N.D

Texas

Greek City Of Sybaris Discovered

PHILADELPHIA. (AP) — The director of the University of Pennsylvania Museum said last night that he and an Italian archaeologist have rediscovered Sybaris — an ancient Greek city which disappeared almost 2,500 years ago.

Dr. Froelich G. Rainey said Sybaris — located in what is now Italy — lies beneath 15 to 18 feet of earth, below both sea level and the water table, in an area about six miles in circumference and about a mile and a quarter inland from the Gulf of Taranto shoreline.

100-Year Search

The announcement, made jointly by Rainey and Prof. Guiseppe Foti, superintendent of Antiquities of Calabria, Italy, apparently ends the century-old search scholars of various nations for the ruins of the Greek colony.

Sybaris was conquered and destroyed by its Croton neighbors in 510 B.C.

The Crontoniates reportedly diverted a river over the city and submerged it.

The archaeologists declined to speculate on what buried treasures might lie beneath the soil and water table, but they said Sybaris was the largest and richest Greek city of its time, not even exceeded by Athens.

The search, which began in 1960, was carried out by the museum with the cooperation and supervision of the Italian Department of Antiquities.

New Instrument

Final success in locating the buried city was due largely, Rainey said, to an instrument called a cesium magnetometer. The instrument is capable of locating objects 20 feet below the surface.

A high speed drill was used to confirm the anomalies found by the magnetometer. It brought to the surface pieces of archaic tile and pottery of the time of Sybaris.

Excavation was limited to test cuts because of the problem of flooding. The threat of flooding will present difficulty in the future to the uncovering of the long-lost city.

The Italians, however, plan a test excavation next spring.

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Search For Sybaris

By Orville H. Bullitt. 238 pp. New York: J. B. Lippincott Co. $6.95.

Sybaris was the richest city of Magna Graecia, the ancient Greek settlements in Southern Italy. The Sybarites, deservedly or not, are credited with inventing *la dolce vita* by dedicating themselves to pleasure and luxury for 20 years, until their city was wiped off the map by the neighboring state of Croton in 510 B.C. and was lost without trace.

Some 2,500 years later, Orville H. Bullitt, a sybaritically wealthy Philadelphian, made up his mind to find it. Enlisting an archeological team from the Museum of the University of Pennsylvania, under its distinguished director Froelich G. Rainey, he spent eight dogged years and a large, though unspecified, fortune exploring 400 square miles of alluvial plain by the Ionian Sea. After innumerable disappointments and setbacks, they finally succeeded, locating the ruins late last year under 15-20 feet of mud. This book is the story of their search.

It is not very exciting. For one thing, there was no crock of gold at the end of the rainbow. The ruins were found by drilling a lot of holes in places indicated by electronic sounding equipment—the excavation of Sybaris and its treasures, if any, still lies ahead. And for another thing, Mr. Bullitt is not a practiced writer—he is an insurance man by trade. Nevertheless, the book does celebrate one of the most significant finds in recent years, and private patronage for such an expensive, nonprofit pursuit as archeology deserves every encouragement.

Mr. Goddard is on the staff of The Times Sunday Department.

Archeologists Turn To Space Age Devices In Hunt for Old Ruins

* * *

Museum Researchers Will Try Sonic Detection; Magnetism Helps Locate Ancient Tombs

By ROBERT L. BARTLEY
Staff Reporter of THE WALL STREET JOURNAL

The ancient Greek colony of Sybaris in southern Italy was so famed for its wealth and luxury that even today pleasure seekers are referred to as Sybarites. But the soft life was too much for the original Sybarites. In 510 B.C. their city was conquered and destroyed and its exact location was lost to history.

Archeologists, hoping to find remnants of Sybaris's splendor, have searched in vain for years. This summer, however, a team of researchers from the University of Pennsylvania's University Museum is going to resume the hunt for the city's site using a technique called sonic detection. They plan to beam sound waves into the earth, and then, by studying the reflections of these waves, to try gathering detailed information about what lies beneath the surface.

Sonic detection is only one of the modern techniques and tools developed to aid archeologists in their search for ancient ruins. Others include instruments for measuring subsoil magnetism, and a midget submarine.

"Many of these new techniques let you plan an intelligent excavation with a good deal less time and expense," says Alfred Kidder, II, associate director of University Museum. To help perfect these techniques and to develop new ones, special laboratories have been established at University Museum and also at Oxford University and Rome's Lerici Foundation, which is supported by Italian industrialist C. M. Lerici.

Short Wave Beams

Sonic detection, which is being developed mainly at University Museum, is similar to a technique long used in geological prospecting. But because archeologists hunt in shallower depths than geologists, they need to send the sound beams on shorter wave lengths. They've been unable to generate such wave lengths properly with electronic instruments, so this summer University Museum researchers will try producing them by detonating rifle cartridges planted in the ground.

In searching for Sybaris, scientists also plan to use another technique—magnetic detection. This method, developed about three years ago, is based on the fact that archeological features, such as an old trench or buried urns, cause variations in the strength

"The most striking characteristic of magnetic surveying is the clarity with which archeological anomalies stand out," says Martin J. Aitken, who pioneered magnetic detection work at Oxford. His laboratory publishes Archaeometry, a journal which reports on applications of other sciences to archeology.

The proton magnetometer, as archeologists call it, has been used by Oxford researchers to look for Iron Age remains in England. It also has helped the Indiana Historical Society trace the outline of trenches at a prehistoric Indian village and has aided the Lerici Foundation to locate Etruscan tombs.

Space Research Byproduct

A few months ago, Varian Associates, an electronics firm, announced the development of another magnetic detector, which it says is more sensitive than the proton magnetometer. Varian's new magnetometer, adapted from a space research device, uses an element called rubidium, in vaporous form.

The way rubidium transmits light is sharply affected by magnetism. So by analyzing the light rays transmitted through rubidium vapor in the magnetometer researchers hope to detect magnetic variations in the ground and thus locate archeological features. "This should be a real money-saver for archeologists," claims Lee Langan, Jr., Varian's special products sales manager.

Archeologists are starting to hunt for artifacts beneath the waves as well as below the earth. In 1959, for example, Penn's University Museum was offered the chance to salvage a merchant ship believed to have sunk in the Mediterranean about 1,200 B.C. To salvage the wreck—the oldest known—says George F. Bass, head of the museum's marine work, "I was sent to the YMCA to learn to dive."

In three expeditions Mr. Bass and his coworkers have made considerable progress in salvaging the wreck's remains. But this year they plan to investigate other wrecks and they expect their task will be made easier by a two-man submarine recently acquired by the museum. The sub, named Asherah after the Phoenician goddess of the sea, is equipped with stereoscopic cameras which can be used to make three-dimensional models of a site without tedious hand measurements. The Asherah was built by the Electric Boat division of General Dynamics Corp.

Descubren la Legendaria Ciudad de Síbaris

e se decía haber sido la ciu-
l del antiguo mundo griego,
ada en el sur de Italia ente-
metros de profundidad. Un
queólogos italianos y norteazo el descubrimiento por megnetómetro de vapor de rubiumento extremadamente senvan varias de las naves es-
eamericanas.
a ciudad más rica de la antiga, desapareció de la faz de
e cerca de 2.500 años. Hacia
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han localizado a unos seis
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a, y la posibilidad de excanota, pues el costo sería pro-

uno de los descubrimientos
más interesantes que se
n muchos años", declaró el
elich G. Rainey, director del
Universidad de Pennsylvania (Filadelfia). Durante los últimos tres años, el profesor Froelich ha dirigido una expedición dedicada a la búsqueda de las ruinas de Síbaris, en colaboración con la Fundación Lerici de Roma, y bajo la autoridad general del profesor G. Foti, director del Departamento de Antiguedades de Reggio, Calabria.

Según la historia antigua, Síbaris fue destruida por su vecina Crotona el año 510 antes de Jesucristo. La ciudad, una colonia griega de la parte sur de lo que hoy es Italia, era la envidia de sus vecinas menos opulentas. A pesar de su amor al lujo y a la indolencia, los sibaritas se defendieron admirablemente.

Pero un error inocente fue su ruina. Los soldados de Síbaris habían enseñado a sus caballos a bailar al son de la gaita. Según escritos antiguos, los de Crotona atacaron tocando la música de gaita conocida por los caballos y estos al oírla creyeron que era hora de bailar y no de combatir. La ciudad fue destruída y el curso del río Crati desviado para que pasase sobre sus ruinas.

Los arqueólogos creían desde hacía mucho tiempo que la sede de Síbaris se encontraba en el llano de Crati, dentro de un área de 200 kilómetro cuadrados, y la han estado buscando desde 1878.

El magnetómetro de vapor de rubidio vino en su auxilio. Varias naves espacia-

Miembros del equipo italo-norteamericano que descubrió la legendaria ciudad griega de Síbaris aprenden a manejar un instrumento extremadamente sensible.

pasea llevando dos sensores sobre la sede de la ciudad de Síbaris, repumás rica del mundo griego de la antigüedad.

les norteamericanas habían utilizado este instrumento muy sensible para medir campos magnéticos débiles. El éxito arqueológico del magnetómetro se debe a su capacidad para advertir cambios de una parte en diez millones en el campo magnético de la tierra.

"A diferencia de otros instrumentos detectores, como los electrónicos y los sónicos, que se habían utilizado anteriormente", dice el profesor Rainey, "el magnetómetro de rubidio permite la localización y delimitación de las ruinas con gran celeridad y precisión, y es efectivo a profundidades mucho mayores que las que alcanzan otros instrumentos...

"La existencia de construcciones enterradas, revelada por el magnetómetro, fue en todos los casos verificada por las perforaciones subsiguientes .El experimento demostró la posibilidad de delimitar con exactitud todas las construcciones enterradas en una zona de cinco o seis kilómetros cuadrados del Llano de Crati, en unos tres meses y a un costo de pocos miles de dólares.

El magnetómetro de vapor de rubidio registra las minúsculas variaciones causadas en el campo magnético de la tierra por los objetos enterrados bajo la superficie. Define claramente la forma, tamaño y situación, y puede identificar objetos enterrados tales como cimientos, paredes, hornos de alfarería y caminos. Algunos de los edificios enterrados son suficientemente grandes como para haber sido templos.

MAÑANA, EN ESTE MISMO ESPACIO, EN LA COLUMNA "ASI PROGRESA EL MUNDO": EL ORBITADOR LUNAR II

N-D

DA ISTITUIRE

Antiquarium di Sibari

Un « antiquarium », capace di accogliere i manufatti rinvenuti nella area della Sibaritide, dovrebbe sorgere, fra non molto, nella zona della Piana.

Ne ha dato notizia il Ministro della Pubblica Istruzione nella risposta ad una interrogazione dell'on. Salvatore Foderaro.

Il parlamentare calabrese aveva interrogato il Ministro della Pubblica Istruzione « per conoscere se, ed in quale misura, siano previsti per il prossimo esercizio finanziario adeguati stanziamenti per la prosecuzione degli scavi archeologici nella Piana di Sibari, finora condotti con mezzi non troppo adeguati e con evidente leggerezza, dovuta proprio alla scarsità dei mezzi finanziari posti a disposizione della competente sovrindentenza ».

All'interrogazione dell'on. Foderaro il Ministro Gui ha risposto nei seguenti termini:

« La prosecuzione degli scavi archeologici nella zona di Siba non dipende dalla disponibilità di fondi, bensì dalla possibilità materiale di effettuare gli scavi stessi; e ciò in quanto, dopo la campagna di scavi del 1962, le acque del Crati, infiltrandosi per largo raggio, hanno ricoperto interamente lo spesso strato archeologico dell'antico centro urbano.

« La Cassa per il Mezzogiorno — è detto ancora nella risposta del Ministro Gui — ha, invero, stanziato per gli scavi una somma di cento milioni di lire, ma non ha consentito che parte di tale somma fosse distratta per i lavori di contenimento delle acque.

La soprindentenza alle Antichità si sta, peraltro, adoperando al fine di ottenere che altri Enti e Comitati locali intervengano per superare l'ostacolo e per rendere concretamente possibili altre proficue campagne di scavo. Si aggiunge infine — conclude nella sua risposta il Ministro Gui — che è in progettazione la costruzione sul posto di un « antiquarium » capace di accogliere i manufatti rinvenuti nella piana di Sibari ».

Send me MONTE MORE literature, etc. Thank you very much,

Robert A. Geiger
1456 N. Farwell #3
Milwaukee, Wis. 53202

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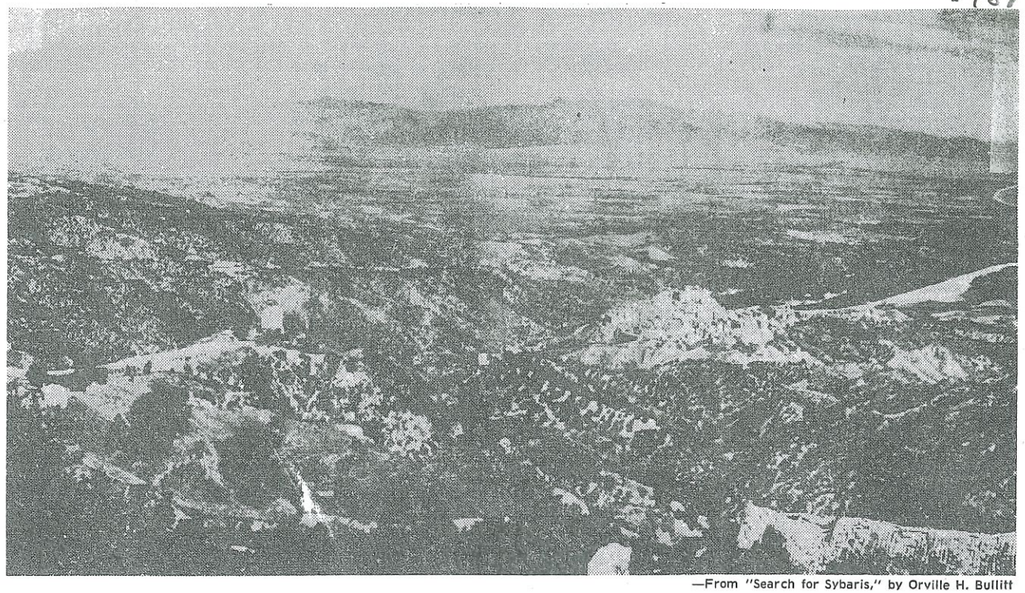
THE MILWAUKEE JOURNAL Part 1, Page 18 Wednesday, September 3, 1969



—From "Search for Sybaris," by Orville H. Bullitt

This area in southern Italy was the site of ancient Sybaris

An Old 'Fun City' Comes to Light

Italy's Sybaris Lasted Only 200 Years, but Its Reputation Has Endured, d After Long Search, Archeologists Have Uncovered Its Site

A NINETY year search for a lost city was finally rewarded last year when a team of American archeologists, after 10 years of patient probing, trilling and digging, found the ite of Sybaris in southern Ita-y. Orville H. Bullitt, a wealthy hiladelphian who helped to nspire and finance the project, ells about it in a new book, Search for Sybaris" (Lippinott), in which he skillfully lends the legends and history f an ancient city with the rilling account of a modern rcheological adventure.

Though Sybaris existed for nly 200 years between its unding in 720 B.C. and its deruction in 510, it established unique reputation in the anent world and bequeathed a ord to all later languages. To ll anyone a Sybarite is to acse him of being excessively ldicted to the pleasures of e flesh. Some 80 ancient aurs from Herodotus through ristophanes to Athenaeus, no lived in the early Chrisn era, told stories about the fined ways in which the inbitants of Sybaris catered to eir bodies.

Sight of Work Was Fatiguing

All their physical labor was performed by slaves. The very sight of men exerting themselves fatigued them. Carpenters and smiths and others whose work was noisy were forbidden to practice their crafts within the city. One Sybarite who visited Sparta was appalled by the rigorous life there. He thought he knew why Spartans faced death with equanimity, since they had so little to live for. Another citizen took 1,000 slaves and a number of cooks with him when he wooed the daughter of Cleisthenes of Sicyon. Her other suitors did not have a chance.

The gourmets of their age, they regarded exotic foods so highly that they awarded crowns to their best cooks. A chef who invented a good dish would be given exclusive rights to it for a year, probably the earliest recorded example of a patent. As they were the first to invite women to their banquets, they passed a law that invitations should be issued a year in advance to enable women to prepare dresses and adornments in keeping with the occasion.

Sybarites dressed in clothes made from a special imported wool and affected costly sashes to set themselves off from lesser neighbors who wore "nonsash tunics." Even boys wore purple and had their hair tied in braids secured by golden ornaments. Aristotle reports that a Sybarite named Alcisthenes owned a robe of such precious stuff that Dionysius later sold it for 120 talents (more than half a million dollars).

They installed sauna baths in their mansions and invented the chamber pot, which they carried with them to their drinking parties. One of their patricians complained of having slept poorly because his slaves had crumpled some of the rose petals which served as his mattress. Maltese puppies were favorite playthings in Sybaris, and horses were trained to dance like Viennese Lippizaners to the tunes of a flute.

Right Place, Right Time

This voluptuous life was made possible by the city's position as a warehouse for the flourishing trade between the Etruscan west and the Grecian east. The latter supplied wool, dyes and luxury items in exchange for Etruscan grain, iron (mined on Elba) and wine. Traders found it more profitable to unload their goods at Sybaris in the arch of the Italian boot and have them transported 40 miles overland to west Italian ports than to make the

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arrest. In this crisis Croton's most eminent citizen, the philosopher Pythagoras, urged mediation. An embassy of 30 was accordingly sent to Sybaris, but Telys had them murdered and thrown over the walls.

Horses' Dance Proved Fatal

In the ensuing war, the Sybarites were defeated by a clever ruse. One of their citizens, in revenge for an insult, revealed the dance tune of the horses to Croton pipers, who played it lustily just as Sybarite archers were about to discharge their arrows. The horses began their capers and not only threw the cavalry into confusion but danced into the line of the infantry. The Sybarites literally danced to defeat. They were slaughtered, and their city, after a 70 day siege, was so thoroughly sacked and burned that it disappeared from history in a day. Years later, when Herodotus and other Athenians established the new colony of Thurii near the site, they found nothing but the ruins of what had been the proudest of Greek communities.

According to old accounts Sybaris lay between two rivers, the Crati and the Sybaris. Today one of these streams flows into the other three miles from the seashore. In the course of 2,500 years so much soil has been washed down the mountains which rise 20 miles to the north that the site of the ancient city and the courses of the old rivers were silted over with 20 feet of rich alluvial deposit.

Until World War II, the region remained a forgotten part of Italy because it was infested with malaria bearing mosquitoes. All attempts at farming or archeological digs proved abortive until the American army cleared the area of pests and turned a neglected region into a fertile valley. Grain and oranges have become profitable crops, and as many as seven crops of alfalfa can be harvested in a year. The cattle of the area look very much like the sleek, horned beasts depicted on Grecian urns.

Magnetometer Detects Artifacts

To this gardenland about 10 years ago came Orville Bullitt and two American archeologists, Dr. Froelich Rainey, head of the University of Pennsylvania museum, and an assistant, Dr. Elizabeth Ralph, who had developed a "thermoluminescence" technique more accurate than the carbon 14 method of dating pottery, and who in the course of the search invented a magnetometer, or electronic device, that can spot the presence of masonry and shards as far as 20 feet beneath the surface. They were joined by two Italian archeologists and received substantial aid from an influential local farmer, Enrico Mueller.

There existed no clues as to the whereabouts of the buried city. The searchers eventually probed an area covering 100 square miles with magnetometers and high speed drills. Excavations in most places were impossible because the water level often rises to within six feet of the surface. All operations also had to be suspended once the rainy season began in November. It took the better part of a decade before the exact site of Sybaris was drill-pointed. Sample diggings proved the presence of stone structures in the sea of mud.

It now remains to be seen whether the Italian government will provide enough money to finance the engineering feat that could resurrect the ancient metropolis from its watery grave. In the meanwhile the searchers have felt amply rewarded not only in providing future archeologists with the magnetometer, but in discovering the reality of a city which "has become a legend, a moral lesson, a symbol, and a useful word in the English language."

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Sybaris is in the arch of the Italian "boot"

MR. LININGTON

University of Pennsylvania
NEWS BUREAU
201 S. 34th st., Philadelphia 4, Pa.
(EVergreen 6-0100, Ext. 8181-8182)

For release:
Sunday, September 25, 1960

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 archaeologists 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

(more)

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 University of Pennsylvania Museum. The funds are being used to develop new techniques in archaeological research.

NEW YORK TIMES, SUNDAY, NOV. 12, 1961

NEW INSTRUMENTS AID ARCHAEOLOGY

Electronic Devices Said to Revolutionize Exploring

By WILLIAM G. WEART
Special to The New York Times.

PHILADELPHIA, Nov. 11 — The techniques of archaeological exploration may be revolutionized by new electronic instruments that were used successfully underground during recent field tests in Italy.

Officials at the University of Pennsylvania Museum made that prediction tonight in reporting the results of the experiments made by Italian and American scientists at Tarquinia and Cervetri in Tuscany, and on the plains of Sybaris in Calabria.

Three types of instruments were used in the tests, a combined undertaking of the University of Pennsylvania Museum and the Lerici Foundation in Rome.

They include an electronic instrument that measures the electrical conduction of the surface soil, a Proton-Magnetometer developed at Oxford University to measure slight changes in the magnetic intensity of the surface soil and seismic instruments of the type used for oil prospecting and other commercial operations.

Dr. Froelich G. Rainey, director of the university museum, said the experiments, which he supervised, had shown that the electronic instruments "can greatly expand the scope and scale of archaeological exploration."

Sonic Device Studied

In addition, he said, the museum is working on a new sonic device that promises to be even more effective than the instruments tested in Italy. The new device is expected to be raedy for testing next spring.

"The research in Italy during the past few weeks has convinced us," Dr. Rainey reported, "that the introduction of new atomic and electronic instruments in archaeology will make possible the discovery of ancient sites and ancient remains which are practically impossible to discover by other means.

"In our work at Tarquinia and Cervetri," he said, "we learned that the Proton-Magnetometer could locate Etruscan tombs cut into the rock much more rapidly than the resistance equipment."

"At the end of a month of experimentation at these sites we were locating about five tombs each day," he went on. "A few contained rich deposits of Etruscan objects but the great majority had been looted during the past 2,000 years.

"We also found," he continued, "that the Proton-Magnetometer could locate varied structures such as walls and ruined buildings, and this much more rapidly than the resistance equipment."

The experiments also showed, Dr. Rainey said, that seismic instruments of the commercial type produced in this country could be used to locate buried tombs, stone walls and the like, but "less effectively than the other two types of instruments."

The Italian-American testing crew used special drilling equipment, including some that had been designed for drilling holes on the moon, and a special periscope. The periscope made it possible to look into buried tombs and buildings located by the instruments, to determine whether excavation was warranted.

While searching for the ruins of ancient Sybaris, a Greek city destroyed in the sixth century before Christ, the archaeologists were able to trace in ten days, for a distance of 800 meters, a buried stone wall on the plain of Sybaris near the Crati River. They used a Proton-Magnetometer.

"The nature and purpose of this structure is still a mystery," Dr. Rainey said. "But we have demonstrated that with these instruments we can carry on large-scale archeological exploration without extensive excavation and thus it now seems practical to search out the ruins of Sybaris although it might lie anywhere in a region of several square miles."

MAYORAL RECOUNT

DOPO MILLENNI

IL MISTERO DI SIBARI STA PER ESSERE SVELATO

I protoni di un magnetometro, scrutando il sottosuolo della piana del Crati, hanno « avvertito » un muro di oltre un migliaio di metri

Piana di Sibari, giugno.

Tutti i moderni mezzi della ricerca geofisica del sottosuolo sono stati messi in azione alla ricerca di Sibari. Onde elettromagnetiche percorrono il terreno torboso della pianura del Crati e cercano di scuotere dal letargo la sommersa città.

Se non basteranno le onde elettromagnetiche, si ricorrerà alle onde sismiche e soniche. Dove quelle onde incontrano una resistenza nel terreno si sollevano, si corrugano, s'increspano e in quegli urti, sollevamenti e increspature, registrati in diagrammi e profili, e che in un terreno alluvionale senza giacimenti e vene rocciose, corrispondono ad altrettanti muri e manufatti antichi, interviene la sonda a perforare e a scrutare come il bisturi del chirurgo dopo l'esame radiografico.

Ero stato due anni fa a diguazzare nella mota della piana del Crati; mi ero affacciato alle prode della morta gora del « Parco del Cavallo » aperta nel 1932 dallo scavo di Zanotti Bianco e, sotto il denso velo delle muffe, m'era riuscito appena di vedere affiorare il collo di una colonna di quel misterioso edificio affondato nelle acque.

Oggi mi trovo in una giornata rutilante di sole senza ombre all'intorno, sopra un viottolo erboso segnato da una siepe bassa di tamerici, fra pulsare di pompe, tonfi della secchia di una scavatrice meccanica, sussulto di una sonda, paletti di segnalazione ad ogni passo, rivoli di acqua e di fango e operatori con i loro apparecchi, che i tecnici preferiscono chiamare apparecchiature forse per dare un senso più pregnante e dinamico alla loro attività. Strumenti confezionati e calibrati dai laboratori della Fondazione Lerici del Politecnico di Milano e dai centri sperimentali delle Università di Filadelfia e di Oxford e tuttora in via di esperimento e di perfezionamento. Strumento sovrano il magnetometro a protoni che utilizza le proprietà del protone dell'atomo dell'idrogeno per la registrazione delle anomalie che si determinano nel campo magnetico, anomalie prodotte dalla presenza di muri nel sottosuolo fino alla massima profondità a cui si può presumere che debba giungere lo strato archeologico della Sibari arcaica. E' il *radar* dell'archeologia di Sibari racchiuso in una cassetta portatile di facile e rapido funzionamento; ne è entusiasta Brancaleone, il bravo operatore di Lerici, passato dalla sonda fotografica delle tombe di Tarquinia alle anomalie magnetiche della valle del Crati.

L'ultima tragedia

A capo di questa missione sperimentale geofisica è il professor Rainey del museo dell'università di Pennsylvania, il primo a curvarsi sul terreno per togliere e sciacquare nell'acqua torbida d'un secchio i frammenti dei cocci rimasti impegolati o incapsulati nella spirale o nella « carota » d'una sonda, felice quando, dopo il consueto cocciame ellenistico, riesce a riconoscere negli strati inferiori, a 5 o 6 metri, un frammento di ceramica del VI secolo della Sibari arcaica.

L'anomalia, ossia il manufatto più importante che sia stato finora segnalato dalle prime ricerche del Lerici e dalle successive del Rainey, è la presenza di un lungo muro che, inseguito aggredito bombardato dai protoni del magnetometro, corre quasi ininterrottamente per oltre un migliaio di metri; quando con la scavatrice e le pompe se n'è messo in luce a fatica un piccolo tratto è apparso un muro tardo romano poggiato su un muro più antico a blocchi squadrati addossati l'uno e l'altro a un terrapieno. Non era un muro di cinta della Colonia romana di Copia (alle sue spalle gli strumenti segnalano altri numerosi muri di abitato a eguale o maggiore profondità); era invece un muro di argine contro il pericolo di alluvioni che venivano dal vecchio corso del Sibaris, il fiume più minaccioso della città greca ellenistica e romana. Quel muro pertanto nella sua rozzezza esprime l'ultima tragedia di Sibari; la città del VI secolo condannata dai crotoniati ad essere sommersa, rinata nel V e nel II secolo, continuò a combattere contro le acque fino all'estremo, fino a che anche Turi e Copia seguirono lo stesso destino di quella prima violenza.

Mentre tecnici e geofisici si accaniscono intorno al mistero più grave dell'archeologia meridionale, torno al « Parco del Cavallo » e, invece dello stagno verdastro e gracidante, la Soprintendenza di Reggio ha fatto il miracolo, con pale e pompe, di scoprire l'emiciclo romano in tutta la sua imponenza. E' indubbiamente un edificio pubblico della colonia romana di *Copia*, che ripete nella pianta le forme di uno di quegli edifici ellenistici destinati a sede del Consiglio della città (*bulieuterion*) e successivamente a Curia o Basilica romana; doveva essere pertanto collegato al centro della città romana: al Foro.

Il re del piano

E, dopo fango e sole, ripercorro la fattoria delle « Caselle », un'azienda modello della rinascita agraria di Sibari, con strade alberate di pioppi e cipressi come un parco, case coloniche, silos, stalle, magazzini e incontro, in una radura, un gruppo di buoi alla stanga. E' il bue sibarita possente e massiccio, con la sua groppa poderosa, la pesante giogaia, le grandi corna, la lunga coda a fiocco che trascina e agita contro le mosche e i tafani. E' il bue delle monete incise di Sibari; nè dèi, nè attributi divini impressero i Sibariti sulla moneta della loro ricchezza, ma il bue aratore. Ed eccolo ancora vivo sulla terra di Sibari. Vive tutto l'anno all'aperto e lascia il lusso delle stalle alle mucche pezzate di gran razza che figliano e danno latte; esso si accoscia e si adagia lento e grave sul terreno. E, a dispetto dei trattori e dei camion che gli ronfano attorno, resta il dominatore della pianura.

Amedeo Maiuri

CORRIERE DELLA SERA Tuesday, 12, 62

TRA LA MELMA REMOTA E RECENTE DELLA PIANA DEL CRATI

Un magnetometro a protoni ricerca le vestigia sommerse dell'arcaica Sibari

SIBARI, giugno

Un sole accecante sovrasta, inesorabile, la motosa e deserta piana del Crati e non c'è refrigerio nè rifugio d'ombra per nessuno: per i tecnici che lavorano a torso nudo a scandagliare la terra, per le greggi che scivolano lontano scorrendo sulle immense pianure in cerca d'erbe, per i contadini e per i pastori che si riparano con grandi fazzoletti bianchi intrisi d'acqua sulla testa a mo' di cappuccio.

A Sibari si cerca di localizzare, oggi con onde elettromagnetiche, domani forse con onde sismiche o soniche l'antica città sepolta nell'acqua dai crotoniati che, come si sa l'allagarono e la sommersero nel VI secolo distruggendo una lunga parte dell'argine (lungo 12 chilometri e già rinvenuto) che era stato eretto dai sibariti per infrenare le acque alluvionali del minaccioso fiume Sibaris che poi fu adoperato nuovamente nel II secolo dagli stessi crotoniati per allagare e sommergere le colonie romane di Turi e di Copia.

Dell'antica incantevole città, dunque, fino ad oggi non è stato rintracciato quasi nulla: giusto il lunghissimo muraglione arginale del fiume che si credette in un primo momento fosse un muro di cinta perimetrale della colonia di Copia, e poi qualche colonna ed il disegno emicircolare di un misterioso edificio ellenistico che poteva essere (in periodo greco) la sede del consiglio di città, o (in periodo romano) una Curia o una Basilica.

Questo secondo ritrovamento risale al 1932, agli scavi del «Parco del cavallo» fatti eseguire da Zanotti Bianco.

Oggi i tecnici sono tornati, dunque, nella piana di Sibari con i loro strumenti di sondaggio fotografico ed elettromagnetico approntati dalla Fondazione Lerici e soprattutto con uno strumento nuovo e miracoloso: il magnetometro a protoni che, attraverso la utilizzazione, appunto, del protone dell'atomo dell'idrogeno riesce a registrare le anomalie, provocate dalla presenza di muri a grandissima profondità, che si determinano nel campo magnetico.

L'antica Sibari dovrebbe trovarsi a profondità assai notevoli nella gora di fango e di terra che i millenni vi hanno aggiunto, stratificandola, dopo l'alluvione e la sommersione provocata dagli eterni e rozzi nemici della città più squisita della magna graecia, i crotoniati.

Qualche successo è stato già ottenuto in questa attenta e scrupolosa investigazione sotterranea: vestigia di mura oltre quello lungo circa dodicimila metri e che certamente costituiva una diga a difesa dalle piene del Sibaris incombente; vestigia di mura che dovrebbero essere quelle periferiche settentrionali della città e che dovrebbero essere collegate, alla zona già parzialmente rinvenuta del *bulenterion* che evidentemente prelude al forum.

Accanto ai sondaggi per onde elettromagnetiche, i quali servono, come è logico, a fornire delimitazioni di massima sulle quali penetreranno quindi la sonda fotografica e la trivella e poi il piccone, si continuano tuttavia gli scavi archeologici veri e propri con i mezzi e con i sistemi tradizionali e questi scavi hanno fornito indicazioni anch'esse utili alla individuazione della zona della città sibarita. Nelle spirali della sonda infatti sono rimasti incapsulati dei frammenti di ceramica ellenistica provenienti da stratificazioni inferiori ai 7-8 metri di profondità sotto il suolo perforato

Il professor Rainey, del museo universitario della Pennsylvania, che conduce e dirige queste esplorazioni del sottosuolo nella piana del Crati esamina con estrema cura ed attenzione questi frammenti e li classifica, li cataloga e attraverso di essi puntualizza alcuni riferimenti di riporto sulla grande carta «topografica» sotterranea che minuziosamente sta ricostruendo.

Ora, dunque, accanto al lavoro di esplorazione effettuato con il magnetometro, a quello di sondaggio effettuato con le trivelle a «carota» si sta svolgendo il lavoro di individuazione e di scopertura dei manufatti già identificati e «sentiti» attraverso le anomalie segnalate dai campi magnetici. Questo lavoro di individuazione si rivolge alla scopertura di un altro muro che, aggredito dalla escavatrice e messo a nudo in una sua minima parte, ancora, appare come un manufatto romano del periodo più tardo, poggiato, però, su un altro muro di più antica fattura costituito di grossi blocchi di pietra squadrata, addossati l'uno sull'altro a ridosso di un terrapieno. Certamente, si considera, esso è un'altra parte di quell'enorme argine contro il fiume costruito in un primo tempo dai sibariti certamente in periodo anteriore al VI secolo e ricostruito ancora nel IV secolo da un'altra generazione di sibariti quando la città rinacque, e ancora accresciuto dai copiensi nel II secolo prima della nuova tragedia della sommersione di Copia e di Turi.

C'è dunque speranza che la arcaica Sibari, finalmente, venga individuata in maniera definitiva e venga riportata alla luce: sarebbe questo, anzi sarà, l'evento archeologico forse più importante del secolo dato lo splendore leggendario che le storie riferiscono della Sibari magica la quale, si rammenta, malgrado le interpretazioni e le deformazioni della sua civiltà, adorava la Forza del lavoro come un miracolo perennemente foriero di opulenza e di ricchezza pagana: il bue enorme e massiccio delle sue monete, curvo sotto la giogaia, intento a spaccare, con l'aratro, il solco sulla terra per le feconde seminagioni.

Silvestro Prestifilippo

IL MATTINO 25 Giugno 1962

ARCHÆOLOGICAL SECTION NO. 2115.

ENGINEERING DEVICES USED IN THE EXCAVATION OF THE LOST CITY OF SYBARIS: DISCOVERIES BY A JOINT U.S.-ITALIAN EXPEDITION—PART 2.

By Professor ***FROELICH RAINEY****, University Museum, University of Pennsylvania.*

THE precise location of ancient Sybaris, of course, requires much more than surveys of the land surface with electronic instruments. There is, as yet, no way of knowing what an " anomaly " below the surface actually represents unless you can feel or see it. To prove an anomaly recorded by the instruments, and to " feel " it in a literal sense, we borrowed an instrument from the tomb robbers of Etruria, an instrument which may well have been invented by the ancient Romans who first looted the Etruscan tombs. This is a thin metal rod, made in sections, which can be screwed together and capped with a T-shaped section. We found that in the water-saturated sands and clays of the Sybaris plain such a probe could be driven down by hand to depths of seven or eight metres in a very few minutes. When the point of the probe strikes stone or other hard material there is a perceptible " clank " and one can " feel " its relative hardness. It was this simple and effective tool which made it possible to confirm the exact location of the " long wall " in 1962. The " Spilo " crew followed on the heels of the proton-magnetometer crew to probe each anomaly and to determine its precise depth. Both instruments were so effective that in a few days in April 1962 we extended our location of the " long wall " from 800 to 1350 metres.

But in archæology it is eventually necessary to *see* as well as to *feel* what you are looking for and there is no substitute for excavation. Donald Brown had demonstrated what could be done with drills some ten years ago. Therefore when he joined the Museum group in April 1962 (he is now at Harvard University) we renewed the drilling system but with a new technique devised by him. An auger drill powered with a portable gasoline engine was screwed into the ground (at first to six and later to eight metres) and then lifted without rotation by means of a chain hoist fastened to a steel tripod set above the drill shaft. When the drill shaft was pulled out of the ground in this way earth was packed solid between the flanges of the drill shaft. In this earth was debris from the subterranean deposits and usually fragments of pottery large enough to be identified. These fragments, when removed from the drill shaft and placed upon a measured plank beside the shaft, gave us a stratigraphic record in metres of the different occupation levels. Again we confirmed the basic stratification of potsherds on the plain in a large area about the Roman ruins at the Parco di Cavallo: an upper, Roman, level, a median 4th-century B.C. Greek level, and the lowest 6th-century B.C. (archaic) Greek level. (Fig. 1.)

In May, Mr. Lerici arranged with the Polytechnic Institute in Milan to send us a jeep-mounted power-driven drill which is used for commercial geophysical prospecting. This has a soil-sampling device to remove columns of soil from specific measured depths. At Sybaris, however, the consistency of clays and sands is such that the sampling device is very time-consuming. When this was discovered, Franco Brancaleoni, an engineer from the Lerici Foundation, devised a technique to collect stratified samples without the soil-sampler. The water from a tank-truck which is pumped into the drill hole as it is being cut flushes out potsherds and other cultural debris. Thus with precise timing and observation of drill depth, potsherds could be caught at the drill hole, metre by metre, as the drill penetrated the deposit. The method was so successful and so rapid that Brancaleoni and Peppe, the drill-master, were able to drill just over 400 holes in a month. Marjolein de Vos worked out a neat system of recording and labelling all potsherds from these drillings so that we now have a record of pottery stratification on a section of the plain both north and south of the Crati. (Fig. 6.)

Meanwhile, in April, Professor Foti, Superintendent of Antiquities in Calabria, renewed excavations of the Roman ruins at Parco di Cavallo and it was clear to all of us by that time that the best chance of reaching the six metre level of Archaic pottery was in a sounding below the Roman structure. The Roman walls would act as a kind of caisson to hold back the saturated and fluid clays and sands, a great advantage in the very difficult problem of excavating below the water-level in fluid soils. The disadvantage lay in the fact that only a small sounding could be made without destroying a significant part of an important Roman structure. Nevertheless Santo Tiné and Orio Miggiano of the Antiquities Department did manage to reach the six-metre level in May, after great difficulties with the flow of ground water, and found without doubt that 4th century and 6th century remains lay below the Roman level.

FIG. 1. A CLOSE-UP VIEW OF THE MECHANICAL DRILL USED TO ASSIST IN THE RECOVERY OF SMALL PIECES OF POTTERY, LIKE THOSE SEEN LAID OUT ON THE LEFT. THIS METHOD, AS IT WERE, SAMPLES THE STRATA.

A few days later the same level was reached in a sounding on the south side of the " long wall." This cut exposed the same stratification of remains. The Roman wall at that point was found to rest upon a 4th century B.C. Greek wall constructed of large limestone blocks. We assume that the whole 1350 metres of the long Roman wall so far located, paralleling the Crati, was built upon at least the lower courses of a Greek structure, since we have two soundings along the wall excavated to this depth. Archaic (6th century) pottery was again found below Greek structures of the 4th century.

The usual procedure of excavating a stratigraphic pit, or making a sounding, which is elementary in archæological exploration, turned out to be an impossible operation on the Sybaris plain. Without Roman structures in the upper levels to hold back the fluid clays and sands, the walls of a test pit simply flowed into the cut, and excavating with shovels by hand, below two or three metres, was wholly impractical—no ledge or step on which to shovel the earth would stand. Moreover, even the best of pumps could not exhaust all of the water and workmen were naturally unable to shovel mud from below the water level. In the fall of 1961 Enrico Mueller tried to solve this problem with a clam-shell mechanical excavator from his farm. Since we could not exhaust all of the water with pumps, and since the diameter of the cut was necessarily expanded enormously for each metre of increased depth, that excavating machine could reach a depth of no more than four metres. In 1962, therefore, we employed a much larger excavator (a drag-line type) which theoretically could reach a depth of at least eight metres. But in two months of work with this machine, in four different soundings, we were able to reach a depth of no more than seven metres. At about six metres in all cuts we reached coarse, water-laden sand lying below a dense clay stratum, and to excavate in this sand was much the same as attempting to dig a hole in coarse sand at the edge of the sea. It flowed in as fast as it was removed. Moreover, once the excavator broke through the dense clays at about six metres it invariably opened up a " surgente " or spring which burst forth like a broken water-main. The first encounter with a " surgente " swamped our pumps and the excavator. Later we learned that by concentrating two or three large gasoline or electric pumps in one cut and by pumping night and day for several days we could materially reduce the flow of the " surgente " and stabilise the walls of the cut. That is, if the walls of the cut remained dry for some days they became consolidated and would stand without sliding into the cut. But when the pumps failed and the excavation was flooded, the walls would again slip into the hole.

It soon became obvious that to do a systematic stratigraphic cut under such circumstances we must establish a deep sump and then excavate away from the sump allowing the water to drain into it so that it could be pumped from this sump into the irrigation ditches on the surface leaving a relatively dry cut in which to work. Such a sump was excavated to about seven metres in depth just south of the " long wall " and we then excavated a long trench north of the wall to a deep anomaly (stone structures) discovered with instruments and drills on the north side. It was arranged so that water flowed down the trench and under the Greek wall at the base of the Roman wall. This nice scheme, however, was upset when the excavator struck cross-walls in the trench at a depth of no more than five metres. Because we did not wish to tear out these walls, the trench never reached a sufficient depth to drain completely the big stone structures lying more than five metres deep to the north of the wall. Thus the lowest levels were again with difficulty removed from below water.

However, in spite of these troubles, we did manage to complete two stratigraphic cuts by hand north and south of the wall to a depth of about seven metres. That south of the wall at the edge of the sump gave Ellen Kohler and Orio Miggiano the best opportunity to determine the specific layers of soils, clays, and sands, and to make a detailed analysis of potsherds associated with the different strata. Essentially, these two cuts duplicated the conditions at the Parco di Cavallo. Below the level of Roman remains, between approximately four and six metres in depth, were stone structures and pottery of the later Greek settlement known as Thurii (*i.e.* late 5th and early 4th century B.C.). These remains lay in compact clay and a typical " occupation level." We will all [*Continued opposite.*

THE IRISH FAMINE.

*"THE GREAT FAMINE" By Cecil Woodham-Smith**

An Appreciation by SIR CHARLES PETRIE.

THERE have been three great breaks in the continuity of Irish history, namely the Flight of the Earls at the beginning of the 17th century and the Treaty of Limerick at the end of it, and the Famine, but the last was probably the most far-reaching of all, for it was then that the old Celtic civilisation received a blow from which it was never to recover. In these circumstances a great debt of gratitude is due to Mrs. Woodham-Smith for this masterly and erudite, yet eminently readable, study of a catastrophe which, outside Ireland, has never received the attention it deserves, but of which the consequences are still with us in the bitter memories of their ancestors' sufferings which to this day animate no inconsiderable proportion of the population of the United States. For the rest, Irish history has a tendency to become bedevilled with Irish politics, and the author's objective approach to her subject is therefore the more refreshing.

The first impression created by a perusal of these pages is the easy-going incompetence of those concerned with the alleviation of suffering. It is true that had the English statesmen of an earlier day paid the slightest attention to Irish social and economic conditions, the Famine need never have taken place at all, but when their successors were confronted with it their inadequacy would be incredible were it not fully documented. The British Government's conceptions of its duty were always subservient to the rigid rules of what was regarded as scientific economics, and when faced with a whole people dying of starvation, ministers expatiated in all sincerity on the danger of interfering with private enterprise, whether in the distribution of food or the improvement of agriculture: the result was that destitute persons starved to death within sight of the Government depots, while public funds were wasted on the making of superfluous roads and the levelling of innocuous hills. On the other hand, as the author well puts it, "whatever parsimony and callousness the British Government displayed towards Ireland, was paralleled seven years later by the treatment of their own soldiers which brought about the destruction of the British Army in the Crimea."

Indeed, it is no exaggeration to say that from 1846 to 1855 there was no real Government in Great Britain at all. The Offices of State were held by ill-assorted combinations of "old-gangers" of various shades of opinion, and through the fog of contemporary politics one chiefly discerns the futile figure of Lord John Russell, at one moment forming ministries and at the next wrecking them from mere peevishness. It was indeed a tragedy for Ireland that the Famine should have occurred when such a state of affairs prevailed in Whitehall and at Westminster, but even so it almost passes belief that British ministers did not cross the narrow strip of water separating the two countries in order to find out for themselves what was taking place. Half-an-hour in Ballina workhouse would have taught them more than all the reports they received from the Castle in Dublin.

On Mrs. Woodham-Smith's showing, the Irish landlords behaved very badly in the crisis. There was, for instance, Mrs. Gerrard of Ballinglass, County Galway, who during the Famine had three hundred tenants evicted with the assistance of police and troops, in order that their holdings might be turned into a grazing farm. These people, it may be added, were not in arrear with their rent, and they had actually reclaimed an area of about four hundred acres from a neighbouring bog by their own efforts.

The people were officially called on to give up possession, and the houses were then demolished—roofs torn off, walls thrown down. The scene was frightful; women running wailing with pieces of their property and clinging to door-posts from which they had to be forcibly torn; men cursing, children screaming with fright. That night the people slept in the ruins; next day they were driven out, the foundations of the houses were torn up and razed, and no neighbour was allowed to take them in.

Of course there were landlords who did everything in their power to aid their distressed tenants, but it is to be feared that Mrs. Gerrard was typical, not exceptional. It was notorious that, for the Irish tenant, who in any case had no security of tenure, failure to pay his rent meant eviction. Yet even in the emergency of the Famine no protection, no period of grace, was given him; he was left to the mercy of his landlord, and as a Commissariat officer wrote from Sligo, "The first object of the landlords will be to collect rents." It is small wonder that the British soldiers became disaffected as a result of the duties forced upon them in connection with the evictions, or that Fenianism and the Land War were just round the corner.

Readers of Bernard Shaw's *Man and Superman* will remember the lines;

Malone: "My father died of starvation in Ireland in the Black '47. Maybe you've heard of it?"

Violet: "The Famine?"

Malone (with smouldering passion): "No, the starvation. When a country is full of food, and exporting it, there can be no famine."

This is a common point of view in Ireland, but it is not held by the author. It is her opinion that if all the food had been kept in the country, and home-grown grain and provisions been on sale; had private enterprise succeeded in functioning and supplies of cheap food been freely available; the Irish people would have been little better off. They were penniless, and even if the food had been abundant they could not have bought it: any money they had went to the landlord for rent.

THE AUTHOR OF THE BOOK REVIEWED ON THIS PAGE: MRS. CECIL WOODHAM-SMITH.
Mrs. Woodham-Smith has written two other accounts of the 19th century, "Florence Nightingale" and "The Reason Why"; the first was a biography of the "angel of the Crimea," and the second dealt with the Crimean War. In the latter, Mrs. Woodham-Smith touched on the intolerable conditions prevailing in Ireland, and in this, her latest book, she deals with the subject comprehensively. Nine years of research in North America, Ireland and in this country have gone into the preparation of this volume, an appreciation of which, by Sir Charles Petrie, appears on this page.

FROM *THE ILLUSTRATED LONDON NEWS* OF DECEMBER 16, 1848: AN EXAMPLE OF THE "WHOLESALE EVICTIONS" WHICH WERE ALL TOO PREVALENT IN IRELAND. "NO HOPE IS FELT THAT AN END WILL SOON BE PUT TO THIS STATE OF WRETCHEDNESS."

"AN EVENT OF NO UNUSUAL OCCURRENCE" DURING THE FAMINE IN IRELAND: THE GHASTLY CONDITIONS UNDER WHICH A MILLION AND A HALF DIED OF HUNGER, DISEASE AND NEGLECT.
An account of a funeral at Skibbereen, accompanied by the above illustration, appeared in *The Illustrated London News*, January 30, 1847. Dr. Crowley of Skibbereen wrote. "Deaths here are daily increasing. Dr. Donovan and I are returning from the village of South Reen, where we had to bury a body ourselves that was eleven days dead; and where do you think? In a kitchen garden. We had to dig the ground, or rather the hole ourselves; no one would come near us, the smell was so intolerable. We are half dead from the work lately imposed upon us."
(Illustrations on this page, originally from "The Illustrated London News," are from "The Great Hunger," the book under review, published by Hamish Hamilton, Ltd.)

This common point of view in Ireland, but it is not held by the author. It is her opinion that if all the food had been kept in the country, and home-grown grain and provisions been on sale; had private enterprise succeeded in functioning and supplies of cheap food been freely available; the Irish people would have been little better off. They were penniless, and even if the food had been abundant they could not have bought it: any money they had went to the landlord for rent.

Mrs. Woodham-Smith is rightly extremely cautious in estimating the number of those who lost their lives in the Famine. The census of 1841 put the population of Ireland at something over eight million, but there is good reason to believe that this is an under-estimate, and that the figure should be nine: in 1851 it had dropped to six-and-a-half million. "Between 1846 and 1851," the author tells us, "nearly a million persons emigrated, and it therefore appears that, roughly, about a million and a half perished during the Famine, of hunger, diseases brought on by hunger, and fever."

The cultural loss was, in the long run, even greater than the material. George Petrie, writing in 1855, spoke of "the calamities which, in the year 1846-7, had struck down and well-nigh annihilated the Irish remnant of the great Celtic family," and nearly seventy years later Douglas Hyde, in due course to be President of Ireland, confirmed in retrospect Petrie's contemporary apprehensions. Before the Famine, Irish was the ordinary language of about four millions of the people, but after that it wilted away until only about three-quarters of a million, the bulk of whom were old people, knew anything about it. In Douglas Hyde's dramatic expression, "It just wilted off the face of Ireland," and with it vanished many a tradition which would to-day have linked the Irish people with their remote ancestors.

Finally, Mrs. Woodham-Smith has proved that she has the story of nineteenth-century Ireland so much at her finger-tips that it is to be hoped she will continue to work in that field where scholars with an objective outlook have in the past been extremely rare: the Fenian Movement, for example, would lend itself admirably to her treatment.

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* "The Great Hunger." by Cecil Woodham-Smith. Illustrated. (Hamish Hamilton Ltd.; 30s.)

FIG. 2. THE DRAG-LINE CLEARING THE 4TH-CENTURY GREEK STRUCTURE NORTH OF THE LONG WALL. ELECTRIC PUMPS ARE DRIVEN BY A GENERATOR IN THE TRUCK TRAILER.

Continued.] agree that the three soundings conclusively prove that we are on the site of Greek Thurii and Thurii-Copia, the succeeding Roman city. But the level below this is a coarse sand which, so far as we know now, contains no structures—only masses of 6th-century B.C. (Archaic) potsherds. Our drills indicate that the coarse sand extends to a depth of fifteen metres at least, and that potsherds are rarely found below eight metres.

Foundation walls of Greek Thurii found south of the " long wall " are bedded in dense clay and the lowest courses lie almost directly upon the coarse sands which underlie the plain of Sybaris. We do not know whether the sands are sea-deposited or river-deposited but at the present time the surface of these subterranean sands is about three metres below sea level. Hence it is obvious that the sea level has risen, or the land surface of the original plain has been depressed, since the founding of Greek Thurii.

Thanks to the proton-magnetometer it is now possible to say that there are many archaeological features such as walls, buildings, and dense deposits of pottery on both banks of the Crati river in an area of nine square kilometres lying about two kilometres from the present mouth of the river and extending at least five kilometres upstream. We do not as yet know the limits of such deposits. As the result of drilling (about five hundred holes) in the same area we know that fragments of pottery representing the three different periods are scattered over most of this region (limits also unknown), and that the coarse sand stratum everywhere underlies the actual occupation levels. But there are two very puzzling phenomena for which we have, as yet, no adequate explanation.

What is the function of the " long wall "? The south side of the upper (Roman) wall facing the present bed of the Crati river has a smooth well-finished surface suggesting that it was exposed and meant to be seen, while the north face, away from the river, is rough and unfinished, indicating that it was built against an earth fill and not meant to be seen. The lower, 4th-century Greek wall is well faced on both sides. After our first sounding on the north face we assumed that the wall was first built by the people of Thurii in the 4th or 5th century B.C. to protect their city from debris washed down on to the plain by a " torrente " toward the north or from the encroaching sea, and then increased or elevated at a later period by the Romans when the level of the plain continued to sink, in relation to the sea. But after the deep excavation north of the wall uncovered 4th and 5th-century Greek structures, it was apparent that the earlier Greek wall was built right through the Greek city of that period. Perhaps we will discover eventually that structures to the north of the wall are somewhat older and that at some period the people of Thurii found it necessary to abandon part of their city and to build the wall in order to protect the remainder. Certainly the wall is too narrow to be of use as a fortification.

The second puzzle is the apparently uniform layer of Archaic Greek pottery fragments lying in coarse sand below the clay and the ruins of Thurii. Because of this layer, Professor Foti is more confident than I that we have discovered the actual site of the original Sybaris. I find it difficult to believe that the city could have been built upon these sands or that nothing remains from the 6th century but a layer of potsherds. All of our ancient sources agree that the Crotonians destroyed Sybaris and then inundated the remains by directing the river over it in 510 B.C. But even so we would expect to find the foundation of buildings and a normal " living level " in the archaeological sense. For the present, the most plausible explanation would seem to be [*Continued overleaf.*

MECHANICAL PUMPS AND DRILLS TO ASSIST RECOVERY WORK AT SYBARIS.

FIG. 3. "THE SPILO," A THIN METAL ROD CAPPED WITH A T-SHAPED SECTION, BEING USED TO "FEEL" FOR BURIED WALLS IN SECTION B.

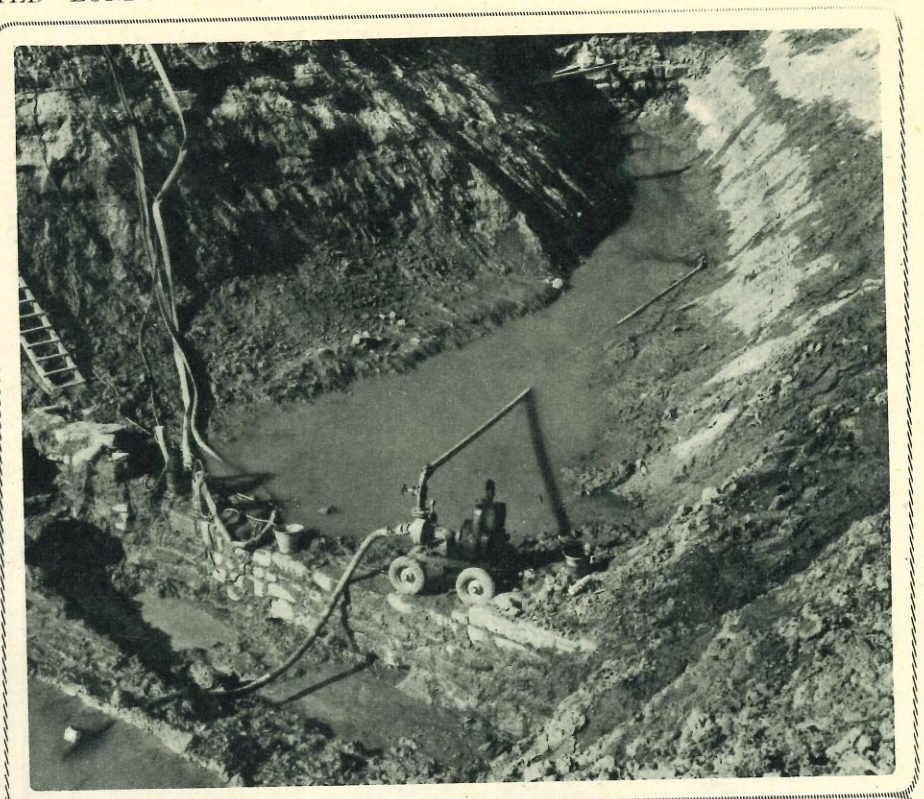


FIG. 4. ELECTRIC AND PETROL DRIVEN PUMPS HOLDING THE WATER AT THE SIX METRE LEVEL ON THE INNER FACE OF A 4TH-CENTURY GREEK WALL.

FIG. 5. THE AUGER DRILL AND TRIPOD AT LEFT AND THE JEEP-MOUNTED GEOPHYSICAL PROSPECTING DRILL AT RIGHT, WITH ITS TANK TRUCK FOR WATER SUPPLY.

FIG. 6. THE POWER-DRIVEN GEOPHYSICAL PROSPECTING DRILL, MOUNTED ON A JEEP, AND USED TO WASH POTSHERDS FROM DRILL HOLES AT SPECIFIC MEASURED DEPTHS.

Continued.] that we have found Archaic pottery from the original Sybaris re-deposited by the sea or by the rivers Crati and Coscile, or by one of the many "torrentes" which occasionally inundate the plain. One can now observe that the force of the "torrentes" is such that they transport even large boulders. If this is true then the original site should lie inland and upstream from the section of the plain which we have explored. Actually this opinion is strengthened by the fact that the last drill-borings in June, made about two kilometres upstream from the soundings along the "long wall," turned up Archaic sherds in the clays *above* the coarse sands and in a stratum which appears to be an actual living level. Moreover, so far as we can tell from the few borings at this point, there were few, if any, later Greek and Roman sherds above them.

Perhaps Diodorus Siculus is correct in his account of the founding of Thurii when he says that the city was moved to another site not far from Sybaris to be near a spring called "Thuria." Surely the masses of Sybaritic sherds found in our soundings and with the drills assure us that we are near the actual site of the city. I feel confident that we will eventually find it some small distance inland.

The actual excavation of Sybaris, once the exact site is found, will be an exceedingly difficult operation. It will be several metres under the ground water level and below sea level. Our difficulties in excavating even limited soundings to seven metres were much greater than anticipated. We now know that constant pumping of large volumes of water is necessary and that earth moving machinery will be essential. Enrico Mueller, who was primarily responsible for the pumps and excavating machinery used during the past season, has suggested the possibility of excavating a deep moat around the site or section to be dug, and of utilising a whole series of water pumps to exhaust the water from the moat and thus gradually drain the enclosed area. We hope that this method would then make it possible to excavate a section of the site with normal archaeological methods. If substantial ruins of Sybaris are found there can be little doubt that it will then be worth great effort and expense. The recent publication of Hellenic Art in Magna Graecia by Leonard von Matt and Umberto Zanotti-Bianco, illustrating the great works of Archaic Greek Art found at neighbouring and less sumptuous Greek city sites of that period, gives some indication of the extraordinarily beautiful archaic objects to be found at Sybaris—somewhere six metres below the present land surface.

For the moment we are interested in perfecting a technique for the discovery of archaeological sites lying deep below the fluvial deposits in river valleys, particularly near the sea, where we may expect to find the remains of some of the most important ancient settlements. The efficiency of the proton-magnetometer on the plain of Sybaris is most encouraging and demonstrates how the application of scientific techniques in archaeological survey make it possible to detect deposits which are beyond the reach of conventional methods. But Carlo Lerici and I believe that this application is only a beginning. Technical developments in the atomic and electronic fields are now proceeding at such a pace that we may expect to find many new techniques applicable to archaeology. The problem is to discover what is being developed in the laboratories of many nations, to adapt it for archaeological research, and to test it in the field. Our experience at Sybaris confirms that there really is a great difference between theory and practice.

The plain of Sybaris near the toe of Italy's "boot" where archeologists are seeking the ancient Grecian city.

Penn archeologists use new electric devices in their

SEARCH for SYBARIS

By HUGH SCOTT

SUNDAY TODAY
The Philadelphia Inquirer Magazine,
January 27, 1963

TO THE residents of ancient Sybaris, life was just a bowl of nectar. They toiled not, neither did their kin. Just watching a slave laboring in the fields gave one Sybarite a sharp pain in the side. Streets were covered to protect these early Grecians from the harsh southern Italian sun. Wine was piped down from hillside vineyards to irrigate the populace. Banquets were as common as servants, and, as an added touch of luxury, the horses of Sybaris were taught to dance to the music of flutes.

This last proved to be a dubious move. For when the neighboring Grecian city of Croton attacked Sybaris in 510 B.C., they came with tooting flutes. The horses dependably danced off with their riders, and Sybaris fell. To complete the job, the Crotonians rerouted a handy river and washed a lot of the conquered city seaward.

All this happened some 2500 years ing out new electronic devices—first, because finding the ruins of Sybaris would be a major archeological breakthrough, comparable to the finding of King Tut's tomb. Too, there are the remains of ancient Roman cities in the same area. In one section a Roman wall of brick was found atop a Greek wall of large limestone blocks. In this same area a large amount of Grecian pottery fragments were found. But Rainey points out that these were discovered in coarse sand, and not in a living area.

His theory is that the pottery fragments were re-deposited from the site of Sybaris to their present location, and that the city lies farther inland and upstream. This belief was strengthened by the fact that the last drill borings taken before activity stopped for the year last June showed pottery fragments in what seemed to be an actual living level. These borings were made upstream from the site of the main excavations. That's where Dr. Rainey and his University Museum team will start working next April with high hopes of a big find.

A systematic search for the ruins of Sybaris has been going on for almost a century. Carried on in earlier years almost entirely by Italians, these explorations located an upper Roman level, a middle level of 4th-century Greek remains, and an original level of 6th-century occupation. More recently, using modern power drills as well as excavation, Italians cleared extensive structures which were identified as the Roman period city of Thurii Copia.

With the introduction of electronic devices in 1960, finds came faster. But

(Continued on Next Page)

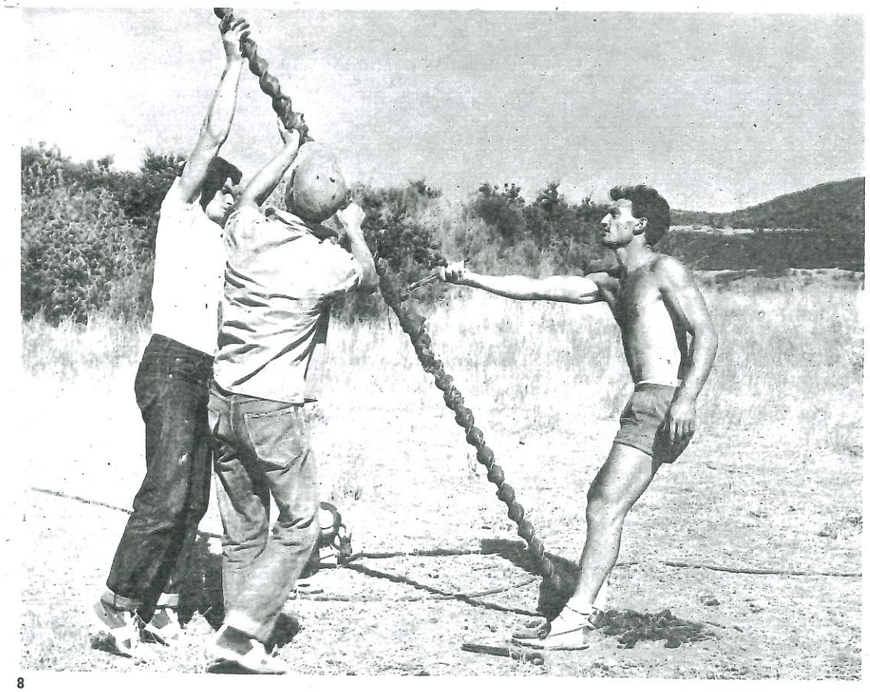
versity of Pennsylvania Museum are using electronics to locate Sybaris. Many devices have been tried, but the museum's pride and joy so far is the proton magnetometer. Based on a principle of nuclear physics discovered just a few years ago, this gadget measures the magnetic intensity of the earth beneath it.

The machine itself consists of a box joined by a long wire to a metal rod. This rod holds a container of alcohol. When an electrical impulse is passed through the alcohol, the nuclei of its hydrogen atoms (protons) are jiggled out of alignment. Buried objects may be located by the way these protons react. Limestone walls, for example, show a low magnetic intensity. Fired brick gives a high reading, as do bits of pottery. And the air spaces of tombs show up sharply. Thus, although the proton magnetometer still is an archeological infant, it has located hundicated 800 yards of city wall under several feet of soil.

"Eventually," says Museum Director Froelich Rainey, "we hope to have instruments that may act somewhat like a geiger counter. Then we would be able to explore wide areas without digging. Right now we are working on a sonic device which may approach this efficiency. We hope to use this gadget at the Sybaris dig starting next April."

The centers for this "electronic" archeology are Oxford University, the University of Pennsylvania Museum, and universities in Rome and Milan. Each works with industrial firms, as well as with other archeological units, to develop more efficient electronic devices. Right now, for example, the University Museum is having work done by Texas Instruments and by the Petty Geophysical Company in Texas. Orville Bullitt of Philadelphia has

Proton magnetometer in use. Dr. Rainey holds rod while assistant director Elizabeth Ralph checks readings.



Setting up power drill to get samples after electronic device has been used to locate a tomb.

SEARCH for SYBARIS:

Continued

there still remains the vast labor of uncovering these ruins. The plain of Sybaris, near the mouth of two rivers that empty into the Ionian Sea, has been covered with silt, much as Pompeii was covered with volcanic lava. Its low position also means that water hampers digging operations. However, as Rainey points out, finding Sybaris would justify great effort and expense.

Sybaris was founded in southern Italy as one of a number of colonies of the then too-crowded Greece. During the 6th Century it probably was the richest and most luxurious city of the Hellenic world. In fact, the Greeks there had it so good that the city's name lived on as the adjective "sybaritic," suggestive of creature comfort and pleasure. Said Herodotus, of the 5th Century B.C., "From Italy came Smindyrides, the son of Hippocrates of Sybaris, who of all men ~~n~~ earth reached the highest point of luxury."

After its dancing horses were fluted to disaster, the city was rebuilt by the Greeks. But it is believed that it was moved at that time to a site near the spring of Thurii, and therefore took that name. The Roman city of Thurii Copia came later.

In addition to the Sybaris area, the electronic devices have been used very successfully in locating tombs in the famous cemetery of Tarquinia. The proton magnetometer proved most efficient there. Under normal operating conditions the archeologists, from the museum and the Lerici Foundation of Italy, could locate and explore five or six tombs in a day. Located by the proton magnetometer, the tombs were drilled into with an electrically driven auger. Then a periscope was lowered into the hole to see what the tomb contained. All this was done without any of the normal excavation work which would have been necessary to discover, for example, if the tomb were painted, or if it had been looted in earlier years. Painted and unlooted tombs, obviously, are worthwhile objects of further, careful excavation.

The five-year-old field of electronic archeology, thus, is a promising, fast-growing youngster. Today it is experimental; tomorrow it may be bringing whole new areas of the ancient world to modern inspection.

A.S.C.A
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University of Pennsylvania
NEWS BUREAU
Museum of the University of Pennsylvania
33rd and Spruce Streets
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For Release:
Sunday, November 22, 1964

For Information, Call: Joseph P. McLaughlin
EV 6-7400 or KI 6-1830 (Area Code 215)

With the aid of an electronic instrument built for research in the earth's magnetic field and used successfully since 1960 in the U.S. space program, American and Italian archaeologists are mapping a 2,500-year-old Greek settlement that modern man may never see.

The instrument, the rubidium magnetometer, is more than 100 times as sensitive as any hitherto used in archaeological exploration. It has located buildings, some large enough to be temples, walls, and even paved roads buried in a two to three square mile area beneath as much as 20 feet of soil on the Crati plain facing the Ionian sea, during a two-week's field trial in Southern Italy last month. The settlement is believed to be either the seaport of the half-legendary city of Sybaris, or Sybaris itself.

Because the ruins lie 15 feet below the water table, the possibility of excavating them is remote due to the prohibitive cost. However, the rubidium magnetometer clearly defines their shape, size and location, enabling archaeologists to map the ruins without physically having seen them.

(more)

"THE NEW YORK TIMES, SUNDAY, NOVEMBER 22, 1964

Space-Age Device Maps Ancient City

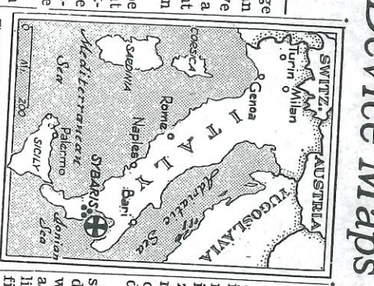
By WILLIAM G. WEART
Special to The New York Times

PHILADELPHIA, Nov. 21—With the aid of a space-age electronic instrument, American and Italian archeologists have located and are mapping a 2,500-year-old Greek settlement in southern Italy that modern man may never see.

The ruins, believed to be either the seaport of ancient Sybaris or the fabled city itself, lies 15 feet below the water table, making the possibility of excavation remote because of prohibitive costs.

Archeologists have been searching for Sybaris, reputedly the wealthiest city of the ancient Greek world, since 1878. Its citizens were known for their love of luxury and pleasure, an degave the English world "Sybarite."

In reporting the find tonight, the University of Pennsylvania Museum said the electronic instrument, known as the Rubidium magnetometer, had located buildings, some large enough to be temples, walls, and even [illegible] to map the ancient settlement [illegible] was verified in every instance by later drilling."



The New York Times Nov. 22, 1964
Site of ancient ruins, cross.

"The experiment demonstrated," he continued, "that it is possible to map with accuracy all of the buried structures in the two or three square-mile zone on the Crati Plains in a matter of three months, at the cost of only a few thousand dollars."

"The success of this new instrument," Dr. Rainey said, "is due to its high sensitivity, which is capable of detecting a change of one part in 10 million of the earth's magnetic field. It permits the location and mapping of ruins with great speed and accuracy."

Since 1961 Dr. Rainey has headed an expedition to locate Sybaris in collaboration with the Lerici Foundation of Rome and the Department of Antiquities, Reggio Calabria.

Legend has it that the Sybarites taught their cavalry horses to dance to the music that contributed to their down-

During a two-week field trial last month, the museum reported, it "clearly defined the size and location of flutes, an accomplishment archeologists [illegible]

"This is one of the most exciting developments in archaeology in many years," said Dr. Froelich G. Rainey, director of the University Museum of the University of Pennsylvania. For the past three years he has headed an expedition to locate Sybaris in collaboration with the Lerici Foundation, Rome, and under the general supervision of Professor G. Foti, director, Department of Antiquities, Reggio Calabria.

Sybaris, which was destroyed by neighboring Crotone in 510 B.C. according to ancient sources, was the wealthiest city of the ancient Greek world. Its inhabitants were noted for their love of luxury and indolence, attributes which gave the word "sybarite" to the English language.

According to ancient writers, the Sybarites taught their cavalry horses to dance to pipe music, an accomplishment which reputedly led to the city's downfall. When the Crotonians attacked, at a crucial moment in the battle they played pipe music and the Sybarite horses danced off with their riders, leaving the city undefended. Sybaris was destroyed and the course of the river Crati was diverted over the ruins.

Later a Greek city called Thurii was built nearby, followed by the Roman city, Thurii-Copia.

While archaeologists long have believed that the site of sixth century B. C. Sybaris lies in an 80 square mile area of the Crati plain, efforts to find it have proved fruitless. Archaeologists have been searching since 1878. (more)

"Based on the results of this first trial in Southern Italy," Dr. Rainey said, "the successful adaptation to archaeology of the rubidium magnetometer opens up bright new vistas in man's search for buried remains of which there are no surface indications. The success of this new instrument is due to its high sensitivity which is capable of detecting a change of one part in ten million of the earth's magnetic field."

The rubidium magnetometer was used in the Explorer space probe of March, 1961, to continuously measure ultra-low magnetic fields as far as 145,000 miles from the earth.

"Unlike the electronic, sonic and other detection instruments we have used earlier," Dr. Rainey continued, "the rubidium magnetometer permits the location and mapping of ruins with great speed and accuracy. It is effective at depths much greater than is true of the other instruments."

"It provides a continuous flow of information and does not require the placing of rods in the soil at fixed points for its operation. Hence, it is much quicker."

"Existence of the buried structures disclosed by the magnetometer was verified in every instance by later drilling," he said. "The experiment demonstrated that it is possible to map with accuracy all of the buried structures in the two or three square mile zone on the Crati plain in a matter of three months, at the cost of only a few thousand dollars," Dr. Rainey added.

(more)

Experiments with the magnetometer were carried out under Dr. Rainey's supervision by Sheldon Breiner of Varian Associates, Palo Alto, Calif., manufacturers of the instrument, and Elizabeth K. Ralph, associate director of the University Museum's Applied Science Center for Archaeology. Others who participated in the experiment are: Franco Brancaleoni and Francesca Serres, both of the Lerici Foundation; Orio Miggiano, of the Department of Antiquities, Reggio Calabria; and David Ridgeway, of the University Museum.

Like other instruments of its type, the rubidium magnetometer measures slight variations in the earth's magnetic field and detects anomalies such as walls, foundations of buildings, pottery kilns and other remains of ancient occupation because their magnetic intensity varies from that of the surrounding soils.

Unlike other magnetometers which utilize the proton, the nucleus of the hydrogen atom, the rubidium magnetometer exploits magnetic field-dependent energy levels in the atoms of alkali metals. The interaction of the light from a rubidium lamp with the vapor of this rare metal results in an atomic oscillator.

The rubidium magnetometer may employ two sensors--one fixed and one movable--which in combination enable archaeologists to pinpoint the depth of anomalies picked up. One of the sensors is carried by a man who walks steadily across the area under exploration in parallel lines about a yard apart. The sensor apparatus is connected by cable to the recording instrument. Differences in

(more)

magnetic intensity picked up by the sensors are recorded visually on a graph and are also broadcast over a loudspeaker or earphones.

The signal emitted by the loudspeaker maintains a fairly constant pitch until the sensor is passed over an anomaly in the soil. The resulting change in pitch reflects the slight differences in magnetic intensity. Recordings on the graph can be combined with great accuracy with a magnetic contour map of the area traversed by the man carrying the sensor.

Archaeologists Use Science To Map Ancient Villages

American and Italian archeologists are mapping a 2,500-year-old Greek settlement in Southern Italy.

The Archeologists are using a rubidium magnetometer, which had an important role in the Explorer space probe of March, 1961. Built for research in the earth's magnetic field, it is more than 100 times as sensitive as any instrument previously used in archaeological exploration. Last month it located structures, some large enough to be temples, walls, or paved roads, buried in a two to three square mile area beneath as much as 20 feet of soil on the Crati plain facing the Ionian Sea.

It is believed that the settlement is either the seaport of the half-legendary city of Sybaris, or Sybaris itself. This city, destroyed by neighboring Crotone in 510 B.C., according to ancient sources, was the wealthiest in the ancient Greek world.

Archeologists have been futilely searching for Sybaris since 1878. Although it is now possible to map the ruins from the informed from the rubidium magnetometer, modern man may never see the ruins, which lie 15 feet below the water table, because of prohibitive excavating costs.

"This is one of the most exciting developments in archaeology in many years," said Dr. Froelich G. Rainey, director of the University Museum of the University.

"Based on the results of this first trial in Southern Italy," Dr. Rainey continued, "the successful adaption to archaeology of the rubidium magnetometer opens up bright new vistas in man's search for buried remains of which there are no surface indications. The success of this new instrument is due to its high sensitivity....."

Dr. Rainey added that the new instrument, unlike those used previously, "permits the location and mapping of ruins with great speed and accuracy," and it is effective at much greater depths than the other instruments are, and that it is much quicker than the others.

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The rubidium magnetometer is unlike other magnetometers in the way in which it operates and in its effectiveness.

Rubidium Magnetometer Used For Archeology

With the aid of an electronic instrument built for research in the earth's magnetic field and used successfully since 1960 in the U.S. space program, American and Italian archaeolgists are mapping a 2,500 year old Greek settlement that modern man may never see.

The instrument, the rubidium magentometer, is more than 100 times as sensitive as any hitherto used in archaeological exploration. It has located buildings, some large enough to be temples, walls, and even paved roads buried in a two to three square mile area beneath as much as 20 feet of soil on the Crati plain facing the Ionian sea, during a two-week's field trial in Southern Italy last month. The settlement is believed to be either the seaport of the half-legendary city of Sybaris, or Sybaris itself.

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"Existence of the buried structures disclosed by the magnetometer was verified in every instance by later drilling," he said. "The experiment demonstrated that it is possible to map with accuracy all of the buried structures in the two or three square mile zone on the Crati plain in a matter of three months, at the cost of only a few thousand dollars," Dr. Rainey added.

Experiments with the magentometer were carried out under Dr. Rainey's supervision by Sheldon Breiner of Varian Associates, Palo Alto, Calif., manufacturers of the instrument, and Elizabeth K. Ralph, associate director of the University Museum's Applied Science Center for Archaeology. Others who participated in the experiment are: Franco Brancaleoni and Francesca Serres, both of the Lerici Foundation; Orio Miggiano of the Department of Antiquities, Reggio Calabria; and David Ridgeway, of the University Museum.

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"The most striking characteristic of magnetic surveying is the clarity with which archeological anomalies stand out," says Martin J. Aitken, who pioneered magnetic detection work at Oxford. His laboratory publishes Archaeometry, a journal which reports on applications of other sciences to archeology.

The proton magnetometer, as archeologists call it, has been used by Oxford researchers to look for Iron Age remains in England. It also has helped the Indiana Historical Society trace the outline of trenches at a prehistoric Indian village and has aided the Lerici Foundation to locate Etruscan tombs.

Space Research Byproduct

A few months ago, Varian Associates, an electronics firm, announced the development of another magnetic detector, which it says is more sensitive than the proton magnetometer. Varian's new magnetometer, adapted from a space research device, uses an element called rubidium, in vaporous form.

The way rubidium transmits light is sharply affected by magnetism. So by analyzing the light rays transmitted through rubidium vapor in the magnetometer researchers hope to detect magnetic variations in the ground and thus locate archeological features. "This should be a real money-saver for archeologists," claims Lee Langan, Jr., Varian's special products sales manager.

Archeologists are starting to hunt for artifacts beneath the waves as well as below the earth. In 1959, for example, Penn's University Museum was offered the chance to salvage a merchant ship believed to have sunk in the Mediterranean about 1,200 B.C. To salvage the wreck — the oldest known — says George F. Bass, head of the museum's marine work,, "I was sent to the YMCA to learn to dive."

In three expeditions Mr. Bass and his coworkers have made considerable progress in salvaging the wreck's remains. But this year they plan to investigate other wrecks and they expect their task will be made easier by a two-man submarine recently acquired by the museum. The sub, named Asherah after the Phoenician goddess of the sea, is equipped with stereoscopic cameras which can be used to make three-dimensional models of a site without tedious hand measurements. The Asherah was built by the Electric Boat division of General Dynamics Corp.

Archeologists Turn To Space Age Devices In Hunt for Old Ruins

* * *

Museum Researchers Will Try Sonic Detection; Magnetism Helps Locate Ancient Tombs

June 24, 1964

By ROBERT L. BARTLEY
Staff Reporter of THE WALL STREET JOURNAL

The ancient Greek colony of Sybaris in southern Italy was so famed for its wealth and luxury that even today pleasure seekers are referred to as Sybarites. But the soft life was too much for the original Sybarites. In 510 B.C. their city was conquered and destroyed and its exact location was lost to history.

Archeologists, hoping to find remnants of Sybaris's splendor, have searched in vain for years. This summer, however, a team of researchers from the University of Pennsylvania's University Museum, is going to resume the hunt for the city's site using a technique called sonic detection. They plan to beam sound waves into the earth, and then, by studying the reflections of these waves, to try gathering detailed information about what lies beneath the surface.

Sonic detection is only one of the modern techniques and tools developed to aid archeologists in their search for ancient ruins. Others include instruments for measuring subsoil magnetism, and a midget submarine.

"Many of these new techniques let you plan an intelligent excavation with a good deal less time and expense," says Alfred Kidder II, associate director of University Museum. To help perfect these techniques and to develop new ones, special laboratories have been established at University Museum and also at Oxford University and Rome's Lerici Foundation, which is supported by Italian industrialist C. M. Lerici.

Short Wave Beams

Sonic detection, which is being developed mainly at University Museum, is similar to a technique long used in geological prospecting. But because archeologists hunt in shallower depths than geologists, they need to send the sound beams on shorter wave lengths. They've been unable to generate such wave lengths properly with electronic instruments, so this summer University Museum researchers will try producing them by detonating rifle cartridges planted in the ground.

In searching for Sybaris, scientists also plan to use another technique—magnetic detection. This method, developed about three years ago, is based on the fact that archeological features, such as an old trench or buried urns, cause variations in the strength of magnetism in the ground. These variations can be detected by a magnetometer, a device whose main feature is a plastic bottle filled with liquid and wrapped in an electric coil. The variations affect movement of protons (positively charged particles) in the fluid, changing the strength of voltage in the coil. Scientists measure the voltage to locate the variations.

Hohokam Artifacts Are Unearthed

Electronic 'Nose' Can Sniff Out Ruins

By BOB THOMAS

1 electronic machine that be used in the search for lost Greek city of Sybaris is g tested by locating Arizona okam Indian ruins on the Xavier Reservation.

ybaris, in southern Italy, be- ie so notorious for the in- gence of its citizens that "sy- itic" has become a synonym pleasure and luxury.

esterday a group from the lied Science Center for Ar- eology at the University of nsylvania, and scientists n Palo Alto, Calif., tried the chine out on an archeaology g" on the right-of-way of the Nogales Freeway.

lizabeth K. Ralph, associate ector of the center, tested the chine, called a rubidium gnetometer.

he will carry the magnetome- with her when she leaves Italy next month to continue search for Sybaris.

he device detects changes in frequency of earth's magnetic field, caused, for instance by a piece of burned wood.

When charcoal, fired clay pots or other residue of human life are encountered, the jumps in frequency can be measured so that the general outline of a buried structure can be "mapped" on a graph.

This will be invaluable to archaeologists who now dig trenches with the hope of hitting ruins.

Working on a site suggested by James Sciscenti, 30, Arizona State Museum field archeaologist, Dr. Ralph used the machine to plot the foundation of a Hohokam house buried two to three feet under sand.

Helping her were two geophysicists from Palo Alto, Sheldon Breiner and Bob Morrison, employes of Varian Associates, of Palo Alto, manufacturers and developers of the magnetometer.

She said, "We used a similar machine last year to search for Sybaris, and it showed us it can locate walls and pottery. We didn't find the city—but we hope that this year the magnetometer will save us time by locating the bigger ruins so that we can dig for the more important structures."

The lost city is believed to be on the Gulf of Tarentum, now called the Gulf of Taranto, in the "arch" between the heel and toe of southern Italy. The ctiy thousand years of soil from an alluvial plain.

* * * *

Complicating the excavation of Sybaris is a water table only a few feet beneath the surface, which means powerful pumps must be used to keep a site clear of water.

Breiner said similar magnetometers are being used for underwater archaeology and to find petroleum and mineral deposits.

* * * *

Using conventional pick-and-shovel excavating, the museum team has accomplished a lot on nine sites some 15 miles south of Tucson.

Eight sites are prehistoric — homes of the Santa Cruz branch of the Hohokams who lived between 900 and 1100 A.D.

One site is historical — the ranch home of Fritz Contzen, a pioneer who first came to Arizona in 1855 as a member of the U.S. Boundary Commission.

* * * *

Located three miles south of the San Xavier Mission, the ranch was called by Contzen "Punta de Agua."

Just south of the Contzen ranch is the prehistoric ruin of a small Hohokam settlement.

The 10 Papago Indians excavating the ruins under Sciscenti's direction found 14 urns holding cremated bones. Two complete skeletons were also found, which is unusual because the Hohokams practiced cremation.

→

Four of the nine sites on the reservation remain unexcavated. Sciscenti, who has been working on the project since June 21, hopes to complete the job by Sept. 10.

The museum has received a $16,146 contract from the Arizona Highway Dept. to do the archaeological research before the highway is completed.

Contzen Came To Arizona In 1855

Fritz Contzen was one of the first Americans to settle in Arizona.

Shortly after arriving in 1855 he and his brother, Julius, were on their way to Hermosillo for supplies when they were jumped by 35 Apaches who had killed 12 Mexican soldiers the day before.

Two Papago Indians who were with the Contzens escaped and went to Imuris, Mexico, for help.

When the rescue party from Imuris arrived they found 12 dead Apaches and both brothers wounded. Fritz, hit in the left leg, was a cripple for many years after the fight.

His brother never recovered, dying two years later at the San Xavier Mission.

Fritz never forgave the Apaches. He participated in the infamous Camp Grant massacre later in which a group of Tucson men and a large party of Papagos slaughtered a peaceful tribe who were under the protection of the U.S. Army.

Most of the dead Apaches were women and children.

Contzen later founded the San Xavier Mine near the mission and the Young America Mine near Silverbell.

He died in Tucson in 1909 at the age of 78.

GOOD MORNING
he drunken driver has no hangover during
ie mourning after.

The Arizona Daily Star
★ An Independent NEWSpaper Printing The News Impartially ★

Second
NEWS SECTION

)L. 124 NO. 231 TUCSON, ARIZONA, THURSDAY MORNING, AUGUST 19, 1965 SECTION B — PAGE ONE

Archeologie (6 x 4 cv) #2 1965
4 Glu Mlle Rois Xvie Fouilles

NOUVELLES ARCHEOLOGIQUES · NOUVELLES ARCHEOLOGIQUES

d'après la légende, un anneau magique lui permettant de se rendre invisible lorsque l'envie lui en prenait. Une mission archéologique envoyée par l'université de Harvard (Etats-Unis), si elle n'a pas retrouvé le fameux anneau, a du moins, mis au jour le tombeau du roi. Il est formé d'un grand tumulus de 200 m de diamètre et de 35 m de haut, composé d'argile, de calcaire et de terre. Un réseau de galeries le parcourt intérieurement et serait l'œuvre des Romains en quête du trésor enfoui avec le roi.

10 000 volumes de pierre... au Pérou.

Une mission internationale scientifique se trouve actuellement dans l'extrémité méridionale du Pérou pour y étudier et déchiffrer les livres de la « bibliothèque de pierre » gigantesque, gravés par les populations préhistoriques du haut-plateau des Andes dans la roche des montagnes. Il s'agit de milliers de dessins géants dont on a pris d'innombrables photographies aériennes. Les « inscriptions » se trouvent pour la plupart dans une interminable vallée coupée par le fleuve Maples, encadrée par les volcans Ampato, Cachani et Misti, tous hauts de quelque 7 000 mètres. Dans cette vallée inhabitée et désolée, on a dénombré environ 10 000 blocs de pierre volcanique alignés l'un près de l'autre, sur une étendue de 8-10 km-carrés. Presque tous ces rochers lisses sont couverts de dessins sculptés, qui forment une chronique complète de ces temps révolus. Certains des dessins sont de véritables tableaux peints de couleurs encore vives. On y voit figurer des daims, serpents renards, oiseaux, jaguars et d'autres bêtes, ainsi que des représentations assez naïves de l'homme, entouré souvent de signes et symboles abstraits, de maïs sinueux, de soleils et d'étoiles. Sur certains visages, on a dessiné des larmes, et le style de ces œuvres se rapproche de celui de la culture connue, mais encore mystérieuse, de Tiahuanaco en Bolivie. Jusqu'ici, aucune des inscriptions et figurations n'a encore été déchiffrée. L'on suppose qu'il s'agit de chroniques des principaux événements de l'histoire.

Gloires archéologiques corses.

Au XIXe siècle, l'opinion des savants était que la Corse ne recélait aucun témoignage important d'aucune époque du passé. Depuis, ils ont bien changé d'avis. Sans parler des fameuses statues-menhirs et des « torre » préhistoriques, le site d'Aleria se révèle d'une exceptionnelle richesse : c'était, à n'en pas douter, un important carrefour méditerranéen au temps de l'antiquité grecque. Le musée des fouilles,

magnétomètre miracle.

Sybaris voici 2 500 ans, était la ville la plus riche du monde grec. Sa richesse même, entraînant le luxe, avait fait de ses habitants ce que depuis on appelle des « sybarites ». Au point que jugeant la démarche naturelle du cheval peu élégante ils apprirent à leurs montures à danser au son des flûtes. Hélas ! Lorsque leurs ennemis et jaloux les Crotoniates eurent les attaquer, il suffit de quelques mélodies jouées par les agresseurs, pour que toute la cavalerie de Sybaris, au lieu de charger, se mît à faire des grâces, sans s'opposer à l'attaque. Sybaris fut donc vaincue, détruite et disparut si bien de la carte du monde, qu'on ignorait son emplacement exact jusqu'à tout récemment. Ici entrent en jeu un instrument nommé Magnétomètre au Rubidium, moderne produit de cette civilisation atomique et spatiale. Cet appareil permet de localiser les murs, bâtiments et routes enfouis à des profondeurs relativement considérables. Le merveilleux appareil offre en outre beaucoup de facilité de maniement, en ce sens qu'il opère de façon continue, sans qu'il soit besoin de faire des « prises de sol » comme avec d'autres appareils. D'où : rapidité. Donc, grâce à ce magnétomètre miracle, le Dr Froelich G. Rainey directeur du Musée de l'Université de Pennsylvanie, a pu dresser le plan exact d'une ville ensevelie, qui doit être Sybaris ou le port de Sybaris. Elle est située en Calabre, à 6 m. sous le sol de la plaine de Crati, laquelle se trouve en bordure de la mer Ionienne. Vaste ensemble de 200 hectares environ, qui contient singulièrement les choses. En effet si l'on creuse le sol lui-même à la cote d'aperçu, on se trouvera au-dessous du niveau actuel de la mer. Il faudrait donc, pour exhumer les ruines, construire une digue et effectuer des travaux d'une importance telle que les crédits scientifiques américains eux-mêmes n'y suffiraient pas. Pour le moment donc, on se borne à relever soigneusement tous les détails topographiques de la ville. C'est déjà prodigieux.

Le tombeau de Gygès.

Le roi Gygès qui régnait sur la Lydie (actuel Turquie) de 687 à 652 avant J.-C. passedait

Electronic Detective At Work

Beneath this grid system lies a thousand-year-old Hohokam Indian ruin, pinpointed by the electronic machine held by geophysicist Sheldon Breiner. Dr. Elizabeth K. Ralph, taking notes at the left, plans to use the device, a rubidium magnetometer, to try to find the ancient Greek city of Sybaris in southern Italy. Reading the magnetometer's scope is Bob Morrison, of Varian Associates, developers of the achaeological aid.

Located by Electronics

Ancient Sybaris Believed Found in Italy

PHILADELPHIA (UPI) —An archeological discovery, which may prove to be the long lost Greek Colony of Sybaris on the "toe" of Italy was reported by a University of Pennsylvania expedition.

A new electronic sounding device, four times more sensitive than the one previously used, clearly defined "very large structures, 100 meters in length," Dr. Froehlich Rainey, director of the University of Pennsylvania Museum, said.

He cautioned, however, that there were three previous claims of having found the 2600-year-old Greek "trading post" but all have been proven incorrect.

Rainey said the new instrument, a cesium magnetometer, was acquired shortly before the expedition he headed returned to this country. It replaced a proton magnetometer which had found only the roof tiles of a house at the level thought to date back to the 6th century B. C.

He said the large structures indicated by the new device could be the walls of temples or large administration buildings in the ancient Achaearn - Troezenian colony.

"We hope to pin it down this time," he said.

Sybaris was founded about 720 B.C. by Greek traders dealing with the Etruscans, the little-known people who preceeded the Romans in Italy. The expedition site is a barren, 80 square kilometer plain of mud and clay in Calabria, Italy.

Sped. in abb. post. - Gruppo IV

MAGNA GRAECIA

Rassegna di archeologia - storia - attualità diretta da Tanino de Santis

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"E' AL PARCO DEL CAVALLO!,,
DICE L'ARCHEOLOGIA UFFICIALE

Ma Sibari non c'è

di FROELICH RAINEY

Nei passati Convegni Intern. di Studi sulla Magna Grecia, tenuti a Taranto, che sono, come dire, gli annuali incontri al vertice degli studiosi particolarmente interessati a quanto c'è di nuovo in relazione alla civiltà magnogreca, com'è noto, l'archeologia ufficiale italiana si è da tempo chiaramente pronunziata sull'annosa questione della sepolta Sibari arcaica.

Sugli Atti del Convegno di Taranto del 1963 («Metropoli e colonie di Magna Grecia» — Napoli 1964), gli ultimi che siano apparsi in ordine di tempo, a firma del Soprintendente alle AA e BB AA della Calabria, dr. Giuseppe Foti, nella sua relazione circa "La documentazione archeologica in Calabria" (pag. 176,) così si legge: "Ribadiamo l'identificazione del sito di Sibari, confermata lo scorso anno con i saggi nell'area pianeggiante a cavallo del Crati". I saggi citati sono quelli effettuati dalla Soprintendenza, nell'aprile del 1962, in località Parco del Cavallo, nell'area di un non meglio identificato edificio parzialmente messo in luce, nel 1932, da Umberto Zanotti Bianco, primo propugnatore della tesi Sibari-Thurio nell'hinterland del Parco del Cavallo.

Ed in altra sede («Almanacco Calabrese» 1963, pag. 42) il Soprintendente Foti meglio precisa: "Cosi', nell'area che comprende le contrade Casa Bianca, Ministalla e Lattughella, si rilevano, stratificati nell'ordine dall'alto verso il basso, i resti delle tre città sovrapposte: la romana Copia Thurii, la greca Thurio e l'arcaica Sibari".

Ma l'équipe di geofisici dell'Università di Pennsylvania che da qualche anno è al lavoro nella Sibaritide, pur avendo passato tutta la pianura bene al vaglio delle più moderne apparecchiature elettroniche, non ha potuto provare la veridicità delle asserzioni dell'archeologia ufficiale italiana, (ed a ragion veduta parliamo di semplici "asserzioni" perchè mai suffragate da alcun rapporto relativo ai saggi di scavo nonchè al complesso di indizi che hanno consentito di proporre le sensazionali conclusioni cui si è in precedenza accennato).

Pensiamo perciò di fare cosa gradita ai nostri lettori presentando un articolo del prof. Froelich Rainey, Direttore del Museo dell'Università di Pennsylvania e capo della équipe di geofisici, articolo quanto mai significativo, perchè viene a ridimensionare quella scoperta del sito di Sibari che tanta eco aveva prodotto in Italia ed all'estero.

A quanto pare, l'antica Sibari (come Thurio e Copia) giace ancora nascosta chissà dove nella grande piana.

Se le cose stanno così', bisogna ammettere che l'archeologia ufficiale italiana se ne esce un pò con le ossa rotte, dal suo forse troppo semplicistico tentativo di risolvere il problema topografico della Sibari arcaica con un colpo di bacchetta magica, cioè con i soli saggi dell'aprile '62 al Parco del Cavallo.

Una buona ragione, comunque, per decidersi una buona volta ad affrontare meno avventatamente il mistero affascinante, ma sempre più fitto, della leggendaria città sepolta sotto le acque del Crati. (N. d. D.)

Maschera fittile di attore fliacico. (Dalla Mostra allestita nel Museo Naz. di Taranto in occasione del VI Convegno di Studi sulla Magna Grecia).

Durante la primavera del 1966, abbiamo effettuato lo scavo di un altro saggio, nella zona del Parco del Cavallo vicino all'estremità est del cosiddetto Muro Lungo (Long Wall), dove avevamo individuato con il magnetometro al cesio una struttura sepolta. Il magnetometro e le nostre perforatrici hanno rivelato questa struttura a 5 - 6 metri di profondità e di 40-50 m. di diametro. Ciò ci fece supporre che questa struttura fosse dell'epoca arcaica. Tuttavia, il saggio ci dimostrò che era invece dell'epoca romana, di costruzione rozza e semplice, fabbricata con mattoni, pietre e cemento. Non avendo potuto ottenere il profilo completo di questa struttura, non abbiamo potuto determinarne la funzione precisa. Sotto di questa, nel livello sabbioso, abbiamo di nuovo trovato frammenti di cocci dell'epoca arcaica.

La Signorina Elizabeth Ralph, assieme a due geofisici della California, ha continuato le ricerche nella zona del Parco del Cavallo con il nuovo magnetometro al cesio che ha una capacità di penetrazione nel suolo di circa 6 m. Sono riusciti a stabilire il profilo di una gran parte della suddetta zona, determinandone l'estensione ch'è di circa 4 km quadrati.

Sappiamo inoltre, mediante altri saggi, che le rovine di epoca romana e tarda greca sono concentrate nella sezione sud vicino alla riva nord del Crati, e che esistono rovine d'epoca arcaica in una zona limitata a nord della strada degli Stombi. In quest'ultima zona non si sono trovate rovine alcune nel livello al disopra di quello arcaico.

Questa è l'unica zona nella quale abbiamo individuato strutture d'epoca arcaica «in situ». Tuttavia, i nostri strumenti elettronici, le perforatrici, e uno scavo in questo

settore nord, hanno rivelato soltanto strutture piccole e di costruzione molto semplice, che possono esser considerate un comune tipo d'abitazione. Siamo stati incapaci di trovare rovine alcune che potessero considerarsi come appartenenti a un tempio distrutto, come le varie rovine trovate a Locri e a Metaponto.

Nella zona del Parco del Cavallo abbiamo incontrato i soliti livelli d'epoca romana, tarda greca, e arcaica. Ma nella maggior parte di questa zona si sono trovati soltanto frammenti nel livello sabbioso, e nessuna vera e propria rovina d'epoca arcaica.

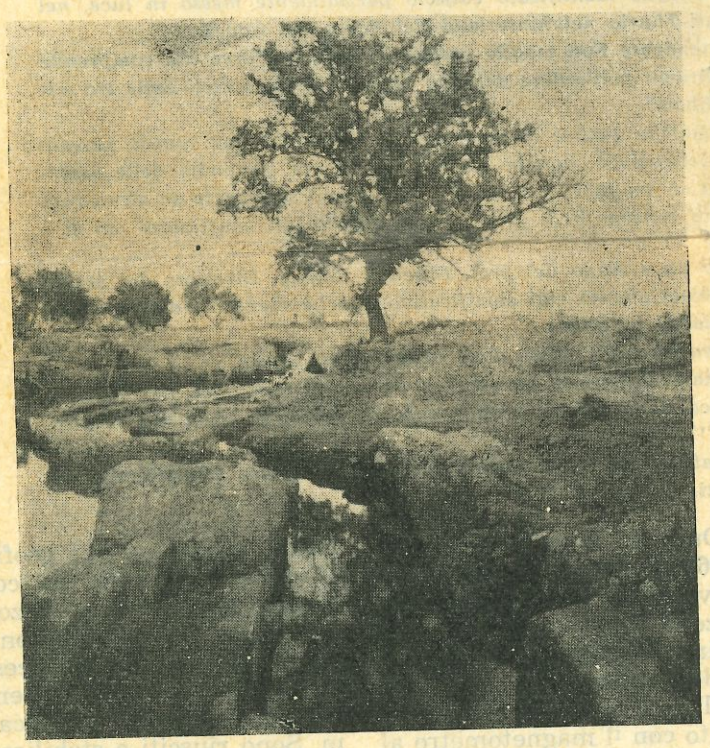
Quindi, posso soltanto a questo punto concludere, che la zona Parco del Cavallo è certamente l'antico porto romano, tardo greco, e arcaico della città di Sibari; ma, a causa della mancanza di vere e proprie rovine di templi o costruzioni pubbliche nel livello arcaico, ritengo che non sia possibile assumere che questa zona rappresenti la vera città di Sibari.

Abbiamo esplorato la maggior parte della piana con gli strumenti elettronici e le proforatrici, e non siamo riusciti a individuare rovine alcune che possano considerarsi appartenenti alla città di Sibari.

Tuttavia, durante il mese di giugno, la USAF (United States Air Force) ci ha messo a disposizione un aereo equipaggiato con una complessa macchina fotografica con 9 lenti.

Queste diverse lenti registrano su un film a colori la composizione fisica del suolo, e speriamo che il film ci possa eventualmente rivelare ciò che non siamo riusciti a individuare con gli altri mezzi tecnici adoperati nella pianura di Sibari.

Froelich Rainey



La roggia al Parco del Cavallo dalla quale affiorano i resti del misterioso edificio parzialmente messo in luce negli scavi del Sen. Umberto Zanotti Bianco e della Soprintendenza alle AA.

Diverse e troppo contrastanti sono le interpretazioni finora avanzate in merito alla costruzione. Si tratta del Cleandridaion di Thurio, come dimostra P. Zancani Montuoro? («Atti e M. della Società Magna Grecia», N.S. IV, 1962, pag. 7-63). E' una Curia a pianta curvilinea di Copia, come vuole A. Maiuri? («Le vie d'Italia», 1962, n. 9, pag. 1136) Oppure una grandiosa villa privata romana, come ipotizza A. De Franciscis? («Almanacco Calabrese», 1964, pag. 52).

SYBARIS

Sybaris, sol cendreux sous les noueux oliviers,
Plaine étrange en sommeil dans son linceul de gloire,
Des troupeaux de taureaux hantent ses chaussées noires,
Et loin, de fauves nues creusent les monts d'acier.

Tout est poignant ici, tout est grande pitié,
Crotone qui vainquit rougit de sa victoire
Devant le bas forfait qui souille sa mémoire:
Sybaris revêtue de myrte et de laurier!

Des beaux marbres gisant sous les eaux du Crathi,
Des trésors que jadis Milon a engloutis,
Profanant la Citè, rien ne demeure plus!

Seul, le vent dru secoue les olives et chante
Sur la tragique mer dont les vagues sont nues
Qui portaient les vaisseaux aux flammes éclatantes.

F. C. Delalande

Se son rose... fioriranno

Va premesso, riportiamo quanto segue per semplice dovere di cronaca e non già perchè prestiamo troppa fede alle promesse tanto facilmente elargite dal Ministro Gui.

In merito ad una interrogazione dell'On. Salvatore Foderaro «per conoscere più dettagliate notizie circa la notizia diffusa dalla stampa, secondo la quale una missione di studiosi statunitensi, e precisamente dell'Università di Pennsylvania, sarebbe riuscita a localizzare con buona approssimazione, la zona ove giacciono i resti della più famosa città della Magna Grecia, e quale intervento concreto è previsto da parte del Governo italiano a tali ricerche», il Ministro della P.I. On. Gui, ha cosi' risposto:

«Le ricerche esplorative per la identificazione del sito di Sibari, nella piana del Crati, sono state affidate alla «Fondazione Lerici» la quale ha operato in collaborazione con la Pennsylvania University.

Dette ricerche, anche se ancora proseguono con sondaggi geofisici, si sono virtualmente esaurite quando nel maggio 1962 la Soprintendenza, in seguito ad un saggio nell'area del «Parco del Cavallo», ha ottenuto, con i normali mezzi la conferma che l'ipotesi di Umberto Zanotti Bianco, era fondata.

«Dal 1962 tutti gli sforzi effettuati hanno consentito di meglio delimitare la zona archeologica interessante la città arcaica. I lavori, peraltro, non sono ancora terminati. Nello stesso tempo, la Soprintendenza alle Antichità della Calabria, ha avviato con gli organi della Cassa per il Mezzogiorno le richieste di bonifica che consentano finalmente di mettere in luce alcune delle rovine della antica Sibari. I suoi resti giacciono a sette metri di profondità dall'attuale superficie del terreno e a tre-quattro metri al di sotto del livello del mare.

L'impegno di lavoro è dunque notevolissimo e dipende dalla concessione di enormi mezzi finanziari. Si ha però motivo di ritenere che essi verranno impegnati, nei limiti delle reali possibilità, per rimettere in luce l'antica città».

* * *

Altra interrogazione è stata pure presentata, dall'On. Foderaro, sempre al Ministro della P.I., on. Gui, «per conoscere se si intenda sollecitare le operazioni di riordinamento delle raccolte archeologiche dell'Antiquarium di Sibari, provvedendo in conseguenza alla apertura al pubblico di tale Antiquarium, e ciò per venir incontro al desiderio manifestato dai turisti, specialmente stranieri, che sempre più numerosi accorrono in quelle plaghe richiamati dalla fama della antica città, il cui ritrovamento — dopo l'ormai certa localizzazione — è destinato a suscitare enorme interesse in tutto il mondo scientifico».

L'on. Gui ha cosi' risposto: «Il Ministero ha da tempo allo studio la possibilità di istituire in Sibari un Antiquarium che consenta di riunire le raccolte archeologiche, civiche e private, della zona.

«Un progetto per un Antiquarium già esistente negli anni scorsi, non ha potuto essere attuato, per la indisponibilità del terreno prescelto.

Ora è in corso di elaborazione un nuovo progetto che si auspica possa venire eseguito con l'intervento della Cassa del Mezzogiorno.

«Si fa presente altresi' che, a seguito della concessione di alcuni locali da parte del Comune di Cassano Jonio, attualmente è esposta al pubblico una piccola parte del materiale archeologico reperito nella zona».

PENNSYLVANIA TRIANGLE :02/1967, VOL.54

Items on display in the New World section have helped archaeologists discover many things about the past. They have even been able to ascertain when people first began to grow corn—five-inch-long ears found in South America are displayed in this section.

Middle American excavations have recovered tiny figures of jade and stone from tombs, and the Museum has been able to ascertain that these were to provide humor or happiness to the deceased. Tall stone monuments called stelae stand in this room, too. One of these, from Piedras Negras, Guatemala, is a Mayan sculpture depicting a priest-ruler and his wife. Stones like these, whose function was to record the happenings of the times, help the excavators to piece together bits of knowledge about the past.

To the right of the Museum's main entrance is the North America room. Arctic and Eskimo archaeology stand to the rear and items from these provide a means of sketching the development of fishing implements among these people. Such things as blubber scrapers, skin scrapers, fur combs, and finger rests all tell the story.

Lastly, shown in Figure Three, the Hall of Man contains skulls of fossil men, more clues to man's ancient past. In one corner stands a white model of an ancient man, towered over by one of modern man. All of these exhibits and more make known the University Museum's role of searching into man's past.

SYBARIS: *Pennsylvania's New Techniques in Archaeology*

Sybaris, an Achaean colony founded in Magna Graecia in southern Italy about 720 B.C. was celebrated by Graeco-Roman historians as perhaps the wealthiest city in the Hellenic world during the sixth century B.C. Decadence and frivolity led to her defeat and destruction around 510 B.C. at the hands of the Crotonians who turned the waters of the River Crati over the city. Athenians who reoccupied it in fifth century B.C. moved to a nearby site and renamed the city Thurii. During the Roman era, the city was renamed Copia Thurii.

The quest for Sybaris, taken up in 1961 by the ASCA (Applied Science Center for Archaeology) of the University Museum, is by no means new. The Italian government began a systematic search for the ruins as far back as the 1880's. Thirty years ago an impressive Roman ruin was found on Parco di Cavallo (see Figure Four). Ten years ago test drillings on either side of the Crati demonstrated the three levels of occupation: the upper Roman layer extending to a depth of three or four meters, the middle section of fourth century Greek to a depth of five or six meters, and a lower original archaic Greek level at six to seven meters in depth.

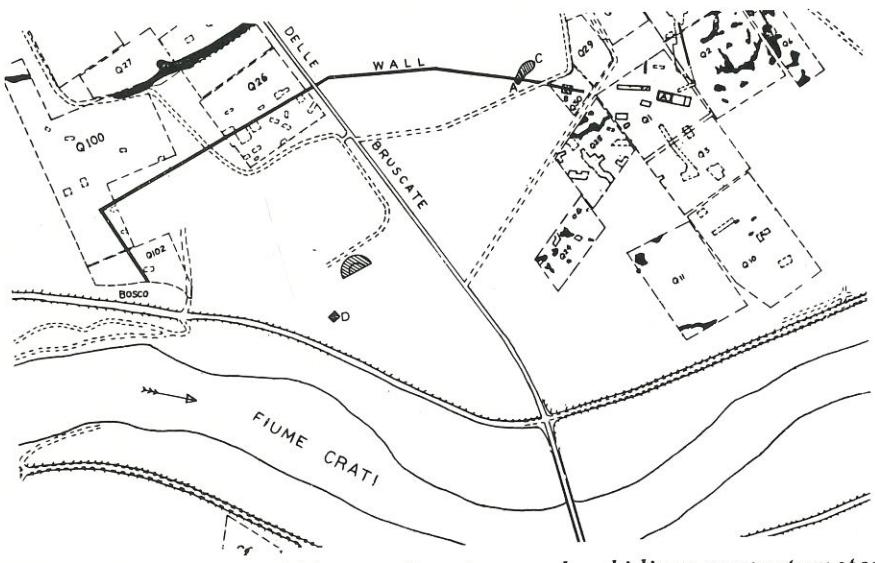
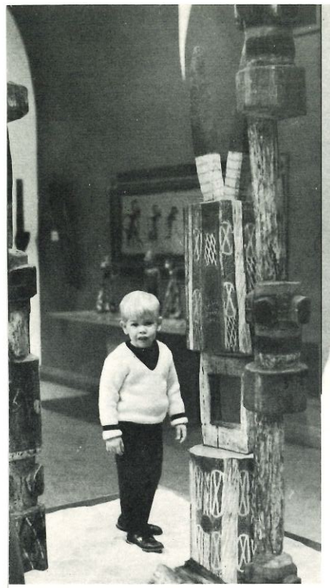
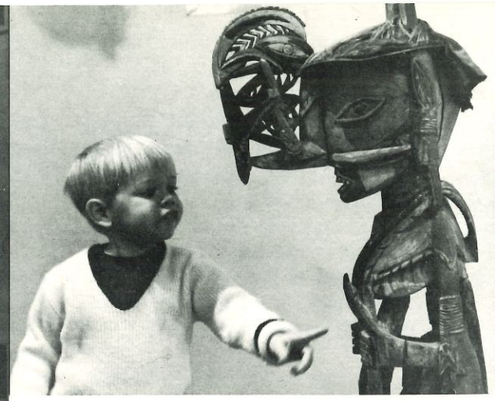


Figure Four. 1965-1966 map of cesium and rubidium magnetometer grids on the plain of Sybaris showing the Parco di Cavallo site, the Long Wall, and grid layouts.

Normal methods of archaeological research, i.e., digging test trenches to find the location of excavation, were unfeasible on the plain of Sybaris for many reasons. Due to the changing bed of the Crati River, Sybaris could be located virtually anywhere within the 80-100 square kilometers of the river valley or possibly on surrounding terraces, adding another 50 square kilometers to the area. Also, the water table is approximately one meter below the surface, introducing problems of drainage and pumping. Thus, magnetic methods, pioneered in the late 50's, were sought as a means of attacking the Sybaris problem.

All magnetic instruments (i.e. magnetometers) employed in locating buried archaeological features measure local variations in magnetic field intensity, **H** (in units of oersteds or gammas). Anomalies, deviations of **H** from the normal background intensity, will occur when passing over kilns, brick walls, fire pits, and the like. This is because these objects are more magnetic than the surrounding clays due to the firing process which tended to cause





Lost in the Past

The pictures at top show a young adventurer in the Austronesia room. He is a little awed by the work of the Museum, staring (left picture) at funeral poles, carved and painted, as archaeologists discovered, to be placed around the ground at a burial in order to commemorate the deceased.

The Near East (Mesopotamia, Iran, and Palestine), whose history consists mostly of the rise and fall of city states, has overlapping cultural patterns, influenced as they were by the state in power at the moment. Knowledge of the daily life of these ancient people comes mainly from the study of cuneiform tablets. The University Museum has a large collection of these. Burial tombs have also contributed some knowledge of the times. For example, in the Mesopotamian room, there is evidence of a custom otherwise unknown in Mesopotamia—that of including living sacrifices in a tomb. In Queen Shub-ad's tomb were found the remains of soldiers, ladies-in-waiting, and four oxen. Articles from the Queen's tomb are exhibited in this room and one can even see the remains of two of the living sacrifices. In this room, too, is a boundary stone engraved with the details of the extent of the owner's property. On the stone is an ancient version of present day law—a curse is called down on anyone who dares erase, hide or destroy what is written on the stone. (And you can't choose jail or a fine instead!)

Leaving the Near East, a visitor soon finds himself in the world of ancient Egypt. In the second-floor Egyptian gallery are monumental sculptures, and off to one side is the mummy room, with its examples of burying practices between 2500 B.C. and 150 A.D. The walls here are lined with glass-encased mummies and their coffins. There is one of a child with his natron-treated face exposed. Other objects from the grave—gold and jade jewelry, canopic or visceral jars containing some of the internal organs of the deceased, and copies of the Book of the Dead—all have helped the archaeologist unravel the past. From these he can postulate Egyptian belief about death and notice how everything that could possibly be needed for a joyous eternity is included in the deceased's tomb.

Figure Three. Skulls of fossil men are displayed in the Hall of Man of the University Museum.

alignment of the dipole moments with that of the earth's field at the time of firing. Regions of increased magnetism may also be caused by buried iron artifacts and by disturbances of the soil. The latter effect is due to the increased magnetic susceptibility of the soil more recently disturbed than that of the surrounding earth.

In the fall of 1961 a group from the University Museum under Dr. Froelich Rainey joined with certain members of the Lerici Foundation of Milan for ten days of experimentation with the proton magnetometer, an instrument developed in 1958 by the Research Laboratory for Archaeology and the History of Art of Oxford University. The proton magnetometer is based on the detection of proton precession since the frequency of gyration of protons is proportional to the magnetic field in which they are located.

Thus, the procedure followed in 1961 and again in 1962 by Dr. Rainey and Miss Elizabeth Ralph was to use the proton magnetometer to find anomalies, to test these points by drilling into the ground, to analyse the continuous soil samples obtained for archaeological content and stratigraphy, and to dig test pits with a mechanical excavator like the one pictured in Figure Five at points where drilling confirmed the presence of potsherds or walls. This method proved successful in tracing out 800 meters in 1961, then 550 more meters in 1962 of the "Long Wall" (Figure Five) lying as much as three and one-half meters below ground level. Unfortunately (from the aspect of finding Sybaris), the Long Wall proved to be of Roman construction for the upper few meters and late (fourth century B.C.) Greek for the bottom limestone block foundations. However, from the technological standpoint the find was impressive. It served as a demonstration of the feasibility of magnetic detection in the sense of saving time and effort as well as workability.

Figure Five. Excavation of the Long Wall with a drag line shovel. As two pumps try to keep abreast of the ground water rising south of the wall Greek foundations begin to appear under the Roman wall.

While the proton magnetometer was a vast improvement over other archaeological techniques used at the time; it is capable of measuring changes in **H** of one gamma (10^{-5} oersteds) which on the plain of Sybaris is not quite small enough for the detection of the deeply buried archaic Greek structures where the magnetic contrast between the walls and earth is comparatively small. Therefore, the only alternative was to find or develop an instrument with greater sensitivity. This was done by Varian Associates, Palo Alto, California who designed a rubidium magnetometer for measuring the earth's magnetic field from planes, rockets, and satellites. This instrument was pretested at Sybaris in the fall of 1964. In collaboration with the University Museum they were able to modify the rubidium magnetometer by building a light-weight readout and portable battery pack, and substituting cesium for rubidium in the sensing apparatus. This made the sensors less affected by changes in orientation.

The basic principle of the rubidium and of other optical absorption magnetometers (i.e. cesium magnetometer) is that, due to the Zeeman effect, the energy levels of an atom become split into various sublevels whose separations are dependent upon the total intensity of the ambient magnetic field. To detect this proportional splitting, optical pumping is required. The operation of optical pumping involves the excitation of electrons into metastable states by the absorption of appropriate electromagnetic radiation. When pumping is completed, redistribution of the pumped electrons to lower levels is accomplished by stimulation from a radio frequency corresponding to the difference in energy between the split levels. For the isotope Rb^{85} the separation between sub-levels is approximately

4.667 hertz per gamma. In comparison, the change in precession frequency of the proton magnetometer is approximately 0.04 hertz per gamma. This is the basic reason why the Rb^{85} and similar optical absorption magnetometers are capable of detecting changes in magnetic intensity with approximately one-hundred-fold greater sensitivity.

Tests with the cesium magnetometer in the fall of 1965 were highly successful (in the technical sense). Large structures lying six meters beneath the surface were easily detected. The new readout enabled an operator to walk steadily across a field recording the field intensities every two meters (Figure Six) and then working in strips five meters apart to produce a grid as that in Figure Seven. Later, points of equal field intensity could be connected on the grid producing a "contour" map of the area which would be interpreted for interesting anomalies worth taking test drillings. The relatively circular shapes have often been found to be representative of buried structures.

The most recent technique developed by the Itex Company of Massachusetts for use in Sybaris is aerial photography taken from a U.S. Air Force plane flying at 12,500 feet. The multi-band camera takes nine images covering the spectrum from ultra violet to infrared. These

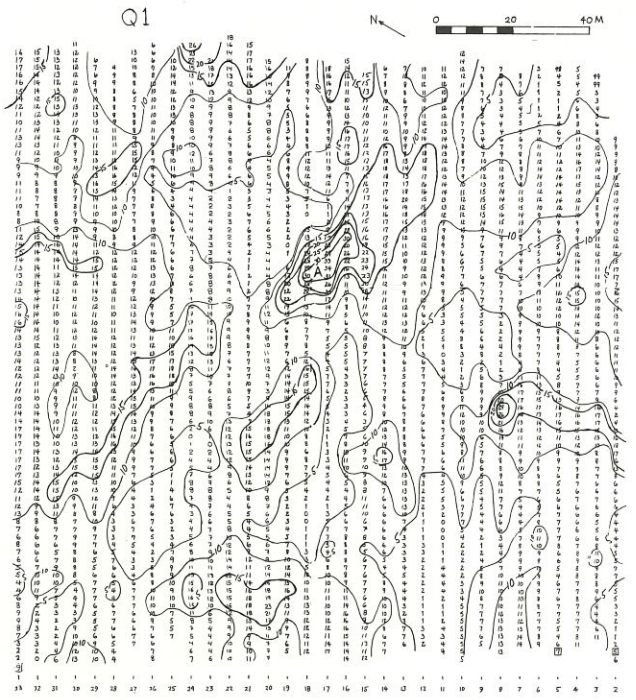


Figure Seven. Grid #1 (location can be seen in Figure 1 as Q1). The rows of small numbers are cesium magnetometer readings. Anomaly A, excavated in May, 1966 was a crude Roman structure of bricks and stones.

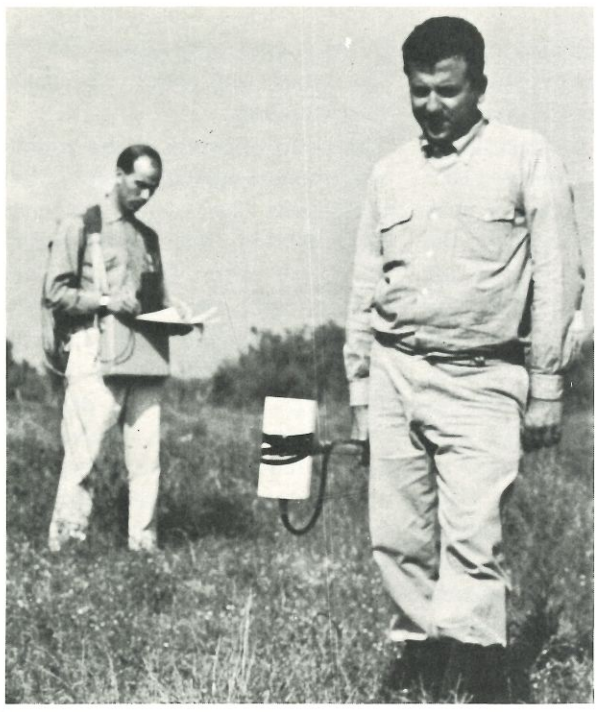


Figure Six. Operation of the cesium magnetometer. Worker in foreground walks ahead with the sensor while another with battery pack and readout follows recording data.

are then examined with a stereoscopic "magnifying glass" for recognizable archaeological features. At the present time useful known areas, those which have previously been surveyed with the magnetometers such as the Long Wall, are being studied to provide a standard with which to compare other photographs of unexplored areas. Thus far, only the eighth band in the infrared has yielded useful results.

Of archaic Greek findings all efforts up to the present time have disclosed nothing but relatively small structures which appear to be simple habitations. Although Italian officials claim that the location of Sybaris has been found, Dr. Rainey feels that the lack of large buildings or temples such as those already unearthed at Metaponti, Locri, and elsewhere indicate that they have probably located the port of Sybaris but that the city lies nearby but farther inland. Despite their failure thus far to find Sybaris, Dr. Rainey considers that the research of the past five years has been by no means wasted. The great technical strides made in instrumentation and procedure which, after all, is the main purpose of ASCA, he feels have more than justified the University's continuing search for the lost city. He readily admits, however, that the discovery of Sybaris is highly desirable not only for its archaeological value (which would be considerable) but also to demonstrate that these new techniques work and are capable of leading to a successful conclusion.

PHILADELPHIA INQUIRER 12/13/1968 P1

Wealthiest City of Its Time

Ancient Sybaris Is Locate

By DENNIS M. HIGGINS
Of The Inquirer Staff

The long-lost Greek c
Sybaris, wealthiest meth
of its day — whose nam
come to denote luxury ar
cadence — has been disco
by archeologists from th
versity Museum of the U
sity of Pennsylvania, it wa
nounced Thursday night.

In scientific circles, it ranks

Background Article on Page 19

with the discovery of th
meric Troy in 1893.

The announcement was
by Dr. Froelich G. Raine
rector of University Mu
and Prof. Guiseppe Foti, s
intendent of antiquities of
bria, Italy, during the
um's annual evening of re
from current field expedit

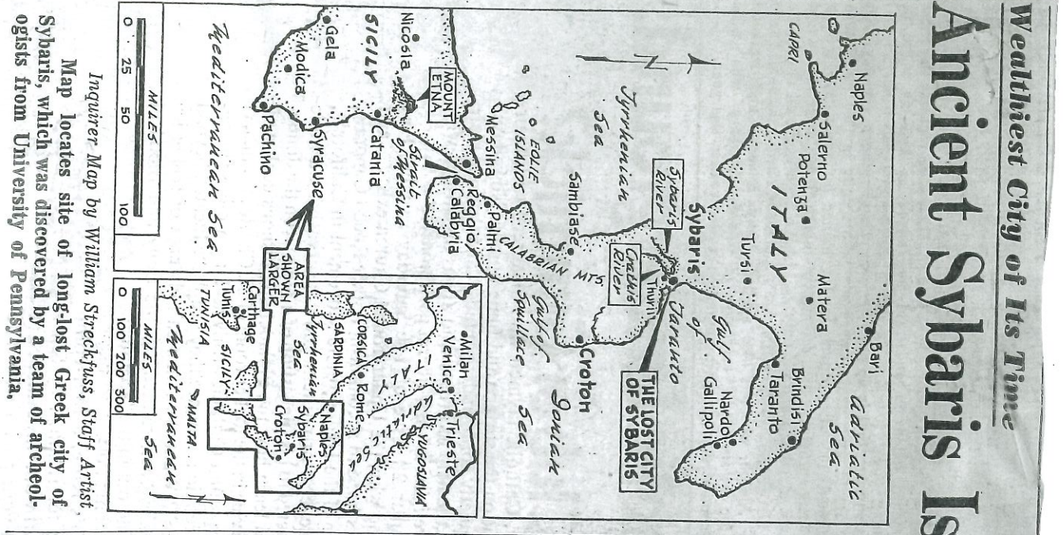
MAJOR IMPORTANCE

Dr. Rainey told the aud
of 550 persons that the disc
was of particular impor
cause it was "one job comp
between two disciplines . . . one
the hard sciences, and the other
the humanities, the classics."

Prof. Foti, thin and in his mid-
30s, lauded Dr. Rainey and said
he would receive an award from
the Italian government "as soon
as all the bureaucracy was
over."

The announcement ends a
century-old search for Sybaris
and an eight-year seasonal

Continued on Page 19, Column 1



Inquirer Map by William Streckfuss, Staff Artist.

Map locates site of long-lost Greek city of Sybaris, which was discovered by a team of archeologists from University of Pennsylvania.

PHILADELPHIA INQUIRER 12/13/1968

Ancient Sybaris Found in Instep Of Italy's Boot

Continued from First Page

expedition by the University Museum and the Italian Department of Antiquities, and, in early years of the dig, by the Lerici Foundation of Rome.

Prof. Foti, who addressed an audience of scholars and museum members through an interpreter, made a special trip to Philadelphia to participate in the joint announcement.

He and Dr. Rainey described it as "of major importance, not only because it solves one of the great mysteries of history, but also because it establishes the validity of new scientific methods of detecting buried ruins with excavation."

Sybaris, which disappeared almost 2500 years ago after it was overwhelmed by soldiers from neighboring Croton, lies between two ancient submerged river beds on the plain of Crati in Calabria, the archeologists said.

BURIED RUINS

This has been established "beyond a reasonable doubt," they said, on the evidence of buried remains and data supplied by both ancient writers and modern science.

The ruins of the city are beneath 15 to 18 feet of earth, below both sea level and the watertable, in an area approximately six miles in circumference and about a mile and a quarter inland from the shore of the Ionian Sea.

FLOODING PROBLEM

There has been no general excavation of the site, which is in the forward arch of the instep of the Italian "boot."

Excavation was limited to test cuts because of the problem of flooding, which Dr. Rainey and Prof. Foti noted will present "enormous difficulties" if attempts are made to further uncover the ruins by conventional methods.

Final success in finding Sybaris was achieved this summer, with the help of an instrument called a cesium magnetometer.

The device, developed by Elizabeth K. Ralph, assistant director of University Museum's Applied Science Center for Archaeology, can find objects 20 feet underground and distinguish between stone walls, fired clay and metal at this depth.

DOUBLE SUCCESS

After the cesium magnetometer indicated the presence of the Sybarite city wall and buildings, a high-speed drill mounted on a tractor brought to the surface pieces of archaic tile and pottery dating from the 6th century B. C.

"Either to have found the long-sought site of Sybaris, or to have perfected the instruments would have been satisfying, but to have both attempts succeed was more than we had expected or hoped for," Dr. Rainey said.

Through eventual widespread use of the cesium magnetometer, he said, archeologists will eliminate much unproductive digging which has been necessary in the past. It could lead to similar new discoveries, he said.

IMPETUS SUPPLIED

The complete story of the search and discovery of Sybaris will be told in a forthcoming book by Orville H. Bullitt, Philadelphia banker, civic leader, former president of the University of Pennsylvania Hospital and for 30 years the chairman of the board of the Philadelphia Orchestra Association.

Bullitt "not only supplied the major part of the funds for this venture but has also given the drive and enthusiasm which brought it to a successful conclusion," Dr. Rainey commented.

Sybaris was founded by Greeks in 720 B. C. and quickly became the largest and richest city of its time — surpassing even Athens in size and wealth.

STANDARD SURVIVES

Major markets were with the Etruscans, to the north of present - day Rome, and the city of Miletus, on the coast of Asia Minor. Sybarite merchants imported wool, pottery and rich dyes from the east and traded with the Etruscans for iron.

With luxury came decadence, and easy living sapped the city's soul. Such were living standards there that even today, a person devoted to hedonism and the search for pleasure is called a sybarite.

The city's population may have exceeded 100,000, according to historians of antiquity.

Toward the end of its tenure as the world's wealthiest city, the people of Sybaris went so far as to sponsor a gymnastic contest in honor of Zeus at the same time the Greeks were conducting the Olympic Games.

WAR THREATENED

The Sybarites, as might be expected, offered greater prizes to attract the best Greek athletes. The end came soon afterward.

For political reasons, 500 of the wealthiest citizens of Sybaris were discredited and their estates were confiscated. When the 500 fled in self-exile to Croton, a smaller Greek trading city 75 miles south, the Sybarite tyrant Telys demanded they be returned or he would go to war.

The Sybarites mustered an army of 300,000 — according to later estimates — but its soldiers were soft.

The Crotoniates put 100,000 men in the field, led by Milo, a six-time winner of Olympic laurels. The men of Croton overwhelmed the Sybarites, taking no prisoners.

DANCING HORSES

According to one account, by Athenaeus, the Sybarites had trained their horses to dance to the music of pipes. During the fighting, the Crotoniates produced pipes and began to play, and the helpless Sybarites were carried off by their prancing horses, leaving their city defenseless.

Sybaris was sacked and burned in 510 B. C., and, according to some Graeco-Roman writers, the Crotoniates diverted one of the two rivers which flowed past the city and the waters engulfed what was left of the ruins.

Bullitt told The Inquirer his initial interest was in locating the treasure-laden tomb of Alaric, the king of the Visigoths who sacked Rome in 410 A. D.

SCOPE WIDENED

When a reconnaisance by Dr. Rainey in 1961 showed the probable site of the tomb to be buried under a modern city in [illegible] Italy, Bullitt said, it was agreed that the museum should try to find Sybaris.

In subsequent digging seasons, Dr. Rainey discovered what was tentatively suggested as the city wall. No substantial evidence, however, was discovered until last summer.

PHILA INQUIRER, 12/13/1968 P1

Background

Greeks Set Standards for Idle Rich

THE luxurious life enjoyed by the people of Sybaris was documented in the writing of more than 70 ancient Greek and Roman authors.

For example, there was a law in Sybaris under which females could be invited to a public celebration only if they were given a full year's notice to allow them enough time to have the appropriate dresses and finery made for them.

Noisemaking craftsmen such as carpenters and blacksmiths were banned from the city. The anti-noise statutes also forbade Sybarites to keep roosters, presumably because of their early morning effect on hangovers.

Wealthy Sybarites had wine carried by pipes from vineyards on their suburban estates to the waterfront, for direct loading on merchant vessels.

Fragment of limestone relief was found in the area of ancient city of Sybaris. It dates back to 540-530 B.C.

Roads leading out of the city were covered to provide shade for the wayfarer.

Not too many Sybarites ever left the city, however, for nowhere else could they find life so pleasant.

One Sybarite who did wander out of the city saw some men digging in a field and reportedly suffered a rupture just watching them.

The Roman historian Diodorus Siculus (80-10 B.C.) reported that a wealthy Sybarite, on hearing this, asked the speaker not to be astounded.

"For I," he said, "at the mere hearing of it, have suffered a stitch in my side."

Another Sybarite confessed he had lost all respect for the bravery of the Spartans when he visited them and observed the frugal and utterly miserable life they led. He concluded that Spartans were no better than the lowest of men.

"For the most cowardly Sybarite," he said, would choose to die thrice rather than endure a life like theirs."

The Sybarites were inventors, constantly [illegible] ways to make their [illegible] easy existence easier. [illegible] put together the [illegible] for steam baths and shackled their [illegible] bearers at the legs so they could not carry the hot water too fast and scald the bathers.

Reportedly, they also invented chamber pots which they carried to their banquets. Merrymakers would not have to leave the party and miss the fun.

Sybarites were also known to have established the first copyright system giving protection to the cooks who invented new delicacies.

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Devoted to Legal, Real Estate, Financial, and General News

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Legend Of Ancient Sybaris Will Be Probed In Spring According To University Council

Philadelphia —The world may begin to learn this year whether the inhabitants of the ancient Greek city of Sybaris really were the indolent, luxury-loving and voluptuous people that legend has made them.

Location of the lost site of Sybaris, from which comes the English word "sybarite" meaning a person who loves pleasure and rich living, was announced in Philadelphia in December.

In a joint statement, archaeologist Giuseppe Foti of Italy and Dr. Froelich G. Rainey, director of the University Museum of the University of Pennsylvania, said the city's site had been found buried under 15 to 18 feet of muck on the Ionian shore of Italy.

Climaxed Search

Pending diggings to begin this spring, the archaeologists said they had established "beyond a reasonable doubt" that Sybaris lies beneath the plain of Crati near Thurii, about a mile from the Ionian shoreline in the province of Cosenza in the region of Calabria.

The announcement climaxed a century-old search by scholars of many nations for the ruins of the Greek colony, reputedly the wealthiest and most decadent of its time.

Sybarites, who allegedly considered work a disgrace and enjoyed a splendor greater than that of Athens, unwittingly set the stage for their downfall with a fancy for training horses to dance to the music of pipes, according to legend.

Jealous Of Easy Life

In 510 B.C., the inhabitants of neighboring Croton, jealous over the easy life of the Sybarites, decided to take it from them. The Crotoniates invaded Sybaris and the Sybarite cavalry went out to meet the enemy. The invaders, as the story goes, pulled out their secret weapon—pipes. They began to play and the trained horses danced away with their helpless masters, leaving the path of invasion clear.

Strabo, a Greek geographer who lived in the first century B.C., wrote that after the conquest of Sybaris, the Crotoniates diverted the course of the river Crati so that it flooded the conquered city.

Dr. Rainey disagrees with the claim that Sybaris was flooded. He said archaeological evidence indicates the city lay in dunes above a flat plain and was virtually immune to flooding as set forth by Strabo.

"Perhaps this is a romanticized version of the destruction by the sea, written about 500 years after the event," Rainey said.

For Outer Space

Foti, superintendent of antiquities of Calabria, and Rainey said that research for Sybaris was aided by an instrument developed for outer space and used in archaelogy for the first time.

The instrument, a cesium magnetometer, was developed for the University of Pennsylvania Museum by Varian Associates of California with the assistance of Elizabeth K. Ralph, assistant director of the museum's Applied Science Center for Archaelogy.

Continued Page 6

Quick, Cheap, Easy Way To Eliminate Fog Solved In Test

Cambridge, Mass. — An Air Force civilian researcher believes he has found a quick, cheap way to get rid of a lot of the fog that costs airlines and highway travelers so much each year in accidents and lost time.

Vernon G. Plank of the Air Force Cambridge Research Laboratories has used a big helicopter to dispel warm air fogs—the type which constitute about 85 per cent. of all fogs.

In a three-week series of tests last month at Smith Mountain Airport, near Roanoke, Va., Plank reports warm fogs 200 feet thick were cleared repeatedly with helicopters. Clearings a mile in diameter were made in 10 minutes.

The helicopters' rotors force dry air into the fog layer from above. In the process, the dew point of the moist layer rises and the water droplets evaporate.

Cold Fogs

Cold fogs—ice crystals so tiny they do not form until well below freezing—are rare and are cleared easily by cloud seeding. Warm-air fogs can be formed by warm air passing over cool water; warm breezes being forced upward and cooled; and by nighttime radiation cooling off the earth's surface.

Plank, a 45-year-old cloud physi-

Continued Page 5

Public Attitude Put In Category By Scientists

By DELOS SMITH

New York — Four scientists were heartened by their own discovery that many people believe "human responsibility includes an obligation to help improve the state of living" for all people.

It went to show, they said, that "a strong sense of altruism is not altogether dead in our modern world."

But they were distressed that one class of people "seem less apt to express the sentiment and also show less willingness to operate on it." This was their own class—scientists, lawyers, and other professionals.

Moral Safeguards

They made their discoveries in turning up public attitudes toward volunteering for experiments which are essential if new drugs and new medical techniques are to "improve the state of living" for all. Ethical and moral safeguards for human experimental subjects are hotly debated in medical and other scientific circles.

The four scientists took notice of that by saying: "Those presently discussing and conferring about the use of human subjects, those who will in all likelihood eventually decide the fate of this major enterprise for generations to come, are of this reluctant group."

They recommended taking the discussion to the public because the subjects must come from the public and because their own findings "strongly suggest that the deci-

Continued Page 5

THE DAILY FAX AND COMMERCIAL NEWS

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INDEX FOR TODAY

NEW BUSINESS LICENSE APPLICATIONS COUNTY OF CLARK

A. Maius & Company, 2324 So Highland Room 12, LV, by Ann Maius

C & C Lock Company, 252 Convention Dr, by Carl C Moreland

Candid Pix's Photo Service, 2800 Merritt Ave, LV, by Doris E Feil

Crystal Color of Hollywood, 1116 So Main St, by Charles H Moehlman

Jewels International, 1111 LV Blvd So Room #317, LV, by Vernon C Faulstich

Las Vegas International Country Club Pro Shop, 3000 Joe W Brown Dr, by Ann Rockwell

Nevada Alarm Systems, 537 E Sahara Ave, LV, by Garhard Kinzel

The Water Company, Inc, 537 E Sahara Suite #210, by Ross H Mendenhall, Pres.

NEW BUSINESS LICENSE APPLICATIONS CITY OF LAS VEGAS

Ted A. Embrey, 300 Fremont #109-10, attorney, by Same of 1909 Embrey

Price P Sanders, 302 E Carson , insurance sales, by Same, 1825 Franklin

Henry Elliano, 1564 No Winwood, a contractor, by same of 1564 No Winwood

Loyd Const, 1027 So 3rd, contractor, by Lester Loyd, 5350 So Princess Jean

NEW BUSINESS LICENSE APPLICATIONS CITY OF LAS VEGAS

Alford Motors, 1700 E Fremont, used car sales, by John C Alford, 6099 Great Smokey Ave

Following are all a change of location to 1111 L V Blvd So #221:

Arnold Brager, of 2509 Cedar Ave #4

Wiley Eugene Keesling, of 7875 Royal Crest #5

John R McFaul, of 5871 Relatta Dr

Victor B Mastin, of 3343 Eastern Ave

Monroe Ltd, 302 E Carson, change of location, by Zack C Monroe, Leland Kendall D E Engbreson

J & L Service, 302 No Main, welding, by Joseph C Enoc

Swift's Barber, 815 W Owens change of location, by Earl Swift, of 1218 Bluff Ct.

J & M Distributors, 1323 Commerce, bakery distributors, by Jim Jackson & Luther Murray

FICTITOUS FIRM NAMES

C C Plumbing, a plumbing business, 1825 Sombrero, by John W Colina et ux, same address

B & L Showboat Union 76, a service station business, 2600 Boulder Highway, by Lonny C Neilsen, 1413 Mallard, LV

The Worlds Fairest, a beauty contest business, 542 C Elm Dr, by Charles C Hoover, aka Charles Rayburn, same address

Cont'd Page 8 Col.1

Ancient Sybaris

(Continued from Page 1)

Brought Into Play

The instrument was brought into play because excavation was ineffective since anything excavated was quickly flooded by water seeping up from below. A high speed drill mounted on a tractor was used to bring up samples of pottery, tile and pieces of numerous stone structures.

The magnetometer uses vaport from the element cesium to detect changes in the magnetic intensity of any area over which it is moved. On the plain of Crati, on the instep of the Italian boot, the instrument detected "anomolies" below ground, such as buried bricks, roof tiles and walls through changes in the magnetic intensity.

The problem of flooding may prevent in-depth excavation of Sybaris, archaeologists say. However, the Italians plan a test excavation this spring.

Rainey said Sybaris apparently defied discovery for so long because evidence indicates a land subsidence dropped the remains of the city several meters below the present sea level are four to six meters below the present land surface.

Escaped Detection

These factors, according to Rainey, explain why the ruins of Sybaris, unlike the remains of its neighboring cities, escaped detection by scientists.

The latest and successful search for Sybaris was begun eight years ago by the University of Pennsylvania Museum. In addition to cooperation from the Italian Department of Antiquities, museum scientists also received collaboration for a time from the Lerici Foundation of Rome, a pioneer in the use of electronic devices for detection of buried ruins.

Put To Death For Disturbance

Legend has it that slaves in Sybaris, which occupies an area about six miles in circumference, could be put to death for disturbing their masters' slumbers before noon.

Carpenters, blacksmiths and other workmen who made noises in pursuit of their occupations were banned from the city. And so were roosters to prevent their crowing from awakening the residents at dawn.

Sybaris was reported to have had a corps of inventors always striving to make life easier. One of their inventions was the steam bath. Water bearers carrying hot water for such baths had their legs hobbled to slow their pace and allow the water to cool so their masters would not be scalded.

Another invention attributed to the inventor crops was the chamber pot, which Sybarites carried to their banquets. The Sybarites also were reported to have established the first copyright system to protect the newest delicacies of cooks.

According to legend, there was a law in Sybaris which decreed that before women could be invited to public celebrations, they had to be given a year's notice to permit them ample time to prepare the appropriate dress and finery.

Fundamentalism, USA

A recent Gallup survey showed that Americans are, by far, the most ardent fundamentalists in the western world. Whereas the survey showed a majority of citizens in older western nations no longer believed in the devil, hell or life after death in some cases, the vast majority of Americans believe in all.

More than ninety per cent. of Americans questioned said they believed in God but only 73 per cent. in France and only 60 per cent. in Sweden. Concerning life after death, the percentage of Americans who believe in it drops to 73 per cent. Only 41 per cent. of the people believe in it in Germany, 38 per cent. in Britain and 35 per cent. in France.

Concerning hell, some 65 per cent. of Americans asked believe in hell (either of the hot coals and pitchfork type or some other) whereas only 25 per cent. of the Germans questioned, 23 per cent. of the British and 22 per cent. of the French believe in it.

The percentage of those believing in the devil drops to 60 per cent. in the United States, to 25 per cent. in Germany, 21 per cent. in Britain and Sweden and 17 per cent. in France.

From these figures it will be seen that the United States is the fundamental stronghold of the world, so to speak, where more people believe in the literal interpretation of scripture as preachers have taught in the past than in any other country.

The trend, of course, in most of the Christian world has been away from literal interpretations, and in some theology schools less emphasis is now placed on absolutes and specifics, including many points in Bible stories, than was formerly the case.

NOTICE OF TRUSTEE'S SALE
UNDER DEED OF TRUST
TF 68-2922-1
Loan 0201090-700614

NOTICE IS HEREBY GIVEN: that WESTWOOD ASSOCIATES, a California corporation, as Trustee, or Successor Trustee, or Substituted Trustee, pursuant to the Deed of Trust executed by RICHARD ALLAN ARKWARD and MAXINE ARKWARD, HUSBAND AND WIFE AS JOINT TENANTS, and recorded January 15, 1968 in Book 847 Instrument No. 680124 of Official Records in the office of the County Recorder of Clark County, Nevada, and pursuant to the Notice of Default and Election to Sell thereunder recorded October 3, 1968, in Book 903 Instrument No. 725442 of said Official Records, will sell, on Thursday, February 13, 1969, at 11:00 A.M.
at the front entrance to Pacific Western Mortgage Co., located at 401 South Third Street, in the City of Las Vegas, County of Clark, State of Nevada, at public auction, to the highest bidder for cash (payable at the time of sale in lawful money of the United States of America) all right, title and interest, conveyed to and now held by it under said Deed in the property situate in No. Las Vegas, Nevada, said County and State described as follows:

Lot 7 in Block 7 of Blocks 4, 5, 6, 7, Tract 2, North Fifth Street Subdivision, as shown by map thereof on file in Book 4 of Plats, Page 3, in the Office of the County Recorder of Clark County, Nevada.

Said sale will be made, but without covenant or warranty, express or implied, regarding title, possession or encumbrances, to satisfy the indebtedness secured by said Deed, including the fee and expenses of the Trustee and of the trusts created by said Deed, advances thereunder, with interest provided therein, and the unpaid principal of the note secured by said Deed; to-wit $19,459.66, with interest thereon from April 1, 1968 as provided in said Note.

DATED: January 3, 1969

WESTWOOD ASSOCIATES, as such Trustee
By Hazel G. Woodsworth, Assistant Secretary
(Corporate Seal)

The Daily Fax & Commercial News
January 15, 22, 29, 1969

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Synopsis of ANNUAL STATEMENT of the Portland Federal Savings & Loan Association corporation for the year ending December 31, 1968.
Location of principal office: 444 S. W. Fifth Avenue, Portland, Oregon 97204
Location or locations of business in Nevada: Reno

Cash on hand December 31, 1968 ..... $ 356,004.99
Assets..... $221,149,277.78
Liabilities..... $209,107,337.62
Income..... $ 13,621,447.49
Expenditures..... $ 2,891,330.94
Profit or Loss..... $ 10,730,116.55

I, C. M. Chase, Treasurer, do hereby certify that the foregoing is a true and accurate statement of the business transacted by said corporation during the year 1968.

/S/ Charles M. Chase

Dated January 14, 1969

The Daily Fax & Commercial News
January 21, 22, 23, 24, 27, 1969

IN THE EIGHTH JUDICIAL DISTRICT COURT of the State of Nevada in and for the County of Clark

NO. A62036
MARY JULIA GROFF,
Plaintiff
vs
GERALD WILBERT GROFF,
Defendant

SUMMONS

The State of Nevada sends greetings to the above named defendant:
You are hereby summoned and required to serve upon
PATRICK FINNEGAN, ESQ., plaintiff's attorney, whose address is
120 S. Third Street
Las Vegas, Nevada
an answer to the Complaint which is herewith served upon you within 20 days after service of this Summons upon you, exclusive of the day of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the Complaint.
This action is brought to recover a judgment dissolving the bonds of matrimony existing between you and the plaintiff.
(District Court Seal)
Loretta Bowman
Clerk of Court
By ELLEN THEOBALD
Deputy Clerk
DATED: January 16, 1969

The Daily Fax and Commercial News,
January 22, 29, and
February 5, 12, 19, 1969

Synopsis of ANNUAL STATEMENT of the Lundeen Coatings Associates corporation for the year ending June 30, 1968.
Location of principal office: 3057 Roswell Street, Los Angeles, California 90065
Location or locations of business in Nevada: c/o United States Corporation Company, Virginia & Truckee Street, Carson City, Nevada.

Cash on hand June 30, 1968.....None
Assets..... None
Liabilities..... None
Income.....$50,880.00
Expenditures.....$28,213.32
Profit or Loss.....,$22,666.68

I, David M. Satkin, President, do hereby certify that the foregoing is a true and accurate statement of the business transacted by said corporation in the state of Nevada during the year ending June 30, 1968.

S/ David M. Satkin, President

Dated January 13, 1969

The Daily Fax & Commercial News
January 20, 21, 22, 23, 24, 1969

Public Attitude

(Continued from Page 1)

sions of professional men do not necessarily represent the intent and will of the larger community."

Volunteered For Prestige

The scientists were Drs. Daniel C. Martin and John D. Arnold, both medical scientists, and Drs. T. F. Zimmerman and Robert H. Richart, who are behavioral scientists. All work at the University of Missouri Medical School in Kansas City, and they reported their findings to the New England Journal of medicine.

They found that county jail prisoners volunteered to be experimental subjects largely for the prestige it gave them in jail society. They gave "informal consent," which is standard ethical requirement for all human experiments, but despite the full information they received they proved to be no better informed than prisoners who hadn't volunteered and had had no information.

A cross-section of the Kansas City population stairstepped by social and economic status, was also questioned. From the results, the scientists "inferred that people of lower socio-economic circumstances show the greatest willingness to participate as subjects. In proceeding up the socio-economic scale, willingness to participate greatly diminishes, except for the task perceived as involving least risk or inconvenience."

All groups agreed on the importance of using human subjects. They also agreed that subjects must be volunteers and should be healthy people rather than the sick or the dying.

The prisoners were most willing to volunteer. Except for the one hypothetical experiment involving little inconvenience, not even a majority of the other groups were willing. But "with the exception of the professional group," the scientists said, "those interviewed tended to emphasize what might be called the theme of 'human responsibility.'"

Their studies involved small numbers—60 prisoners, 28 welfare recipients, 40 policemen and firemen, 28 professionals. They emphasized that their work had been "preliminary" and urged its expansion to the entire nation.

Fog Solved In Test

(Continued from Page 1)

cist, says maritime fogs "may form a bank 2,000 feet thick, and there the helicopter is useless."

The technique also is of no help in "temperature inversion" fogs which build up to similar depths. These account for much of the smog in the Los Angeles area, and occasional air-pollution problems in New York.

During World War II, the British cleared warm ground fogs from airport runways by burning big cans of oil. This technique later was refined to the use of jet engines.

However, this method is expensive and pollutants from the fuel may create particles on which water droplets form. The result would be smog.

"Now we haven't yet run the figures around but the helicopter is cheaper—much more so—than jet engines," Plank says.

His next step is further analysis of the test data from Virginia. Already, he says, the New York Port Authority, which operates that city's three major airports, wants to know more about his findings.

PUBLIC NOTICES

YOUR RIGHT TO KNOW

and be informed of the functions of your government are embodied in public notices. In that self-government charges all citizens to be informed, this newspaper urges every citizen to read and study these notices. We strongly advise those citizens, seeking further information, to exercise their right of access to public records and public meetings.

Evening Chat

Talk About Sybaris Planned

"Search for Sybaris," an illustrated talk, will be given by Orville Bullitt Sunday at 4 P. M. at the home of Mr. and Mrs. John Tyson in West Conshohocken, followed by cocktails.

Mrs. Lloyd M. Coates, of Chestnut Hill, is in charge of reservations. The benefit is a preevent of the Fairmount Park Art Association Booth at the Rittenhouse Square Flower Market, which takes place May 15. Mrs. Henry M. Watts is chairman of the booth.

Sybaris is the ancient Greek city in Southern Italy known as the Lost Sin City of Ancient Greeks. The 2,500-year-old center of Sybarite luxury, where work was considered a disgrace, is under 15 to 18 feet of earth below sea level.

The University of Pennsylvania cooperated with Italian officials in the search for Sybaris.

Mr. Bullitt, a banker and civic leader, supplied the major funds for the search. He plans a book on the "Search for Sybaris" to be published this summer.