News of Science

American Science at World's Fair

Howard S. Cullman, U.S. commissioner general to the Brussels World's Fair, which will take place in 1958, has announced plans for the presentation at the fair of a series of notable American scientific achievements. This country's work in four main areas—the cell, the atom, the molecule, and the crystal—will be displayed in the Palace of International Science. A group of American scientists has been appointed to direct and advise on the U.S. scientific contribution to the fair.

The coordinator of scientific exhibits in the Office of the Commissioner General is Alberto F. Thompson, head of the Office of Scientific Information at the National Science Foundation. The foundation will develop and carry out the American science program at the fair.

A Scientific Advisory Committee has been appointed which will function under the general chairmanship of Paul A. Weiss, head of the Laboratory of Developmental Biology at the Rockefeller Institute for Medical Research. Weiss is also chairman of the Sub-Committee on the Living Cell.

Ernest O. Lawrence, Nobel prize winner and director of the Radiation Laboratory at the University of California, will be chairman of the Sub-Committee on the Atom; and Henry Eyring, professor of physical chemistry and dean of the Graduate School, University of Utah, will be chairman of the Sub-Committee on the Molecule.

The chairman for the Sub-Committee on the Crystal will be Cyril S. Smith, professor of metallurgy and director of the Institute for the Study of Metals at the University of Chicago, and Frederick Seitz, professor of physics at the University of Illinois, will serve as cochairman. An additional group of American scientists has been named to the four subcommittees, and other scientists will be working on the fair project both at the National Science Foundation and elsewhere.

No final decisions have yet been made about the exhibits. However, for the atom, there is a plan to show the bombardment of the earth by cosmic rays in a large cloud chamber in which the radiation particles appear as streaks of rain. Also in the atom section will be a demonstration of Willard F. Libby's carbon-dating method.

In the crystal section there will be a transistor display. The development of single-crystal "whiskers," which are even smaller than transistors but serve many of the same purposes, will also be shown.

In the molecule section the rapidly growing knowledge of the structure of these submicroscopic bodies will be exhibited. In the living cell section, a display that will utilize atomic tracer elements will demonstrate how a single green leaf produces all the necessary components of plant life through the photosynthesis of the minerals from the earth, the gases from the atmosphere, and the energy from the sun.

Smithsonian Ecuadorian Expedition

Recently discovered archeological sites in Ecuador show that the prehistoric cultures of Ecuador had important influences on cultural development in Peru and the Amazon Valley before the arrival of the Spanish in the 16th century. These findings are the result of 4 months of field work on the Río Napo in the eastern lowlands and in the Guayas Province on the coast of Ecuador by Clifford Evans, associate curator, Division of Archeology, U.S. National Museum; Betty J. Meggers, research associate, Smithsonian Institution; and Emilio Estrada, director of Museo Arqueologico "Victor Emilio Estrada," Guayaquil, Ecuador. The work was conducted under the auspices of the Smithsonian Institution and the Casa de la Cultura Ecuatoriana, Nucleo del Guayas, with the aid of a research grant from the American Philosophical Society.

Excavations undertaken on the Río Napo revealed large villages and a well-developed ceramic art, which included elaborate vessel forms and complex decoration by incising, painting, and champleve (that is, with the design background cut back from the original surface). This pottery has close resemblances to the pottery from the island of Marajó at the mouth of the Amazon. The Marajó culture is alien and seems out of place at the mouth of the Amazon, and its origin has until now been unknown. The work of Evans and Meggers indicates that this culture originally came from the headwaters of the Amazonian tributaries in Ecuador and Colombia. This is the first time that such an extensive downriver migration in prehistoric times has been proved by archeological evidence in South America. The movement probably took place a few hundred years before the arrival of the Spanish. When Orellana made his voyage down the Napo and the Amazon in the mid-16th century, the sites along the Río Napo had already been abandoned, and he found no Indians living on that river within the area embraced by the present boundaries of Ecuador.

Archeological investigations by Evans, Meggers, and Estrada in the Guayas Province of coastal Ecuador have revealed the presence of two early cultures whose characteristics show many close similarities with the early cultures of Mexico and Peru. The oldest of these has been named the Valdivia culture. The pottery of the Valdivia culture shares with the earliest pottery-making cultures of Meso-America (Mexico and Central America) distinctive traits like broad-line and fine-line incision, excision, rocker stamping, and highly polished vessel surfaces.

A large number of female figurines made of pottery indicate the existence of a religious complex. These figurines have elaborate hairdresses, suggesting that women even at this ancient time paid a great deal of attention to their coiffures, even though they were nude. Sometimes the body was painted red in various designs. Pottery of a similar style has been found in Peru, but it does not resemble that of the early cultures of Meso-America as closely as does the Valdivia culture from coastal Ecuador. This suggests that the movement that distributed this early Formative Period culture so widely from Mexico to South America traveled from north to south. The Valdivia culture must therefore be at least as old as the similar culture in Peru, which has been dated by carbon-14 as between 1500 and 1000 B.C.

Following the Valdivia culture, Evans, Meggers, and Estrada have discovered another early culture with different features, but which also resembles closely cultures in Meso-America and Peru. This has been called the Chorrera culture and has as characteristic features thin, highly polished red and black pottery, very fine incised lines, rocker stamping, and bottles with tapered spouts and handles decorated with whistle. These traits are shared with the Formative Period cultures of Tlatilco in Mexico and Chavin and Cupisnique in Peru. As in the Valdivia culture, the Ecuadorian pottery more closely resembles the Mexican than the Peruvian expression of this wide-

spread horizon, indicating in this case also that the movement was from north to south. This culture is dated from 1000 to 500 B.C.

The discovery of these two early Ecuadorian cultures is significant because it provides definite evidence of the north-south direction of movement in this early prehistoric period. Prior to the work of Evans, Meggers, and Estrada, the origin of many traits in Peru could not be adequately explained, and the relationship between the early cultures with similar characteristics in Mexico and Peru could not be determined. The archeological investigations in Ecuador thus represent an important contribution to the solution of major problems in New World prehistory.

Baghdad Nuclear Center

King Faisal of Iraq recently opened the Baghdad Pact Nuclear Center at Shalichiyah, near Baghdad. The center includes a teaching laboratory for post-graduate courses of the same standard as the isotope school at Harwell, England, and has enough electronic and radiochemical equipment for the training of 20 students in peaceful uses of the atom. Britain furnished most of the necessary technical equipment, with Iraq supplying buildings. Instruction began this month.

Sir John Cockroft, Britain's atomic energy chief, has been elected chairman of the Baghdad Pact's scientific council. The first director of the center and four of the scientific staff are from Harwell.

MIT Earth Sciences Lab

Massachusetts Institute of Technology has set up a laboratory of earth sciences to study this planet's solid interior, the atmosphere, the oceans, and the land masses between. The laboratory will be operated jointly by the departments of meteorology, geology, and geophysics and is expected to become a research center for geologists, geochemists, geophysicists, meteorologists, and oceanographers.

Handbook of Mathematical Tables

The National Bureau of Standards has begun preparation of a *Handbook of Mathematical Tables*. In addition to the elementary functions, the *Handbook* will cover almost the entire field of transcendental functions. Expected to be ready before the end of 1958, it will appear as a volume of about 1000 pages—750 pages of tables, 50 pages of graphs, and 200 pages of text.

The project is supported by the National Science Foundation, and is being carried out by the bureau's computation laboratory and numerical analysis group. Correspondence regarding the *Handbook* should be addressed to Dr. M. Abramowitz, National Bureau of Standards, Washington 25, D.C.

Ford Aids Woodrow Wilson Fellowship Program

In an effort to combat the shortage of college teachers, the Ford Foundation has announced a $25-million appropriation for a large-scale extension and development of the National Woodrow Wilson Fellowship Program. This action will support a broad program to attract able college students into the academic profession and will provide graduate fellowships to potential college teachers at the rate of 1000 a year for the next 5 years.

Individual awards, which will be applied to tuition and living expenses for the first year of graduate study, are expected to average $2200 and will require approximately $11 million of the total appropriation. Another $10 million will go to universities for aid to graduate students beyond the first year. A nationwide recruiting program will absorb about $2.8 million, and administrative expenses over the 5-year period are expected to be $1 million.

Out of the total funds appropriated, $200,000 will be made available to the Association of American Universities and its affiliate, the Association of Graduate Schools, to provide for an immediate increase of 100 Wilson fellowships for the fall of 1957—a 50-percent rise over the 200 awarded this spring. The $200,000 will be paid to the University of Michigan as fiscal agent. The present national headquarters of the Woodrow Wilson organization is in Ann Arbor, Mich.

To conduct the expanded recruitment and fellowship program planned for the next 5 years, the organization is being reconstituted as a nonprofit corporation, the National Woodrow Wilson Fellowship Corporation. The independent governing board is to be made up of a combination of laymen and educators. Board members and executive officers will be announced later.

The recruitment program will be conducted largely through a corps of 100 or more faculty members, who will give approximately one-third of their time to stimulating faculty cooperation on approximately 1000 college campuses. Four or five full-time regional field directors will assist in developing and coordinating the program.

Nominations for Woodrow Wilson fellowships will be made by local faculty members, and selection will be made by regional committees and a national committee made up of active university and college faculty members. Fellowship recipients may, in general, attend the institutions of their choice and will be free to select their own fields of study. Awards formerly were made only in the humanities and social sciences. The new program includes the natural sciences and mathematics as well.

The $10 million allocated for assistance beyond the first year will be used for grants of $2000 each to the university at which each fellow enrolls. Three-fourths of this amount must be used for financial aid to graduate students, particularly in their final year. The aid provided by this stipend is at the discretion of the university, and it is not limited to Wilson fellows. The remaining one-fourth may be used by the university for additional fellowships or for strengthening its graduate program generally.

The Woodrow Wilson fellowships were initiated in 1945 by Princeton University. In 1952 a national organization was formed under the sponsorship of the Association of American Universities to conduct an expanded program. Prior to the Ford Foundation action, the Carnegie Corporation and the General Education Board of the Rockefeller Foundation supported it with grants of funds totaling $1,150,000.

Rand on Fallout

A detailed description of how radioactive products of nuclear explosions are borne aloft and fall to earth in the vicinity of the explosion and for several hundred miles downwind appears in a paper published by three scientists of the Rand Corporation of Santa Monica, Calif., in a recent issue of the *Journal of Meteorology,* official publication of the American Meteorological Society. The findings, recently declassified, were reported by William W. Kellogg, Stanley M. Greenfield, and R. Robert Rapp. Their paper, "Close-in fallout," is the result of research by Rand for the Atomic Energy Commission.

Rand has programmed the problem of computing the fallout from an atomic cloud for solution on a high-speed electronic digital computer (IBM-701). The computer is given the appropriate wind structure and atomic-cloud dimensions, and proceeds to calculate the location on the ground of 10,000 radioactive particles which are judged to be representative of the atomic debris. The machine takes approximately 1 hour to make this calculation.

In an effort to equip the civil defense planner with a ready means for estimating the probable distribution of fallout