- U. Weinreich, Linguistic Distributions in Coterritorial Societies.
- C. G. Holland, Prehistory of Southwest Virginia.
- P. and L. Bohannon, Divorce in Cross-Cultural Perspective.
- A. R. Holmberg, Prehistoric Human Ecology in Peru.
- F. Hole, Archaeological Investigation of Deh Luran, Iran.
- C. S. Smith, South Dakota Archaeology.
- W. H. Sangree, The Angas of Nigeria.
- J. E. Pierce, Indigenous Languages of Oregon.
- A. Chowning and J. C. Goodale, The Ethnography of New Britain.
- L. S. Cressman and D. E. Dumond, Prehistory of Southwestern Alaska.
- C. R. McGimsey III, The Prehistory of Arkansas.
- J. B. Griffin, Prehistoric Occupations of the Great Lakes Area.
- R. C. and M. E. Hunt, Inter-Village Structure in Oaxaca.
- C. Kaut, Tagalog Social Organization.
- Frank H. H. Roberts, Jr., An Archaeological Investigation of the Key School Site, Georgia.
- Stephen P. and Ethel Dunn, Culture Change in the Soviet Union.
- James B. Watson, Dynamics and Microevolution of a Human Community.
- Ralph S. Solecki, Prehistory of the Zagros-Taurus Mountain Province.
- Douglas Oliver, Javanese Immigrants in New Caledonia.

NEWS OF ANTHROPOLOGISTS AND DEPARTMENTS

The NATIONAL ACADEMY OF SCIENCES in April elected to membership Fred Eggan and Sherwood L. Washburn. Members are elected for their distinguished and continued achievements in original research. Sir Wilfrid Le Gros Clark was elected as a foreign associate. Emeritus Professor of Anatomy at Oxford, Sir Wilfrid has been Visiting Professor of Anthropology at Yale this year.

Wallace L. Chafe, formerly of the BAE, is now Associate Professor of Linguistics at the UNIVERSITY OF CALIFORNIA, Berkeley.

The program in Anthropology at the UNIVERSITY OF ALBERTA, Edmonton, is being expanded. Alan L. Bryan (Ph.D., Harvard) has been appointed Assistant Professor to develop courses and research in Archeology this Fall. During the past two years he has been engaged in research and writing in England. One of his major interests is the Paleo-Indian problem, on which he is preparing a monograph for early publication. Beginning in September a B.A. major in Anthropology will be offered. New courses to be given include Peoples of Asia, Anthropology of Religion, and Prehistoric Archeology. Further additions of staff and courses are anticipated in 1964. Charles Brant is continuing his research on the Cree of northern Alberta during the summer of 1963, as well as initiating a study of Indian migration and acculturation in the area of Yellowknife, Northwest Territories. The latter work, in collaboration with W. E. Kalbach, a demographer, is supported by a grant of the Boreal Institute of Northern Studies, University of Alberta. Willis E. Sibley of Washington State University will be Visiting Professor of Anthropology during the 1963 summer session.

Merlin Meyers has joined the Department of Sociology and Anthropology at BRIGHAM YOUNG UNIVERSITY. He recently completed the Ph.D. at Cambridge. His dissertation on the Six Nations Reserve is tentatively scheduled to appear in a new Cambridge monograph series. John Sorenson is directing an interdisciplinary group making anal-

yses of societies (notably Vietnam and Venezuela) in order to develop an understanding of the nature of unconventional warfare in social and cultural terms.

Michael B. Stanislawski is joining the sociology and anthropology staff at KANSAS STATE UNIVERSITY, Manhattan, to develop work in archaeology and physical anthropology to add to the courses now being taught by Robert B. Taylor.

The Illinois State Academy of Science in April heard a symposium on Ecology and Culture organized by Morris Freilich, NORTHERN ILLINOIS UNIVERSITY, DeKalb. The meetings of the Academy were held at Southern Illinois University. Papers in the symposia were delivered by Demitri Shimkin, John Bennett, Walter Taylor, Carroll Riley, Robert Netting, and James A. Brown. Freilich will spend the summer in Israel conducting a community study under a grant from NIMH.

RICE UNIVERSITY will have two more staff members this fall, Mary Ellen Goodman, who will serve as Visiting Lecturer, and Pauline Mahar Kolenda, who has been appointed Research Associate in Anthropology and Sociology.

Thorne Deuel has retired as Director of the ILLINOIS STATE MUSEUM, Springfield. The new Director is Milton D. Thompson.

The NSF has announced an award to the Department of Anthropology and Sociology of the UNIVERSITY OF ROCHESTER to support a series of self-study seminars to be conducted during the summers of 1963-65. The study will examine graduate training in social anthropology. Participants in the 1963 seminar will be B. S. Cohn, A. Harris, G. Harris, A. Green and J. F. Downs. Plans call for the inclusion of visiting participants in future seminar sessions and the publication and dissemination of the results of the program. Walter A. Sangree is currently beginning a two-year field study in the Jos plateau of Nigeria, supported by an award from NSF. James F. Downs, traveling on a grant awarded by the University, will visit the Mongolian People's Republic in August and September of this year.

HARPUR COLLEGE has been designated a graduate center of the State University of New York. Graduate work in Anthropology will begin in 1964. New appointments in the Department are Assistant Professors Louise E. Sweet and Richard U. Moench. Sweet will be in the Arabian Peninsula during 1964 as an SSRC Fellow. Of the regular faculty, Hans Hoffmann will spend the summer in Peru on an NIMH grant, continuing his studies among the Shipibo. Michael M. Horowitz, Chairman, will spend the summer in

Niger for Operation Crossroads Africa. Peter Dodge has a joint appointment with the Department of Sociology.

POSITIONS OPEN

Australian National University Institute of Advanced Studies invites applications for the position of Research Fellow in prehistory whose duties will be to direct archaeological work in Papua/New Guinea. Applicants should have experience in archaeological exploration and survey and by preference be at home in other of the field sciences. The appointee may wish to specialize in either the lithic or ceramic phases of New Guinea prehistory but will be expected to concern himself generally with the range of archaeological evidence. The salary range for Research Fellows is £A1,656-2,450; initial salary depends on qualifications and experience. Appointment is for 3 years with possible extension to a maximum of five years. Reasonable travel expenses are paid and assistance with housing is provided. Applications should be sent to E. P. Thomas, Institute of Advanced Studies, Box 4 G.P.O., Canberra, A.C.T.

University of Queensland is seeking Visiting Professor of Anthropology in the Anthropology and Sociology section. Will any university teacher of anthropology who is visiting Australia between now and 19th October, 1963, consider spending a period at this newly instituted section? Fares within Australia, living costs and a fee per lecture will be paid. Visitors will be asked to lecture in English to undergraduates on their own specialty. Kindly notify the Registrar, University of Queensland, St. Lucia, Brisbane, Queensland, Australia.

Chicago Teachers College North has position open as Instructor in Anthropology; M.A. or Ph.D.; salary range: \$615.00-\$750.00 per month, depending upon training and experience; 8 or 12 months of teaching a year at option; to teach introductory courses in cultural anthropology; special interest in Culture and Personality desirable. Write Dr. John Mann, Division of Human Personality, Chicago Teachers College, North, 5500 N. St. Louis Avenue, Chicago 25, Illinois.

RECENT DEATHS

Paul Fejos, Director of Research, Wenner-Gren Foundation for Anthropological Research; April 23, in New York City; age 66.

Alfred Metraux, Director d'etudes, Ecole Pratique des Hautes Etudes; April 22, in Paris; age 60.

Richard P. Gilson, Assistant Professor of Anthropology, Los Angeles State College; April 29, in Los Angeles; age 37.

John M. Goggin, Research Professor of Anthropology, University of Florida; May 4, in Gainesville; age 46.

AMERICAN
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Scientific Device to Aid Search for Vanished City

Special to The New York Times

ATHENS, May 4—Science came to the aid of archeology today as the search for ancient Heliki, the city that vanished after a violent earthquake in 373 B.C., was begun by a joint Greek-American team on the south shore of the Gulf of Corinth.

The preliminary search, which is to last until Saturday, is being conducted by Prof. Spyridon Arinatos, a leading Greek archeologist.

To help the search, Elizabeth K. Ralph, associate director of the Applied Science Center for Archeology of the University of Pennsylvania Museum, arrived here with a portable cesium magnetometer.

The device is capable of detecting buried structures by recording the slightest changes of intensity that they cause to the surrounding magnetic field.

The current exploration is to discover whether the ancient town is under solid earth because of the silt carried in the last 2,500 years by two neighboring rivers or

The Montreal Star

GENERAL NEWS

3

MONTREAL, SATURDAY, AUGUST 8, 1964

PRICE FIFTY

Hope to Find Ancient Fortifications

PHOTOS BY JOHN
STORIES BY DUSTY

Archaeologists Digging On Ile-aux-Noix

Physicists Point Way To Finds

The archaeological site at Ile-aux-Noix has attracted the attention of the University of Pennsylvania Applied Science Centre for Archeology.

The centre dispatched a three-man team to the island to experiment with instruments which can "read" what lies beneath a grassy slope and predict where archaeologists will find the buried foundation walls of previous eras.

Old military maps attest to the existence on the island of at least 75 structures, from several different eras, their remains now masked beneath the grass. So far the physicists, using magnetic and metal-detecting devices, have been able to predict quite accurately where the archaeologists should start digging to find the old walls, fortifications and foundations.

The Pennsylvania project has already caught the eye of the National Broadcasting Company, which flew a six-man television crew and tons of equipment from New York. Like everything else, it had to be ferried out to the island.

The Pennsylvania project is international. It is headed by a Princeton physicist from South Africa, Hugh Bergh, who is working for the University of Pennsylvania, which in turn has an agreement with the Canadian government to do the work.

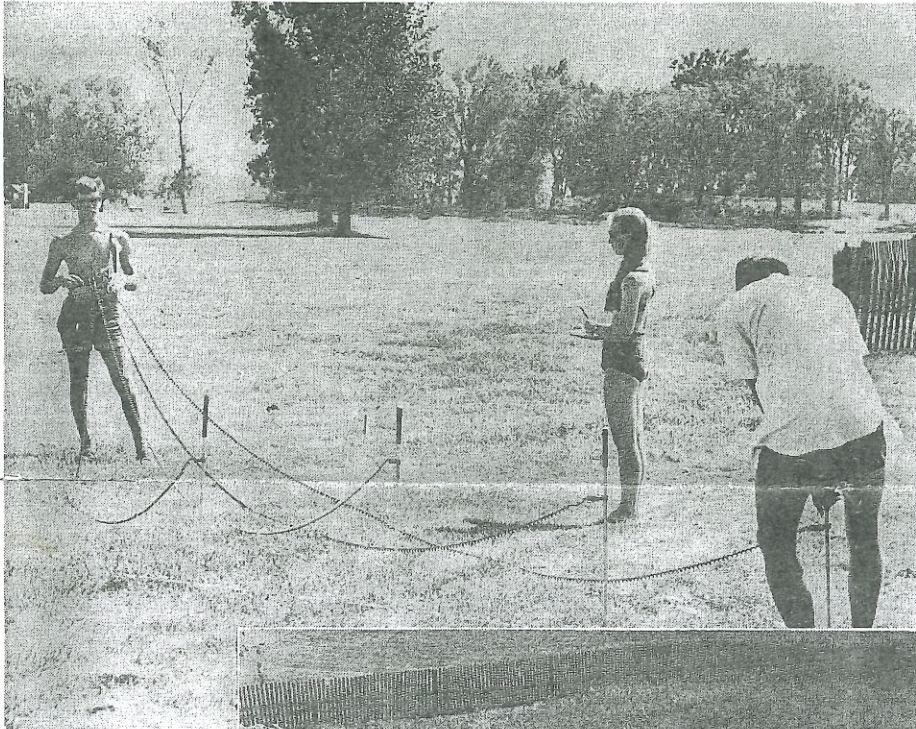
Bergh's student help consists of a German, Heinrich Boerstling, 23, of the University of Pennsylvania, and Ted Spickler, an American student. They've been joined by Canadian James Moscovich of Lethbridge, Alta., who originally enrolled for the archaeology summer school. Fascinated by the physicists, he switched.

Sous une plaine de verdure
un passé mouvementé a laissé son empreinte

Fouilles archéologiques à l'Île-aux-Noix!

Il se passe des choses étranges pour le commun des mortels, à l'Île-aux-Noix. Depuis 1920, cette île du Richelieu n'était plus qu'un parc fédéral grouillant de monde en été. En juin, des archéologues ont envahi le fort Lennox, établi des enclos, crevé la plaine ici et là, et depuis, sous l'œil des campeurs, ils creusent, ratissent, passent les débris à la loupe, au tamis, au peigne fin. Des fondations pierreuses de constructions disparues réapparaissent à la lumière. Des milliers d'objets hétéroclites s'alignent sur des tables: morceaux de sabres, pièces de mousquets pourris, débris de poterie, porcelaine éclatée, squelettes écartelés... Tout doit être lavé, étiqueté, classé et mis en fiches, en attendant d'alimenter les méditations des hommes de science. Ces fouilles mettent au jour une histoire mouvementée, témoin de l'époque où le Richelieu était la grande voie d'accès vers les Etats-Unis, pays ennemi! D'abord occupée par un fermier qui y récoltait des noix et payait redevance à la seigneurie de Noyan en 1753, elle fut fortifiée par les Français en 1759, prise par les Anglais en 1760, occupée par les Américains en 1775-76, équipée d'un nouveau fort (anglais) en 1782-84, de chantiers navals et d'un gros village de 1810 à 1834, du fort actuel entre 1819 et 1830. Théâtre d'une bataille navale durant la guerre de 1812, elle fut finalement abandonnée en 1870. Elle servit de villégiature forcée à des prisonniers allemands des deux guerres mondiales.

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LE PETIT JOURNAL, semaine du 9 août 1964



L'archéologue moderne ne creuse pas au hasard. Des appareils comme cette machine à électrodes plantés dans le sol permettent de repérer avec précision des ruines ensevelies et épargnent bien des efforts. Les variations du courant entre deux électrodes trahissent la présence d'objets intéressants. Comme on peut voir, la barbe n'est pas de rigueur chez les archéologues!

Les physiciens (ci-haut) ne s'étaient pas trompés! A l'endroit indiqué, les archéologues ont exhumé les fondations à fleur de terre d'un ancien hôpital qui dormait là sous la plaine gazonnée depuis plus d'un siècle! Les fouilles sont effectuées par des terrassiers modèles! Notez la régularité des coupes, la propreté du chantier. Un archéologue attentif prend des notes. Tout objet trouvé est soigneusement enregistré.



Une école d'archéologie



La plaine gazonnée est systématiquement arpentée, quadrillée et prospectée par des physiciens avec une sonde électromagnétique (ci-contre) qui détecte les objets enfouis jusqu'à une profondeur considérable. Il s'agit d'un instrument différent de celui de la page précédente, lequel révèle les masses de toute nature par les variations que subit le courant électrique rencontrant des obstacles en passant entre deux électrodes. En bas, les fondations de l'ancien hôpital examinées de près par un étudiant de l'Université Laval, Louis Chevreton. En haut, à droite, une étudiante mesure la base d'un âtre séculaire récemment mis au jour, tandis qu'un jeune travailleur de la région de Saint-Paul démantèle les ruines pierre par pierre et entasse les débris dans une brouette, pour les soumettre au contrôle de l'archéologue responsable de ce chantier. Notez la butte de terre coiffée d'une touffe de gazon portant encore le piquet blanc qu'un arpenteur y a planté. Elle marque le niveau du sol tel qu'il était avant le creusage. En bas, à droite, le directeur des fouilles John Rick donne ses instructions à l'homme-grenouille Sean Gilmore, de Montréal. Depuis le début de juin, Gilmore et son confrère Walter Zacharchuk, de Montréal également, explorent méticuleusement le fond du Richelieu, aux abords de l'île, et M. Rick signale qu'ils ont fait un tas de trouvailles très intéressantes. On sait que le passé de l'île-aux-Noix se situe à l'époque où la navigation était presque la seule façon de voyager à longue distance. Sise à quelques milles de la frontière américaine, l'île-aux-Noix était l'endroit idéal pour contrôler les navires venus des Etats-Unis et, en temps de guerre, pour leur barrer la route. De 1810 à 1834, l'île fut équipée de cales sèches et beaucoup de navires y furent construits, à une époque d'activité intense qui contraste avec le paradis de calme et de verdure qu'elle est devenue.

Micheline Bouchart d'Orval et Pierre Hébert, de l'Université de Montréal; à leurs pieds, les ruines de l'ancien fort anglais.



"L'île-aux-Noix? Un paradis pour archéologues!" Cette observation, je l'ai entendue fuser maintes fois, en arpentant l'île en docte compagnie, lancée avec un sourire en coin par quelque universitaire à la barbe abondante, à la pipe opiniâtre. Ici, le territoire à fouiller est restreint, concentré, et plus on creuse, plus on trouve! "C'est plus encourageant que lorsqu'on a à remuer des tonnes de terre et de roc sans trouver autre chose que de la terre et du roc!" remarque mon guide, qui trouve la vie tout simplement formidable, à l'île-aux-Noix!

Le "paradis" de l'île-aux-Noix, c'est aussi ces casernes spacieuses et chargées d'histoire, telles qu'on les construisait entre 1819 et 1830, avec des murs de pierre épais comme des murailles, des fenêtres-meurtrières, les plafonds en ogive portant de lourds anneaux dont l'usage antique demeure un mystère.

L'équipe de chercheurs a pris possession d'une partie du fort Lennox. Elle y a installé ses quartiers, cuisine et logis, et aussi ses ateliers. On y travaille sans se serrer les coudes, étalant sur de longues tables ses trouvailles par milliers, tapant au dactylo, fouillant dans des classeurs modernes là où les soldats de 1830 faisaient leurs jeux, ou bien encore sortant dans l'enceinte terminer un bout d'ouvrage au soleil. "C'est mieux que les tentes dans lesquelles nous avions l'habitude de nous serrer!" fait un archéologue.

Payés pour apprendre

L'archéologie est une science à l'aise, à l'île-aux-Noix. Une science dynamique, optimiste, fructueuse. La brise du Richelieu, un site enchanteur, la verte plaine ondulée, les ormes gigantesques, la flottille de bateaux qui permettent d'en rompre l'isolement ne sont peut-être pas étrangers à cette heureuse facilité qui semble y alléger le travail des hommes!

Le programme de l'île-aux-Noix marque l'essor de l'archéologie historique au Canada. Il fait écho aux travaux de Fort Saint-Joseph en Ontario, de Fort Meductic au Nouveau-Brunswick, et de loin au gigantesque projet de \$10 millions qui ressuscitera la forteresse de Louisbourg, à l'île du Cap-Breton.

L'archéologie prend une grande expansion chez nous depuis trois ans! Son champ de recherches s'étend et c'est maintenant une profession passionnante qui fait vivre son homme... mais sans plus!" déclare M. John Rick, directeur administratif des fouilles pour le compte de la Division des Sites historiques du ministère du Nord Canadien et des Ressources naturelles, assisté de M. Yan Rodger, et de son épouse, Mme Anne Rick, biologiste de l'Université de Floride, chargée du classement.

On se lance à l'avant-garde à l'île-aux-Noix, où huit étudiants jouissent du "salaire étudiant". Le programme vise non seulement à réveiller le passé de l'île, mais aussi à encourager l'étude de l'archéologie en permettant à de jeunes universitaires de travailler à salaire, dans le domaine qui les intéresse. C'est un fait rare. "Aux Etats-Unis, les étudiants en archéologie ne sont pas payés pour apprendre. Ils paient!" m'affirment quelques heureux élus.

La direction de cette école d'archéologie "sur le terrain" a été confiée à M. Norman Barka, de l'Université Harvard. Les étudiants y forment déjà une famille unie par deux mois de travaux en commun, malgré leurs origines très diverses: il en est venu de l'Université de la Colombie-Britannique, de l'Université de Toronto, de McMaster, du Nouveau-Brunswick, de McGill, de l'Université de Montréal, et de Laval.

Découvertes

Je n'ai pas vu d'excavation qui ait raté son but. Au fond d'une fosse de neuf pieds, Micheline Bouchart d'Orval m'indique d'un air triomphant des bouts de murs qui font saillie: "C'est le vieux fort anglais! Nous sommes tombés droit dessus!"

Un texte
de
Jean-Yves
Bégin

Photos
John
Taylor



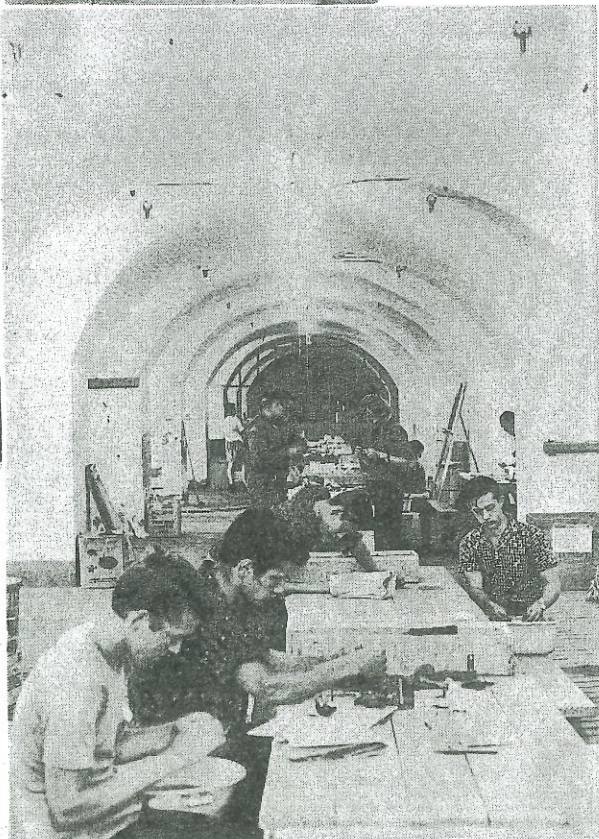
Norman Barka, directeur de l'école d'archéologie qui se tient à l'île-aux-Noix (à g.), et John Rick, directeur administratif des fouilles pour le gouvernement fédéral, examinent avec bonne humeur les ossements provenant d'un squelette (ci-bas) découvert dans une voûte. L'étude de ces os servira à retracer, par exemple, certaines habitudes alimentaires d'autrefois et leur effet sur l'organisme. A l'extrême gauche, Dick Sutton, étudiant à l'Université McGill, suspend à sa "corde à linge" divers objets de fer qu'il a débarrassés de leur rouille séculaire en les plongeant dans un bain électrolytique de soude caustique (plus bas) dans son atelier, au fond d'une pièce glauque taillée sous les remparts et familièrement baptisée "l'Enfer de Dante". A gauche, Carole Yawey, de Lively, Ontario, étudiante en anthropologie de l'Université de Toronto, oeuvre à sa planche à dessin tandis que Mme Anne Barka (plus bas), anthropologue diplômée de l'Université de Washington, répare un pot cassé au cours des siècles derniers. En bas, à gauche, Mary Cherry, de Toronto, diplômée en anthropologie de l'Université de Toronto et assistante de Norman Barka, compile les données de la journée. Ci-dessous, des spécialistes et leurs aides travaillent au nettoyage et à un examen sommaire des pièces découvertes, qui sont légion. Au premier plan, on aperçoit deux adolescents qui lavent et frottent à la brosse à dents les moindres tessons de bouteilles. Tout doit être conservé, étiqueté, catalogué. La pièce la plus insignifiante peut être une véritable révélation. La discipline scientifique exige que les savants aient sous leurs yeux un inventaire complet de ce qui a été trouvé, lorsqu'ils commencent à étudier leur butin de près, l'hiver, et qu'ils amorcent le difficile travail d'interprétation. — L'espace fourni par cette antique caserne de pierre permet à l'équipe d'oeuvrer avec le maximum de confort.

A-43 LE PETIT JOURNAL, semaine du 9 août 1964

Ailleurs, on dirait des poutres. "C'est en bois et ça c'est conservé ! Formidable !" Je commence à deviner, sous l'immense plaine verte ondulée qui n'a l'air de rien, tout un monde enseveli. Avec l'abandon, l'eau et le vent, le sable, la végétation, et aussi beaucoup de temps, tout un siècle peut s'enfouir, que l'autre foule aux pieds sans savoir.

Les étudiants ont d'abord étudié l'arpentage et la photographie. On a dressé une carte approximative des anciennes installations à exhumier, en fondant ensemble sept cartes des années 1800. Les physiciens, armés de leurs instruments ultra-modernes, ont mis une dernière touche de précision, et le creusage a commencé.

Les objets trouvés sont soigneusement mis dans un sac numéroté, lequel permet de retracer sur un plan à quel endroit, à quelle profondeur et dans quelle sorte de sol ils ont été découverts. Ils sont ensuite lavés ou débarrassés de leur rouille, et chaque unité reçoit un numéro identificateur et une fiche descriptive. Des travailleurs de la région de Saint-Paul exécutent la partie matérielle de l'ouvrage sous la direction de spécialistes. A l'automne, quand les fouilles seront interrompues pour l'hiver, les archéologues se pencheront sur toutes ces choses. "Un mois de fouilles signifie facilement deux ou trois mois d'étude et de recherche", déclare M. John Rick. Et pour ces recherches les archéologues feront éventuellement appel à des spécialistes de tous calibres : historiens, anthropologues, etc.



Nous irons "creuser" dans l'Île...aux Noix!

Des étudiants découvrent les ruines d'un hôpital construit en... 1812

70 bâtiments seraient enfouis sous terre

Le ministère fédéral des Richesses naturelles vient d'ouvrir sur l'Île-aux-Noix une école d'archéologie dans le but de mettre à jour avec exactitude les vestiges des anciens bâtiments dont les

fondations gisent enterrées et inconnues.

La plus importante découverte est sans contredit les fondements de l'hôpital du deuxième fort an-

glais (3 forts ont été construits sur l'île, un fort français en 1759, un premier fort anglais vers 1782 et finalement le fort actuel en 1812). Cet édifice fut construit vers 1812. A proximité de ces fondements, on a également découvert ce qu'on croit être la cuisine de l'institution hospitalière.

Une équipe formée d'une trentaine de personnes travaille à ces fouilles depuis le 1er juin et poursuivra ses recherches jusqu'à la fin d'août.

Au cours des prochaines années, lorsque toute l'île aura été explorée et fouillée, le programme tracé par le gouvernement prévoit l'exécution d'une série de travaux de restauration à l'intérieur du fort Lennox. On songe en particulier à remeubler et redécorer le plus grand nombre possible de pièces dans le style de l'époque.

Jusqu'à maintenant, les chercheurs ont découvert plusieurs poteries enfouies dans la terre. Les jeunes gens qui travaillent à cette expérience, s'appliqueront à recoller ces pièces d'art après les avoir lavées de façon à leur redonner leur lustre ancien.

70 BÂTIMENTS

On croit savoir que plus de 70 bâtiments ont déjà existé sur l'île qui a été complètement abandonnée comme fortification militaire en 1870.

Le travail est effectué par qua-

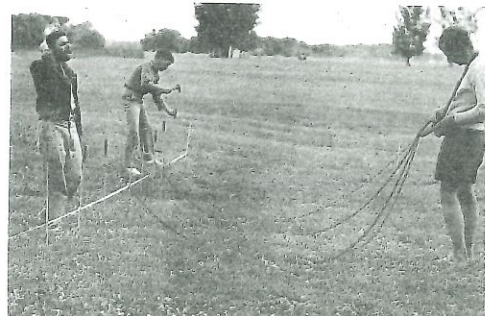


C'est à cet endroit qu'était située la cuisine de l'ancien hôpital...

tre groupes de travailleurs scientifiques. Tout d'abord, les arpenteurs mesurent le terrain; ensuite les physiciens mesurent le degré de résistance du terrain; puis les creuseurs travaillent aux endroits où on croit trouver les vestiges du passé. Ce sont des archéologues qui, au nombre de 10, dirigent toutes les fouilles.

Archéologues, physiciens et arpenteurs sont secondés par un groupe d'étudiants.

En plus d'initier les étudiants aux techniques de l'archéologie, ces fouilles nous permettront de mieux connaître notre région et de découvrir les vestiges de ce qui fut un avant-poste militaire de très grande importance au Canada.



Des physiciens cherchent à mesurer le degré de résistance de la terre avant que les creuseurs commencent leur travail. A voir l'expression de celui de gauche, le travail est loin d'être terminé!



Cet édifice du fort Lennox sert de quartier-général à l'école d'archéologie. Plus de 40 étudiants travailleront et vivront à cet endroit jusqu'à la fin d'août.



Un étudiant occupé à recoller une poterie trouvée dans le sous-sol au début de la semaine dernière. Sur la table nous remarquons également des boulets de canons datant du début de la période anglaise et un plat qui a été découvert en mille morceaux puis qui fut recollé pièce par pièce.



Nous apercevons dans la photo ci-dessus une jeune fille qui travaille d'arrache-pied (c'est le cas de le dire!) à découvrir les fondements de l'ancien

hôpital. Nous voyons une partie des fondements au centre de la photo.

The Arizona Daily Star

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ASCTA

20 January 1965

Dr. Froelich G. Rainey
The University Museum
33rd and Spruce Streets
Philadelphia, Pa. 19104

Dear Dr. Rainey:

I wanted to thank you again for your amiable aid of the Snaketown story. Two clippings are enclosed.

Also, I'd intended to ask you to pass along our regards to Mr. Parkinson of your staff. I've never met him, but my wife grew up across the street from the Parkinsons.

A clip is being mailed to Joe McLaughlin, who was helpful above & beyond the call of duty.

Again, thanks.

Sincerely



Carle Hodge

SACATON—A detector developed for finding oil has been used to pinpoint prehistoric sites buried beneath the desert.

Archaeologists already had proved it to be of help in mapping such submerged ruins in more moist environments.

But the University of Pennsylvania's Dr. Froelich G. Rainey, who pioneered its application in this sort of work, never had tried the electronic device in an arid area.

On Tuesday, though, he wound up a week of doing just that — at Snaketown, the 1,000-year-old Hohokam village which the University of Arizona is unearthing southwest of Chandler.

When he was through, he proclaimed his proton magnetometer to be potentially as effective here as anywhere else. The instrument measures magnetic changes in the earth's field — from the surface.

Since long-covered structures may be either less or more magnetic than the surrounding soil — fire pits, as an example, usually contain more magnetism — they can be charted by these changes.

Rainey, director of the University Museum, Philadelphia, specializes in the adaptation to archaeological fieldwork of new inventions.

He succeeded last summer in Italy, with a similar magnetometer, in mapping miles of what is believed to have been a seaport suburb of ancient Sybaris, or possibly that redoubt of 6th Century luxury living itself.

Vestiges of the almost legendary, Tucson-sized Greek city lie 15 feet below the water table, and therefore may never be seen again.

The *Philadelphian* was invited to Snaketown by Dr. Emil W. Haury, the UA archaeologist directing the excavation. Once here, he and an aide, Hugh Bergh, a Princeton geophysicist, attempted several techniques.

One was seismic sounding, an old standby in underground exploration. It didn't work well because of the fickleness of southern Arizona bedrock. But the magnetic detector — so sensitive that it shows changes of one part in 10,000 — lived up to expectations.

A proton, the nucleus of the hydrogen atom, acts as a tiny magnet. So, the sensor of the magnetometer is a bottle filled with hydrogen-rich liquid, and

connected by cable to a recorder.

A man carries the sensor steadily across the plot being studied, along parallel lines approximately a yard apart. As differences in magnetic intensity appear, the recorder traces them on a graph.

Following this approach, Rainey discovered what shoveling by the Arizonans showed to be a kind of prehistoric patio, complete with cookout pits.

Later, the detector singled out a spot where spadework revealed an ash heap and a house floor. Haury himself troweled out the final few inches of dirt, then turned to Rainey. "It looks like your doodlebug works," he said. The instruments were left at the site for further trials.

The eight-month effort scheduled at Snaketown passed its half-way mark Monday, and Haury expressed pleasure with progress there.

Meanwhile, the scientists were sifting through an elongated mound some 125 feet long — and uncovering relics from almost every period during the millennium or more of aboriginal occupancy.



Artifact Hunt Made Easy

Digging where an electronic device spotted something, University of Arizona archaeologist Emil W. Haury (in hat) stops to inspect a prehistoric floor at Snaketown. Dr. Froelich Rainey, center, and Hugh Bergh look on. Rainey, from Pennsylvania's University Museum, and Bergh tried new detectors in desert for first time.

20 JAN 65

Doodlebug Bares Hohokam Secrets

By CARLE HODGE
Star Science Writer

Greeks to Seek Ancient Town That Vanished in Tidal Wave

U.S. Experts Will Aid in Hunt for Helike, Lost in 373 B.C., in the Gulf of Corinth

Special to The New York Times

ATHENS, March 19 — Greek and American experts hope to discover Helike, an ancient Greek town that vanished 2,339 years ago in the Gulf of Corinth.

Premier Stefanos Stefanopoulos's Government will sponsor a search for the city, which was engulfed by a tidal wave after a violent earthquake in 373 B.C.

The sponsorship was announced after the Premier conferred with Prof. Spyridon Marinatos, leading Greek archeologist, who will head the search.

Professor Marinatos has made arrangements to collaborate with the University of Pennsylvania Museum, a leading authority in applying scientific methods for archeological research.

The first exploratory tests will be made in May, when Miss Elizabeth Ralph of the museum begins a week's work with Professor Marinatos at the site.

The museum's experts have explored the ancient city of Sybaris off the west coast of the Gulf of Taranto in South Italy with the help of a rubidium-magnetometer, a device capable of mapping a buried city from the surface.

This device is being perfected for use at Helike, Professor Marinatos said, because the ruins at Sybaris lay 13 to 16 feet deep, while Helike is believed to be at a depth of 45 to 60 feet.

"If Helike is located," Profes-



The New York Times March 20, 1966

Expedition will seek to find Helike, a town that vanished 2,339 years ago.

sor Marinatos said, "work can begin systematically from next year. We shall then need a great deal of money for recovering it."

Helike is assumed to lie five miles east of the modern town of Aigion, on the north coast of Peloponnesus, an area frequently plagued by earthquakes.

Helike was overwhelmed during the most brilliant period of classical Greece. Plato was still teaching and Aristotle was a child of 12. Scopas, Praxiteles and Cephissodotus were carving their masterpieces of sculpture.

Professor Marinatos said: "Architectural monuments, masterpieces of sculpture in stone and bronze, including some by the greatest artists—perhaps even Phidias—surely are to be found at Helike."

No one at Helike survived the tidal wave. Even 10 Spartan warships in the harbor disappeared.

Many Are Decorating Homes With Stolen Pre-Columbian Art

By PATRICIA MCBROOM
Inquirer Science Writer

Americans by the hundreds are decorating their homes with stolen art — squat Pre-Columbian figurines which have been plundered from graves in western Mexico.

Anyone with a penchant for modern art has to have one of the figurines, selling for up to \$1000 apiece.

They can be bought in most major cities, and fashion magazines regularly promote a Pre-Columbian touch in their decorator schemes with one of these antiquities from western Mexico.

GRAVES LOOTED

Without exception they are coming from looted graves, known only to the peasants who pilfer them.

So far archeologists have not succeeded in locating a single unlooted grave and the peasants aren't giving out any information.

In January, a team from the University of Pennsylvania Museum will enter the scene with an electronic instrument that hopefully will detect the hidden tombs and perhaps undercut an illicit trade.

If the team, led by Dr. Froelich Rainey, museum di-

rector, is successful, it could open the way to control of pillage by Mexican authorities.

It also would add important information on the Indians who lived in the area around the time of Christ.

Their art dates from about 280 B. C. to 240 A. D., but otherwise nothing is known about the people or their culture.

It is possible they were ancestors of the Tarascan Indians, great warriors who lived a thousand years later, during the period of Spanish conquest, according to Dr. William Coe, curator of Mesoamerican archeology at the Museum.

"This is a great cultural area in Pre-Columbian Mexico that is dismally known. We hope to recoup it before it is completely lost," Dr. Coe said.

SITE SELECTED

The museum has selected a site — one of many in western Mexico — that is 60 miles west of Guadalajara, just north of the town of Etzatlán.

The Indians in this region buried their dead around the edge of a now-dry lake bed about five square miles in size.

Peasants who live there now mind the graves through some kind of surface indication on

the ground but won't say what it is.

The museum's Elizabeth K. Ralph and graduate student Bruce Beven will explore the area on foot, hoping to pick up magnetic signals indicating a hidden grave.

MAGNETIC PROBLEM

However, the magnetometer won't work if rocks in the area are highly magnetic, which they could be since the region is volcanic, said Miss Ralph.

She said she doesn't expect any trouble from the grave robbers who might be expected to resent the intrusion.

In other similar cases, said Mr. Ralph, archeologists have not been attacked when they moved into an area subject to plundering, as were the Etruscan tombs in Italy, brought under control in the 1960s.



Inquirer photo by JAMES L. MCGARRITY

Figurines Are Being Blackmarketed
This one, from Mexico, is at University Museum

NATIVE TO ASSIST

But to smooth the way, Dr. Rainey has enlisted the aid of a museum owner in Guadalajara, Federico A. Solorzana, who knows the peasants and feels he can win their cooperation.

The graves, called shaft tombs, may contain one or two chambers, each big enough for three to 12 bodies and their offerings — figurines, pottery, pyrite mirrors, conch-shell trumpets and jewelry.

It has not been decided yet whether the museum will excavate as well as search for the tombs, which depends on agreements with Mexico.

The Mexican trip is in line

with the museum's new aggressive policy on the illicit trade in antiquities, which is serious and getting worse, said Miss Ralph.

Several major American museums depend on the trade and Dr. Rainey shocked his colleagues at a United Nations meeting in Paris last April, when he said the University Museum no longer would buy unknown source.

OCT 13 1960

Science Designs Drill for Moon

By the Associated Press.

How to make a drilling rig for the moon, and how to feed a toad are among this week's scientific questions.

Exploring the Moon

Scientists have started designing a special drill to dig into mysteries of the moon's surface.

Carried by a spaceship, the drill will be operated by remote control, with electronic systems messaging back what it finds.

It isn't a simple challenge, for the moon has no air. Temperatures can range from 270 degrees Fahrenheit down to 184 below zero.

The drill must survive a bumpy landing, and cannot be heavy. Scientists at Armour Research Foundation, Chicago, are wrestling also with questions of what kind of drill head to use, the method of powering the drill, and how hard the surface is.

Missing Link

By evolutionary theory, life began in the ancient sea.

Man's ancestry can be

traced back to a type of jawless fish, known as myxinooids, the most ancient vertebrates, says Donald D. Jensen, Indiana University psychologist.

But what was the link between them and simpler, spineless animals? Mr. Jensen thinks it could be a group of flatworms, named hoplonemertines. They have similarities with myxinooids in such organs as body muscles, pituitary gland, horny teeth, a backbone-like structure, digestive and circulatory systems, and sense organs.

Automatic Translation

At the other end of the telephone line, some one is talking to you in Russian, or Congolese or French. But you hear his words in English. And your talk is automatically translated into his tongue.

Such intercontinental conversation in different languages could be possible within 20 years, predicts Dr. Edwin G. Schneider of Sylvania Electric Products, Inc.

Computer devices would do the translating.

Buried Treasure

A new device using the echo-sounding principle is being developed at the University of Pennsylvania Museum to help locate buried archeological treasures.

Electrical probes and magnetometers have already proved useful in locating campsites, Roman villas and other prizes and mementos of societies long gone. The new probe will add a new scientific tool.

On the Fly

Toads will eat only something which is moving. Then with a flick of their tongues, they corral their dinner.

In the laboratory or home terrarium (a hotel for toads and such), they will eat bits of hamburger, carrots or even some breakfast cereals if the food is waved in front of them.

This is tedious, so researchers designed a turntable or lazy susan, putting food on the rim. The toads seize it as food goes by.

liquid core is also in seeming conflict with the dynamic stability of the Moon⁹. It is interesting, therefore, to inquire whether a magnetic field could have been generated in an outer liquid shell. The studies of Gast⁹ and Wood *et al.*³ of the lunar composition and of its present and past radioactivity lead to the conclusion that at an early epoch, some 3 to 4 × 10⁹ yr ago, there existed a thin anorthosite crust (density 2.9 g cm⁻³) which was floating on a few hundred kilometres thick layer of molten gabbro (density 3 to 3.3 g cm⁻³) which, in turn, was supported by solid olivine (density 3.2 to 4.4 g cm⁻³). This transient situation was caused presumably by a relatively brief pulse of heat generated by various short-lived radioactive elements, primarily ²⁶Al, which tended to concentrate in the liquid fractions.

If such an external liquid shell indeed existed then, in principle, a magnetic field could have been generated in it either by thermally driven convection in analogy to what has been suggested for Jupiter^{10,11}, or by tidal motions produced by Earth⁷. In order to assess the validity of these two mechanisms it is necessary to estimate first the average velocities v produced in the liquid. Using Fish *et al.*'s¹² numerical values for ²⁶Al and for its initial concentration in a 100 km thick layer, the layer must have become liquid in a few million years and at that time the outward heat flux Q was of the order 10⁴ erg s⁻¹ cm⁻² implying a surface temperature of about 100 K if no other heat source was present. The simple mixing length theory of thermally driven convection¹³ with the appropriate numerical quantities leads to the expression

$$v^3 = 8 \times 10^{-9} l Q \text{ cm}^3 \text{ s}^{-3}$$

With a mixing length l of the order of 1 to 100 km convective velocities are 2 to 10 cm s⁻¹. Radioisotopes other than ²⁶Al would lead¹² to much later melting, lower heat fluxes and lower convective velocities.

For evaluation of the tidal mechanism I assume that the outside crust is so thin that it is easily deformable and does not affect the motions in the liquid. The perturbing potential relative to the Moon produced by Earth in the liquid shell at a point P on the lunar surface¹⁴ is

$$\Omega = (3/2)\gamma Er^2 D^{-3} (1/3 - \cos^2 \theta) \quad (1)$$

where γ is gravitational constant, E is mass of the Earth, r is radius of the Moon, D is distance between Earth and Moon and θ is the angle between the line joining the centres of the two bodies and the lunar radius leading to point P (or approximately the lunar latitude). The average value of the perturbing force field (radial and tangential)

$$\overline{\nabla \Omega} \sim (3/2) \gamma Er D^{-3} \quad (2)$$

is about 2 × 10⁻³ cm s⁻², some 23 times larger than the corresponding lunar gravitational field responsible for tides on Earth. It follows that the solar influence, which on Earth is comparable to the lunar influence, is negligible for the Moon. The problem of evaluating velocities v in tidal motions even in a liquid layer of uniform thickness is a formidable one. But an approximate estimate of an average velocity v can be made applying to a spherical shell Malkus's⁶ assumption that the perturbing force is of the same order of magnitude as the Coriolis force per unit mass $[2 \omega \times v]$ where ω is angular velocity. If at the early epoch the rotation of the Earth and the Moon had not yet been slowed, both could have had a period of less than 10 h, typical of initial periods of most bodies in the Solar System¹⁵⁻¹⁷. On the other hand, the very low dynamic symmetry of the Moon may have existed at that time and may already have affected its rotation so that longer periods should be also considered. For periods between 10 h and 30 day the corresponding velocities are 6 to 400 cm s⁻¹.

A self-sustaining magnetic dynamo can exist¹⁰ if the magnetic Reynolds number $G = \mu L \sigma v$ is greater than 10. Here μ is permeability, L is linear dimension and σ is electrical conductivity. Putting $\mu \sim 1$ and L a few hundred kilometres gives $1 < G < 50 (\Omega \text{ cm})^{-1}$ which, using Dyal and Parkin's data for basalt¹⁸, indicates that the temperature of the liquid gabbro had to be not less than 1,900 K for the convective mechanism and not less than 1,600 K for the tidal mechanism. For the Apollo 11 sample¹⁹ the corresponding minimum temperatures are 1,750 and 1,300 K. Thus the tidal mechanism seems to pose less stringent requirements for the generation of a magnetic field in the liquid shell than thermal convection. On the other hand, a more detailed quantitative evaluation of the history of the transient melting might alter this conclusion.

The strength of the magnetic field H produced in this way depends, of course, upon the actual configuration and topology of the currents and is very difficult to estimate. Recent studies²⁰ indicate that the generation of magnetic fields in rotating bodies is closely related to the presence of non-reflexion-symmetric turbulence such as one would expect to exist in tidal motions. By comparing the Coriolis and perturbing forces with the Lorentz force per unit mass $[(4\pi\rho)^{-1} (\nabla \times H) \times H]$ where ρ is the density of the liquid⁶ one obtains, for currents with an effective radius of curvature of the order of kilometres, local fields of 10 gauss or more, which is very high. Clearly, for realistic and complicated boundary conditions, somewhat resembling those for tides in Earth's oceans, the local velocities and the local magnetic fields could be appreciably lower.

This admittedly very simplified model leads to the conclusion that the outer layer of the Moon could have been magnetized by local, more or less randomly oriented, magnetic fields produced by tidal currents, that there would be no overall poloidal field and that the magnetization would be observable primarily near the lunar equator where, from equation (1), the tide producing force has its maximum. All these conclusions seem to be in accord with the observations mentioned earlier and also the conflict with the stability requirements of the Moon is avoided. A detailed quantitative analysis of the tidal motions for a less idealized distribution of the liquid phase should be made. Such a distribution could be perhaps deduced from the most recent surveys of chemistry and morphology of lunar rocks and from the configuration of the surface magnetization and of surface fields.

I thank R. A. Phinney for interesting discussions.

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Rate of Horizontal Fault Displacement in New Zealand

WELLMAN¹ has estimated horizontal faulting rates in New Zealand. His presentation, however, takes little heed of published data relevant to recent crustal movements in New Zealand and his inferences are extremely tenuous.

Wellman states: "From seafloor spreading . . . the rate [of horizontal displacement] is estimated to be about 34 mm per year" and quoted Christoffel² and Wellman³ in support. Christoffel, however, estimated "relative average rate of movement between 4.2 and 5.8 cm a year". The estimate of 34 mm per year is Wellman's alone.

In estimating an age of 10,000 yr for the Waiohine and other aggradation surfaces Wellman ignored the radiocarbon dates from which the dating of correlative aggradation surfaces in the South Island has been developed. These dates^{4,5} indicate an age of about 18,000 yr for the latest principal aggradational surfaces developed during the latest (Otira) glaciation.

Wellman stated that at Turakirae Head "the highest [beach] ridge seems to be roughly 6,300 yr old. Radiocarbon dating of samples from beds a few metres below the highest beach ridge supports this estimate". In fact the radiocarbon dates referred to⁶ are from a different section on a different structure 70 km away across the regional strike of several important structures, and the dating of the beach ridge depends on complex relations of tectonism and sea level rise⁷.

We are unaware of the evidence on which Wellman bases the active dextral fault shown offshore off the southeast of the North Island; this was first postulated in 1971 by Wellman⁸ without any substantiation. Later³ in 1971 he merely noted that it was "reasonably well-defined by bathymetry to the northeast".

Wellman's assumption of a constant average rate of vertical movement ignores the evidence⁹ of decreasing rate and reversals of vertical movements at many active faults since the formation of the last main aggradational surface. This makes calculations based on rates of vertical movement suspect. Wellman has to assume a changing average rate of horizontal movement at Waiohine rather than the constant rate for transcurent faults in general that he has accepted previously^{10,11}.

The Cape Turakirae beaches lie on the anticlinal fold between the Wellington and Wairarapa Faults. Uplift there will result whenever accumulated strain along the fold is relieved by triggering from earthquakes associated with movement at any of the major faults in the region, not only at the Wairarapa fault, which displaces the Waiohine terraces. Uplift at Turakirae may thus be significantly more frequent than movement on the Wairarapa Fault at the Waiohine terraces. Wellman's inference that the same earthquakes caused movement in both places is not valid.

Wellman's ratio will remain the same if a constant factor exists relating frequency of uplift at Turakirae to faulting at Waiohine. No inference of age of the Waiohine surface and by extension of the rate of horizontal movement is possible without knowledge of such a factor. The Waiohine surface could well be several times older than Wellman assumes.

If one were to accept Wellman's 240 m summation of post-aggradation movement at the major faults, and an age of 18,000 yr for the latest principal aggradation surface, the rate of strain would be 13 mm yr⁻¹. This is little more than one-third of Wellman's estimate of 34 mm yr⁻¹ and an even smaller part of either of Christoffel's estimates, all from seafloor spreading. Conversely, for Wellman's rate of 34 mm yr⁻¹ the principal aggradation surfaces must be 7,000 yr old, which is unrealistic.

Suggate¹² has maintained and Freund¹³ has accepted that there is no good evidence of large horizontal displacements in post-glacial time along the central section of the Alpine Fault, where Wellman's reconstruction would require the rate of strain (34 mm yr⁻¹) to be the sum of the rates on the faults of the shear belt to the northeast. Freund¹³ has put forward

one possible hypothesis whereby the horizontal movement on these faults need not be transmitted to the Alpine Fault.

We urge those dependent on published literature for their knowledge of Recent crustal movements in New Zealand to study that literature as fully as possible. New Zealand's key position in relation to floor spreading makes such a study necessary.

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Magnetism and Archaeology

A RECENT discussion about reversed geomagnetic events in the Brunhes epoch contains the statement that no archaeological materials are known to be reversely magnetized¹. This may be true for the specific region that is considered in the article, but it is not true in general. G. Folgheraiter in "Rendi Conti dei Licei", 1896, 1899; *Archives des sciences physiques et naturellas* (Geneva), 1899; *Journal de physique*, 1899; and P. L. Mercanton, in "La methode de Folgheraiter et son role en geophysique", *Archives des sciences physiques et naturellas*, 1907, reported observations made on clay fired in kilns by the Etruscans and Greeks. Their results indicate that in the eighth century BC the Earth's magnetic field was reversed.

In 1896 Giuseppe Folgheraiter made studies of Attic (Greek) and Etruscan vases of various centuries, starting with the eighth century BC. The observations were made on clay fired in kilns. The position of the ancient vases during firing is known. They were fired in a standing position, as indicated by the flow of the glaze. The magnetic inclination or the magnetic dip of the iron particles in the fired clay indicates the nearest pole during time of firing. His conclusion was that in the eighth century BC the Earth's magnetic field was reversed at least in Italy and Greece.

P. L. Mercanton of Geneva, studying the pots of the Hallstatt age from Bavaria (about 1000 BC) and from the Bronze Age caves in the region of Lake Neuchâtel, came to the conclusion that about the tenth century BC the direction of the magnetic field differed only slightly from its present direction. His material was of an earlier date than that used by Folgheraiter but, checking on the method and results of Folgheraiter, Mercanton found them correct².

This work has been brought to the attention of Elizabeth K. Ralph, Associate Director, the University of Pennsylvania Museum, who is presently investigating magnetic field reversals. She is considering investigation of material taken from kilns dating around the eighth century BC. These kilns were recently unearthed in Sarepta by James B. Pritchard who is also asso-

ciated with the museum. This work could provide additional valuable data in the investigation of magnetic field reversals.

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¹ *Nature*, 239, 305 (1972).

² Velikovskiy, I., *Earth in Upheaval*, 146 (Doubleday, 1955).

BIOLOGICAL SCIENCES

Metabolic Availability of Vitamin C in the Guinea-pig

THE results of studies in which L-gulonolactone-1-¹⁴C, the precursor of L-ascorbic acid in the rat, was administered to guinea-pigs showed that the guinea-pig is apparently unable to synthesize vitamin C¹⁻³. This has been attributed to the absence of gulonolactone oxidase from the liver microsomes of the guinea-pig; because this enzyme is the last one in the series for converting glucose to ascorbic acid it completely blocks endogenous synthesis. Synthesis of ascorbic acid has been demonstrated in rats: gulonolactone oxidase is present in their livers⁴⁻⁶. A defect, probably a conditional lethal mutation⁷, in the gene controlling the synthesis of this enzyme in guinea-pigs produces an inactive enzyme or its complete absence. They are therefore dependent on exogenous vitamin C. This genetic disease has been named hypoascorbemia because of the low levels of ascorbic acid in the blood which are pathognomonic of the condition⁸. Neither the sex nor the age of the animals in these experiments was stated, and there was no indication of the state of ascorbic acid tissue saturation or of the scorbutic condition of the guinea-pigs.

Diet, age and sex greatly influence the metabolism of ascorbic acid in rats⁹⁻¹². In spite of the evidence for the uniform presence of a conditional lethal genetic defect in guinea-pigs, Williams and Deason¹³ demonstrated great variability in guinea-pig requirements for exogenous vitamin C in order to prevent the development of scurvy. Guinea-pigs do not develop scurvy on account of an excessively high rate of destruction of L-ascorbic acid¹⁴, so it seems that some guinea-pigs have greater ability to synthesize ascorbic acid than others. The evidence of Burns¹⁵ suggests that these guinea-pigs must have higher concentrations of gulonolactone oxidase in their livers, because their genetic defect is not as dominant as in the other less well-endowed members of the species¹⁶. Stone¹⁶ has suggested that the extent of this defect could be determined by observing the development of scorbutic symptoms and measuring the ability of the guinea-pig to synthesize ascorbic acid while on a diet deficient in ascorbic acid. The results of such an investigation in the guinea-pig are described here.

Duncan-Hartley guinea-pigs, initially weighing 380-400 g, were used. They were housed singly and maintained on a normal diet of rabbit pellets containing 27 mg ascorbic acid/100 g pellets, and free access to water, of which each animal drank about 30 ml. daily. After 2 weeks of acclimatization to the diet and checking to exclude individual pathology, they were transferred to the scorbutogenic diet as described by Hughes and Hurley¹⁷; this contained ground oats, wheat bran, and skimmed milk, modified only by the addition of 0.5% instead of 1.0% supplementary vitamins and salts, excluding ascorbic acid. No vitamin C could be detected in this diet by chemical analysis. On transfer to the diet, supplementary ascorbic acid (50 mg 100 ml.⁻¹) was added to the drinking water so that each animal received about 15 mg supplementary vitamin C daily. This treatment was maintained for a further 2

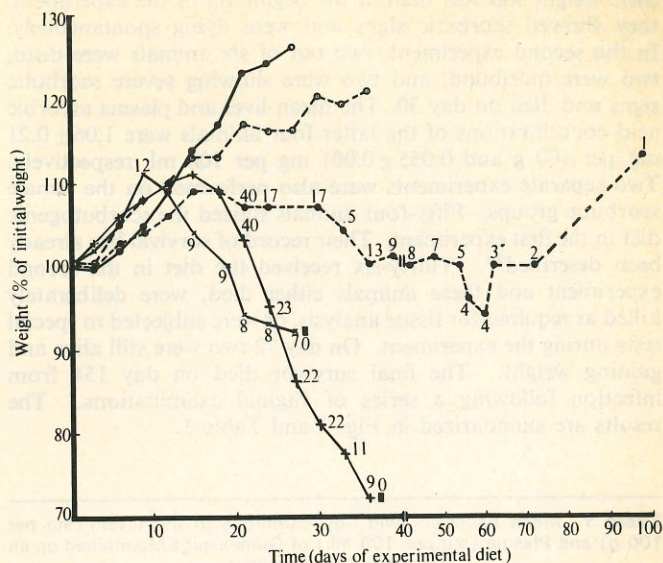


Fig. 1 Effect of ascorbic acid supplementation and deficiency on guinea-pig growth and survival. Survival times and alteration in weight of guinea-pigs maintained on a diet free of ascorbic acid. \circ --- \circ , Control females, diet + 15 mg ascorbic acid daily intraperitoneally. \circ — \circ , Males and females, diet + supplementary ascorbic acid 100 mg daily by stomach tube. \times — \times , Male guinea-pigs, diet alone. \bullet ... \bullet , Female guinea-pigs, Survivors, diet alone. $+—+$, Female guinea-pigs, Diers, diet alone. \blacksquare , 100% fatality. The numbers of guinea-pigs at each point of time in the males on diet alone, the female Survivors and the female Diers, are indicated.

weeks after which animals failing to maintain a steady growth pattern or showing impaired health were discarded. Following this 4 week maintenance period, a control group of females continued treatment with the scorbutic diet and 15 mg of supplementary ascorbic acid was given daily by intraperitoneal injection; a supplemented group, comprising equal numbers of males and females, received the diet together with 100 mg ascorbic acid given daily to individual animals by stomach tube; and separate groups of male and female guinea-pigs continued to receive the diet without any supplementary vitamin C (scorbutic groups). The animals were weighed every 3 days at 1000 h to avoid variations introduced by circadian rhythms. They were divided randomly into groups of six animals so that the killing order for tissue analysis was predetermined during the early part of the experiment. Guinea-pigs were killed at 1200 h by exsanguination after stunning. Ascorbic acid was measured, after extraction in 10% metaphosphoric-acetic acid mixture, by the phenyl hydrazine method¹⁸⁻²⁰. Gulonolactone oxidase activity was detected in liver by a specific histochemical procedure using nitro-blue tetrazolium (Nitro BT), phenazine methosulphate, and potassium cyanide in the presence of L-1,4-gulonolactone²¹.

In Fig. 1 the changes in body weight of male and female guinea-pigs on the scorbutogenic diet are compared with the weight changes in the control group of female guinea-pigs receiving the scorbutogenic diet and 15 mg of vitamin C daily by intraperitoneal injection, and with the gain in body weight of the supplemented group receiving the diet with 100 mg ascorbic acid administered daily by stomach tube.

The control group gained weight steadily during the 36 days of the experiment. The supplemented group began to gain weight more rapidly than the control group after day 18. By day 24 the supplemented group was significantly heavier than the control group. Two separate experiments were carried out on male scorbutic groups. In the first experiment, they became slightly heavier than the control or supplemented groups during the first 12 days of the experiment, then quickly lost weight. They had lost all their additional weight by day 24. On day 27

their weight was less than at the beginning of the experiment, they showed scorbutic signs and were dying spontaneously. In the second experiment, two out of six animals were dead, two were moribund, and two were showing severe scorbutic signs and died on day 30. The mean liver and plasma ascorbic acid concentrations of the latter four animals were 1.06 ± 0.21 mg per 100 g and 0.055 ± 0.001 mg per 100 ml. respectively. Two separate experiments were also performed on the female scorbutic groups. Fifty-four animals started the scorbutogenic diet in the first experiment. Their record of survival has already been described²². Thirty-six received the diet in the second experiment and these animals either died, were deliberately killed as required for tissue analysis, or were subjected to special tests during the experiment. On day 72 two were still alive and gaining weight. The final survivor died on day 154 from infection following a series of vaginal examinations. The results are summarized in Fig. 1 and Table 1.

Table 1 Mean Ascorbic Acid Concentrations in the Livers (mg per 100 g) and Plasma (mg per 100 ml.) of Guinea-pigs Maintained on an Ascorbic Acid Free Diet

Day of diet	No.	Males		Female Survivors			Female Diers		
		Liver	Plasma	No.	Liver	Plasma	No.	Liver	Plasma
0	6	27.48	0.43	6	20.42	0.88			
6	6	24.35	0.50	6	16.35	1.03			
12	6	16.08	0.37	6	7.17	1.02			
18	6	6.29	0.21	6	2.25	0.46			
24				3	2.08	0.25			
27	2	0.30	0.09						
30	4	1.06	0.06				11	2.16	0.12
32				2	3.90	0.17			
35				1	4.27	0.20			
36				3	5.64	0.22	6	2.97	0.08
62				1	4.69	0.57			
72				1	8.17	0.18			
98				1	11.04	1.40			

On day 24, the females were differentiated into potential Diers and potential Survivors on the basis of their growth patterns.

During the first 15 days, the scorbutic females gained weight almost as rapidly as the control and supplemented groups. By day 18 the scorbutic group had begun to lose weight. On day 24 they were significantly lighter than the female control group as has also been reported by Hodges and Hotston²³. The guinea-pigs in these investigations, however, did not receive ascorbic acid supplementation before the experiment, thus accounting for the appearance of a moribund condition by day 24. At this time scorbutic females could be divided into two groups, the potential Diers and the potential Survivors, on the basis of their growth patterns. From day 24 until the end of the experiment, the Diers showed a rapid and steady decrease in weight. On day 24 they were showing scorbutic symptoms. They all died during the first 36 days of the diet. The Survivors ceased to gain weight after day 18. They showed a gradual stepwise decline in weight until day 36 when their weight had fallen to the level at the beginning of the experiment. They maintained this initial weight, apart from a temporary relapse on day 60, until day 72 of the scorbutic diet after which the surviving guinea-pigs gained weight steadily and uniformly. Retrospective analysis of the weights of the Diers and Survivors before day 24 demonstrated that the Diers initially gained weight more rapidly than the Survivors. After day 24, the Diers lost weight much more rapidly than the Survivors. When any of the surviving female guinea-pigs died, they did not show severe scorbutic signs like those of the males or female Diers.

Food intake of males and females rose until day 12. On day 24 it had returned to its original level in the females, but it continued to fall in the males and was 57% of normal when they were dying. From day 27 until day 72 it remained at 70% of the original level in the surviving females. At the end of the

experiment the surviving females were consuming 82% of the initial group food intake.

Plasma and liver ascorbic acid concentrations were measured in males and in female Survivors and Diers as the experiment proceeded (Table 1). Those killed among the Diers were generally moribund at the time of death. Animals selected for tissue analysis among the Survivors had the lowest body weights. The numbers on each occasion were determined by the total number available in the group. Liver ascorbic acid values diminished in both sexes during the first month. The rate of fall was greater in the females. Liver ascorbic acid reached its minimum on day 24 when it was 10.6% of the initial value. The maximal rate of fall was later in the males, and took place when the decrease in body weight was most pronounced. On day 27 the liver ascorbic acid was 1% of the initial value in the males. After day 24 the mean liver ascorbic acid concentrations ceased to fall in the female Survivors. Ascorbic acid was present in relatively high concentration in the livers of the Survivors killed on days 72 and 98. On day 98 the liver ascorbic acid value was 54% of that in the normal animals killed before the diet was started.

Plasma ascorbic acid levels were elevated in both sexes at the beginning of the scorbutogenic diet but the elevation was maintained for 6 days longer in the females. They had reached a minimum in both males and females on day 30. The mean ascorbic acid concentration had begun to rise in the female survivors on day 32. Plasma levels were still diminishing in the Diers even though liver concentration had begun to rise slightly. When the diet was started, liver values began to fall while plasma levels were elevated. Subsequently the rise in plasma ascorbic acid only occurred after raised levels had been detected in the liver.

Table 2 Mean Weights of Surviving Guinea-pigs Maintained on Scorbutogenic Diet Alone, and the Effect of PCMB, 0.3 mg IMI on their Weights while Maintained on the Diet Alone or on the Diet Supplemented with Ascorbic Acid (15 mg Daily)

Diet	Type of treatment	No. of guinea-pigs	Days			
			0	1	4	8
Scorb.	PCMB None	3	435	462	472	478
Scorb. + Suppl.	Daily	2	515	526	534	543
Scorb.	Daily	2	444	482	466	355

Day 1 corresponds to day 54 of the scorbutic diet and to day 4 of the supplemented diet.

Raised ascorbic acid concentrations in the liver before any change in plasma levels suggested that ascorbic acid originated in the liver. Staining of the liver of male and female rats with Nitro BT demonstrated the presence of gulonolactone oxidase. Similar and simultaneous treatment of the liver of the female guinea-pig maintained on the scorbutogenic diet for 98 days demonstrated the presence of brown granules within the hepatic centrilobular cells. The brown granules in the guinea-pig liver were identical in distribution and appearance to those demonstrated in rat liver after staining with Nitro BT. Similar brown granules were not visible in the liver of a male guinea-pig supplemented with ascorbic acid. They could not be detected along the centrilobular cell boundaries in the liver of a male guinea-pig killed on day 28 of the scorbutogenic diet although scanty deeper staining was occasionally visible in the peripheral zone.

It has been demonstrated by chemical methods that the rate of conversion of L-gulonolactone into L-ascorbic acid is strongly inhibited by *p*-chloromecuribenzoate (PCMB), and that this effect is caused by the inhibition of thiol groups in the enzyme gulonolactone oxidase³. The inhibitory effect of PCMB on gulonolactone oxidase has been confirmed by histo-

Ruins of the Ancient City of Anshan Are Uncovered in Southwest Iran

By WALTER SULLIVAN

Thanks to modern archaeological methods, including the use of a highly sensitive magnetometer, the buried ruins of the ancient city of Anshan have been found in southwest Iran.

It was one of the four chief centers of Elam, a civilization that figured prominently in the Bible and made early efforts at developing a form of script.

In the latter part of its history, which extended from before 4000 B.C. until a few centuries B.C., Elam was notable for its use of matrilinear succession, wherein the ruler was normally the son of the sister of a previous king.

The discovery was made by an expedition from the University Museum of the University of Pennsylvania, which has been excavating the site over the last two years. The identity of the city, according to the museum, was established recently from clay tablets excavated there last fall.

The site is 25 miles north of Shiraz in a fertile mountain valley not far from the ruins of Persepolis, where Darius and his son, Xerxes, held sway after Elam had faded into obscurity.

Urbanization Efforts

Elam's four cities represented some of the earliest attempts at urbanization, but the location of only one, Susa, had previously been identified. Susa was the setting for the Book of Esther. The Elamite king Ahasuerus made Esther, a Jewish beauty, his queen.

However, little is known of the Elamite civilization, in part



A clay tablet, bearing a script that has yet to be deciphered, is wrapped for removal from site.

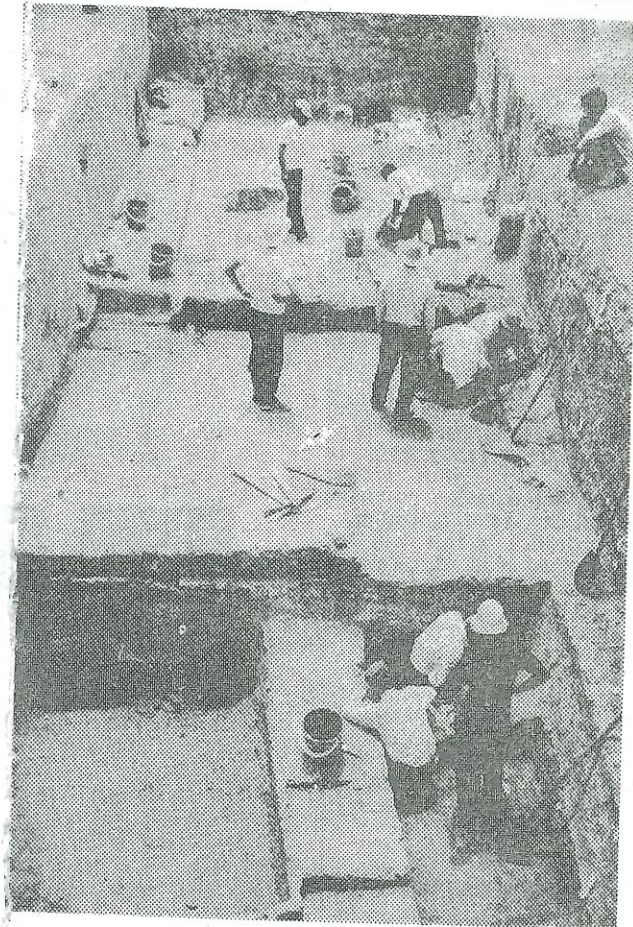
because Susa was sacked about 1130 B.C. by Nebuchadnezzar I. The roots of its language are unknown, and it apparently has no modern descendants. The script found on the oldest tablet from Anshan, ascribed to early in the third millennium B.C., has not yet been deciphered.

The identity of the site was established from less ancient cuneiform inscriptions on bricks there. These were deciphered by Dr. Erica Reiner of the Oriental Institute at the University of Chicago.

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It was the remains of the third and final period of occupation that were discovered, thanks to a cesium magnetometer wielded by Dr. Elizabeth Ralph of the museum's Applied Science Center for Archaeology. Her survey of magnetism over a mound that covered much of the site disclosed an area with an abnor-



Workers at the oldest site excavated in the ancient city of Anshan, on southwestern Iran.

University of Pennsylvania

mal magnetic "signature" that proved to be the buried shell of a room in a large building destroyed by fire.

The ruins cover some 350 acres and already have produced a variety of man-made objects including ornamented cylinder seals and many small clay figurines of animals (in-

cluding a bull) and of women. The latter are either clasping their hands or holding their breasts. According to the museum, the Elamite art of Susa.

The excavations are being supported by the Metropolitan Museum, the Ford Foundation and Ohio State University, as well as by the museum itself.



The New York Times/May 3, 1973
Anshan and other ancient cities shown in bold type.

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FOURTH SECTION

Buried city *The new unearths the old*

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The excavations are being subsidized by New York's Metropolitan Museum, the Ford Foundation and Ohio State University, as well as by the University Museum.

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