News of Science

Jarmo Expedition

Materials that will date the two oldest known villages in which man settled down to a permanent agricultural life have been obtained in Iraq during the last year by an expedition of the Oriental Institute of the University of Chicago. Robert J. Braidwood, professor in the institute and leader of a team of scientists in the institute's Iraq-Jarmo expedition during the past season, has returned to Chicago with a new report on Jarmo, a village he found 6 years ago between Kirkuk and Sulimaniya that has been dated about 4700 B.C. The expedition also found the even earlier village of M'leffat, which probably antedates 5000 B.C. M'leffat was found during the exploration of the basin of the Greater Zab River about 100 miles north of Jarmo.

Fifty-two carbon samples from fire pits in the villages, and from earlier cave dwellings and other sites along the Fertile Crescent were collected by the radiocarbon specialist of the expedition, Frederick R. Matson of Pennsylvania State University. The samples will be processed by the radiocarbon dating method that was developed by Willard F. Libby. It is hoped that a reliable chronology of man's early settlements in western Asia can be established. Three previous samples from Jarmo were dated by Libby in 1952 at approximately 4750 B.C. The geologist member of the team, H. E. Wright of the University of Minnesota, found evidence of Pleistocene age glaciation in the Kurdish Mountains of northeastern Iraq. Impressions of plants and grains in the mud ruins of Jarmo and M'leffat were gathered by Hans Helbaek, botanist of the Danish National Museum. Pieces of bones of animals were found in the two sites and in other prehistoric habitations by zoologist Charles A. Reed of the University of Illinois. Horn cores of goats gave one clue concerning the existence of domesticated animals about 7000 years ago.

An extensive collection of existing plants, 5000 species that were found within 4 miles of Jarmo, was made by Helbaek for comparative study with the older flora. Reed also made a complete collection of modern animals, including not only domestic, but wild species such as bear, fox, and gazelle. No wild horses or cattle exist in the region today. The last wild horse was reported in the Mesopotamia desert in 1928. Wild sheep, goats, and pigs persist; specimens of these were obtained.

Although final knowledge of conditions at the time the village existed must await analysis of the thousands of specimens collected by the expedition, the general evidence indicates that the climate and environment were not greatly different in 4500–5000 B.C. than now. Ancient Jarmo appears to have been a land of limited rain, as it is today. The original inhabitants, though fewer in number and with smaller flocks, started the process of overgrazing and deforestation that resulted in the erosion and depletion of the soil so marked today. The evidence of glaciation, together with the deduction from the various collections, may permit an informed guess concerning the climatic changes over the last 40,000 years, it is reported.

Braidwood had hoped that 3 months of excavation in the spring of this year would reveal all remaining significant features of Jarmo, but during the last week of digging, a deep trench being run through a thick concentration of ash intercepted a wall more than 5 feet thick, an architectural feature not compatible with a primitive village.

The Jarmo houses were made of unbaked mud, which is not very durable. It is Braidwood's present opinion that the 27-foot accretion on the village site, with evidence of a variety of architectural renovations, represents a period of not much more than 250 years, for the early agriculturists continually rebuilt on the heaps of their disintegrated houses.

Many small unbaked clay figurines, emphasizing pregnancy, of the "mother goddess" type, were found this year. Lesser numbers of other unbaked modeling, including some figures that were recognizable as wild boar, were also found. Bowls shaped out of marble were also found. A few shards of painted pottery were found in the upper levels. Some of the stone bowl fragments show that the grinding was planned to use the dark veins of the marble to produce decorative lines in the finished bowl.

No pottery was found at M'leffat. But there is indication that trade in obsidian existed even at that time, for the nearest source was 250 miles away in what is now Turkey. Only scattered pieces of obsidian were found at M'leffat, but obsidian exists in quantity at Jarmo, as do shells from the Persian Gulf.

Other members of the professional staff of the expedition were Bruce Howe of the Peabody Museum, Harvard University, who represented the Baghdad School of the American Schools of Oriental Research and studied the terminal cave stage of life in the area in an associated project; Vivian Broman, field assistant; and Polly Jo Anderson, University of Chicago graduate student in anthropology, anthropological assistant at Jarmo.

Survey of Graduate Students

Twenty-five percent of the resident graduate students in the United States held teaching or research assistantships or fellowships in April 1954, according to preliminary findings of a survey by the National Science Foundation. *Highlights of a Survey of Graduate Student Enrollments, Fellowships, and Assistantships, 1954* (*Scientific Manpower Bulletin,* No. 5), which was recently published by the foundation, summarizes these findings, which covered more than 152,000 resident graduate students who were enrolled for a degree in an academic department in 330 institutions of higher education.

Factual information in the bulletin includes the numbers of graduate students in the United States, their distribution by academic fields, the extent to which they obtained financial assistance in the form of teaching or research assistantships or fellowships, and the sources of funds for such financial assistance. Table 1 shows the distribution of resident graduate students enrolled for a major in April 1954 by field, and the percentages receiving these types of financial assistance.

The graduate-student population covered in the bulletin included about 94,000 first-year graduate students and 58,000 advanced students. About 47 percent of the 152,067 graduate students were attending school full time. Nearly three-fourths of the graduate students in the survey were males, and in most fields of the natural sciences the proportion of women was relatively small.

Survey findings include comparative data by field on the number of graduate students who held teaching or research assistantships or fellowships and the dollar amounts of the stipends paid. Although those who received financial assistance represented about one-fourth of the total number of graduate students concerning whom information was obtained, the proportion who received stipends varied widely from one field to another. Within the natural sciences, for

Table 1. Distribution of resident graduate students by field

Field	All graduate students	Percentage with assistantships or fellowships
All fields	152,067	24.7
Life sciences	11,930	65.7
Physical sciences .	19,009	58.8
Engineering	14,249	25.2
Psychology	5,444	31.6
Social sciences ..	15,405	24.1
Humanities and arts	9,289	32.2
Health professions	1,323	39.9
Education	51,053	3.6
Other professional fields	24,365	17.4

example, about two-thirds of the graduate students were receiving some type of support, whereas in mathematics only 42 percent of the graduate students were receiving financial assistance. Nearly 70 percent of the graduate students in chemistry and about 60 percent of those in physics held assistantships or fellowships.

The median dollar amount of the stipends received by graduate students holding teaching or research assistantships or fellowships showed important differences among academic fields. In general, the stipend levels for students in education and the humanities and arts tended to be relatively low, whereas stipends in the natural sciences, engineering, and the health professions were considerably above the averages for all fields.

Not only did the survey show variations in the amounts for stipends paid in different academic fields, but also it showed wide variation in median stipends for teaching and research assistants and for fellowship holders in the same field. For example, graduate students majoring in physics and holding teaching assistantships received a median stipend of $1260; those with research assistantships received $1550; institutional fellows (university funds) received $1093; and noninstitutional fellowship holders received $1580.

Limited numbers of copies of this bulletin are available to readers who are interested in more detailed information on findings for the major fields of study or on the scope of the survey. Requests should be addressed to National Science Foundation, Washington 25, D.C.

News Briefs

■ Nearly 150 scientists from 32 nations who had attended the Geneva conference on the peaceful uses of atomic energy flew to England on 24 Aug. to spend the day in Britain's atomic research establishment at Harwell. The Soviet Union, other East European countries, and Communist China were represented in the group, which was welcomed by John Cockcroft, director of Harwell.

The visitors were told of Harwell's work in the development of prototypes and designs of nuclear reactors, some of which will soon provide England with electricity. Eighteen exhibitions of workshops were thrown open to the group, with technical experts at hand to explain details.

The models at Harwell, built for research and to examine the possibilities of extracting power commercially from the atom, are also used to produce radioisotopes for industry and medicine. In another section of the center, scientists were shown how these isotopes are withdrawn from the heart of the atomic pile and shipped for processing to chemical laboratories elsewhere in the country for issue to hospitals and factories.

D. V. Skobeltzin, a Soviet delegate to the Geneva conference, has invited Cockcroft to visit nuclear power installations in the U.S.S.R. The trip is being arranged at a time that is mutually convenient. The exact locations of the Soviet nuclear plants were disclosed for the first time during the last session at Geneva: reactors at Moscow and Leningrad, cyclotrons at Kiev and Leningrad, a linear accelerator at Kharkov, and a synchrotron at Moscow.

■ Using rockets vertically launched from aircraft, personnel of the Office of Naval Research have demonstrated the feasibility of another method of upper atmosphere research. In recent tests at the Naval Air Station, Chincoteague, Va., rockets launched vertically from a Navy Banshee fighter plane at 30,000 feet reached an altitude of approximately 90,000 feet. It is hoped that the new rocket-aircraft method, called "rockair," will afford a practical and inexpensive tool for research observations at high altitudes.

Rockets launched from planes do not attain the altitudes reached by large rockets; however, it is felt that there are many possible applications of the new plane-rocket method. The system is expected to stimulate intensified research in the upper atmosphere by permitting reseach opportunities for synoptic measurements not heretofore feasible because of cost. The method will be used to obtain measurements of ambient air temperatures, air densities, ozone concentrations, and high-altitude winds. Its use to obtain synoptic measurements over a broad geographic area during the forthcoming Geophysical Year has been considered.

The Navy has been using balloons for high-atmosphere research since 1947, when its Skyhook program was developed. Another technique, "rockcoon," which utilizes the Skyhook balloon to carry Deacon meteorological rockets aloft, has been used for studies in the auroral regions. The feasibility of this low-cost method has been demonstrated in the annual summer expeditions in northern waters. The small Deacon rockets are fired from the balloon at an altitude of 70,000 feet, above the drag of the earth's atmosphere.

The chief advantage of the new plane-rocket method over the balloon-rocket technique is the controlled-directional launching possible from aircraft. The new rockets, smaller than the Deacon rockets, were provided by the Navy Bureau of Ordnance. The Bureau of Aeronautics, which sponsored the project, assisted ONR by supplying both technical aid and personnel. The vertically launched rockets are to be used in the immediate future for upper air wind research.

■ A group of Italian scientists intends to create within the next 2 or 3 years an artificial aurora borealis that will reproduce in temperate climates the phenomenon as it is observed in the arctic. The aurora will be created by radio waves transmitted into the ionosphere.

This artificial aurora borealis will be an Italian contribution to the International Geophysical Year. Announcement of the plan was made by the Italian delegation to the international congress on the ionosphere that took place recently in Venice, Italy.

■ A second nuclear research reactor for West Germany is to be built in Munich. It will be placed under the direction of Werner Heisenberg, director of the Max Planck-Institute for Physics, Göttingen.

■ Oceanographers have been reporting so many new peaks, ridges, basins, seamounts, and other underwater landmarks that naming them all has become a major problem. Therefore, the British National Committee on the Nomenclature of Ocean Bottom Features has issued a list of 15 rules to guide the deep-sea investigators in naming their finds in a systematic manner. John D. H. Wiseman and Cameron D. Ovey have described the committee's recommendations in a recent issue of the journal, *Deep-Sea Research.*

■ A map showing where the earth's 44,000 daily thunderstorms occur is being completed by the United Nations Meteorological Organization. A report on thunderstorms states that the average one releases 50 times the energy of the first atomic bomb. Also during an average thunderstorm 110,000 tons of water pour upon an area of 8 square miles;