funds provided by the International Cooperation Administration and administered, at ICA's request, by the NIH.

All of this demonstrates that the Administration was able to do exactly the sort of work the Health for Peace Act authorizes even before the act was passed. How much such projects will be expanded now that Congress has expressed its formal intent that they be pushed is a matter that is in the hands of the Administration. So far there is not much indication that the Administration intends to respond to the new Act with a rapid expansion of its international health activities. This does not mean that Senator Hill and other Congressmen and private individuals and organizations that have worked for this legislation have been wasting their time. It does mean that the many people who have supported Health for Peace are misleading themselves if they think the fact that the proposal has been formally passed into law means that results are going to be automatically forthcoming.

Color Additives Act Passed

Congress has passed and the President has signed the final version of the color additives amendment to the Pure Food Act. It specifies the conditions of safety an additive must meet before it can be used in or on a product that comes into contact with the mouth. The Senate accepted the "Delaney clause" (*Science*, 10 June) inserted by the House. This flatly outlaws the use of any material that has been shown to cause cancer in animals or man, no matter how wide the difference between the amount that could cause cancer and the amount which might be ingested through the use of the substance in a color additive.

Federal Funds for Science

The final budget for medical research will not be set until the extra session of Congress convenes in August, but other major appropriations for scientific research and development have been cleared, and they show federal support for science climbing to a new peak, as it has every year since 1950. The exact totals will be compiled by the National Science Foundation for a report it plans to issue in November, but the rough total of money to be spent or committed in the fiscal year is known. It will be in the neighborhood of $9 billion, which is a good deal more than the total for R & D financed by industry and the universities and foundations.

A breakdown is expected to show that about $2 billion of the roughly $9 billion for R & D will be spent on research proper, as opposed to development. Between $600 and $700 million of this will be spent on basic as opposed to applied research—that is, for research not directed towards a specific practical application. About two-thirds of the research money will be spent on the physical sciences, one-third on the life sciences, a small fraction (roughly 3 percent) on the social sciences. About half of the basic research and one-sixth of the applied research is financed through grants to universities.—H.M.

News Notes

AAAS-Westinghouse Science Writing Competition Announced

The nation's newspaper and magazine writers are invited to enter the 1960 AAAS-Westinghouse Science Writing Awards competition, which annually offers two $1000 prizes, one for magazine writing and one for newspaper writing. The AAAS administers the program, and the presentations will be made at the annual dinner of the National Association of Science Writers on 27 December 1960, during the winter meeting of the AAAS in New York City.

A board of six judges prominent in the fields of journalism, science, and public affairs will select the winners. Articles on the natural sciences and their engineering and technological applications (medicine is excluded) will be considered.

The AAAS-Westinghouse Awards were established to recognize and encourage outstanding popular science writing, to stimulate public interest in science, and to foster a deeper understanding of the significance of science on the part of the general public. The program is supported by the Westinghouse Electric Corporation through a grant from the Westinghouse Educational Foundation.

Last year's newspaper award was won by Victor Cohn of the Minneapolis *Tribune* for his series "Year of the Sputnik," which dealt with the state of Russian science. Francis Bello won the magazine award for his article "An Astonishing New Theory of Color," which appeared in the May 1959 issue of *Fortune*.

Conditions

To be considered for the 1960 awards, a magazine article or a newspaper or press association report must have appeared in the United States between 1 October 1959 and 30 September 1960. Either a single article or a series of articles may be submitted. However, work published in trade journals or professional scientific magazines is not eligible.

The entries will be judged on the basis of initiative, originality, scientific accuracy, clarity of interpretation, and value in promoting a better understanding of science by the lay public. All those engaged in popular science writing, irrespective of their professional employment, are invited to participate in this year's competition.

Each entrant may submit for consideration as many as three separate articles published during the contest year. Persons other than the author may nominate entries in accordance with the rules; the deadline for all entries is *10 October 1960*.

In addition to cash awards for the authors, citations will be presented to the newspaper and magazine in which the winning articles appeared. Also, at the discretion of the judges, honorable mention citations or other special recognition for distinguished service to science journalism may be made.

Entry blanks, rules, and information concerning the competition can be obtained by writing: Dr. Graham DuShane, AAAS, 1515 Massachusetts Ave., NW, Washington 5, D.C.

Grant for Astrograph in Southern Hemisphere

The Ford Foundation has allocated $750,000 to construct an astrograph—a telescope for measuring precisely the motion of stars in our galaxy—in the Southern Hemisphere. The new star camera will measure the position and speed of stars in the third of the sky not covered by the only such astrograph now in existence, located at Lick Observatory, Mt. Hamilton, Calif.

The grant was made to Yale University, which will operate the new astrograph jointly with Columbia University. Dirk Brouwer of Yale and Jan Schilt

of Columbia will direct the program. Yale is surveying possible sites in Argentina and Chile; the instrument is scheduled to go into operation in 1962.

The astrograph differs from other great modern telescopes in that it is designed for maximum area of sky coverage with minimum distortion rather than for maximum light-gathering power. Most of the stars in our galaxy are seen best from the Southern Hemisphere. The new astrograph will increase the value of data obtained by the Lick astrograph because the two cameras will overlap in a third of the sky, permitting correlation of data from the two instruments.

Other Ford Foundation Grants

A grant of $16,000 was made to the American Society of Engineering Education for a survey of the attitudes toward academic careers of members of Tau Beta Pi, engineering honor fraternity.

The Brooklyn Polytechnic Institute was given $700,000 to help establish an honors program leading to the doctorate in engineering and the sciences.

The foundation granted $2.5 million to Princeton University and $3.4 million to Stanford University to support an expanded doctoral program in engineering.

Atmospheric Research Group

A $500,000 National Science Foundation contract with the University Corporation on Atmospheric Research will assist in establishing a national center on atmospheric research. The center will consist of a central scientific group to stimulate and supplement university research and to provide facility management for what will probably become a large research effort. Walter Orr Roberts, director of the High Altitude Observatory, Boulder, Colo., since its inception in 1940, has been named director of the group.

Research programs of the center are expected to fall into the following categories: (i) atmospheric motions, (ii) energy exchange processes in the atmosphere, (iii) water substance in the atmosphere, and (iv) physical phenomena in the atmosphere. During the coming year, Roberts will select a senior scientific staff of eight or more individuals; will rent office, laboratory, and shop facilities; and will plan a research program, with his staff and other scientists. Because of the multidisciplinary character of atmospheric research, the staff is expected to be composed of scientists from various fields, including physics, chemistry, meteorology, and engineering.

Early Hindu Texts Translated and Published

Publication of an important series, "Hindu Astronomical and Mathematical Texts," has recently been undertaken by the department of mathematics and astronomy at Lucknow University under the general supervision of Ram Ballabh. The first number in the series—the *Sūrya-siddhānta*, one of the earliest works on Hindu astronomy—appeared in 1957, and the second number has just come out. It is the *Patiganita* of Sridharacarya (8th century A.D.) in the Sanscrit original and with an English translation, introduction, and notes.

The objective in publishing the series is to bring out authoritative editions of important unpublished works dealing with ancient Indian astronomy and mathematics. The works of Bhaskara I of the 6th and 7th centuries A.D. are in press and will appear shortly as Nos. 3 to 6 of the series. Publications of this kind (text editions with translations) are exactly what is needed for studying the history of ancient science.

The exact date of composition of the *Sūrya-siddhānta* is not known. There is reason to believe that it was written before 966 and after 628 A.D. It is an accomplished work on Hindu astronomy and was without doubt based upon an older *siddhānta*. It consists of 14 chapters, of which the first 11 deal with astronomical computations and the remaining three, with cosmogony and geography, astronomical instruments, and time reckoning. In view of our present-day ideas regarding the age of the universe, it may be of interest to point out that the *Sūrya-siddhānta* supposes that the creator Brahma spent 17,164,000 solar years in the creation of the world, and that when the task was over, all the planets and the apogees and ascending nodes of their orbits were in the same straight line. This "time of creation of the world" was apparently computed to have been 1,955,883,257 years before the birth of Christ.

Sridharacarya's *Patiganita* was intended to provide a complete course of arithmetic and mensuration to meet the needs of students and businessmen. It treats addition, substraction, multiplication, division, squares, square roots, cubes, cube roots, operations with fractions, the rule of three, the inverse rule of three, the rule of five, the rule of seven, the rule of nine, barter of commodities, simple interest, partnership, purchase and sale, meeting of two travelers, wages and payments, the well-known cistern problem, and certain special problems that reduce to the solution of simple and quadratic equations. It deals with arithmetic and geometric series as well as with series of squares and cubes and with successive sums of series in arithmetic progression. The rule given for finding the time in which a sum lent out at simple interest will be paid back in equal monthly installments and the rule telling how two travelers starting at different times with different speeds and accelerations would meet twice on their journey are perhaps of special interest as being Sridharacarya's own invention.

E. C. WATSON

American Embassy,
New Delhi, India

AAAS Theobald Smith Award in the Medical Sciences

The Theobald Smith Award of $1000 and a bronze medal, which has been given yearly since 1937 (except for a lapse during the war years) by Eli Lilly and Company of Indianapolis, under the auspices of the American Association for the Advancement of Science, will be presented at the association's 127th meeting in New York, 26–31 December. Travel expenses will be paid by the donors to enable the recipient to receive the award in person.

Nominations are now being requested for the award. They may be made by fellows of the AAAS and should be sent to the secretary of the Section of Medical Sciences, Dr. Allan D. Bass, Department of Pharmacology, Vanderbilt University School of Medicine, Nashville 5, Tenn.

The prize is given for "demonstrated research in the field of the medical sciences, taking into consideration independence of thought and originality." Any investigator who was less than 35 years of age on 1 January 1960 and is a citizen of the United States is eligible. The research is not to be judged in

comparison with the work of more mature and experienced investigators.

Nominations must be received before 1 September. All nominations should be accompanied by: (i) six copies of a two-page summary in the form of a letter of nomination which details the importance of the candidate's work; (ii) six copies of any manuscripts ready for publication; (iii) six copies each of reprints of the candidate's more important published articles; and (iv) six copies of a biographical sketch of the candidate.

The committee of judges consists of William B. Bean, department of internal medicine, University Hospitals, State University of Iowa; Arthur C. Guyton, chairman, department of physiology and biophysics, University of Mississippi Medical Center; C. Walton Lillehei, professor of surgery, University of Minnesota Medical School; and Arnold D. Welch, department of pharmacology, Yale University School of Medicine. Carl F. Schmidt, University of Pennsylvania School of Medicine, chairman of AAAS section N (Medical Sciences), is chairman, ex officio; Dr. Bass will serve as ex officio secretary.

Expenditures for Industrial Research and Development in 1958

American industry spent $8.2 billion on research and development in 1958, according to a report released by the National Science Foundation. This was a 7-percent increase over the figure for 1957 and more than double the level for 1953. Industry's $8.2 billion represents about three-fourths of the national expenditure for research and development in 1958, estimated at $11 billion.

These and other data are included in "Funds for Research and Development Performance in American Industry, 1958," report No. 20 of *Reviews of Data on Research & Development*. The report is based on a survey of industrial research and development conducted for the foundation by the Bureau of the Census.

Industrial research and development financed by the federal government in 1958 amounted to $4.6 billion, or 56 percent of the industry total and triple the comparable dollar figure for 1953. Increases in the amounts spent by the federal government in support of research and development in recent years have been mainly responsible for the significant annual increases in over-all industry totals.

The aircraft and parts and the electrical equipment and communication industries, which were heavily engaged in research and development financed by federal funds, accounted for more than half the $8.2 billion total. Industries ranking next in terms of expenditures on research and development were chemical and allied products, machinery, and motor vehicles and other transportation equipment. In terms of research and development financed wholly by company funds, the chemicals and allied products industry led all others in 1958.

The aircraft and parts industry, in which there had been relatively large increases in research and development activities from 1953 to 1957, reported a slight decline in 1958. Among the industries that reported substantial increases in their research and development expenditures in 1958 were electrical equipment and communication; drugs and medicines; motor vehicles and other transportation equipment; and optical, surgical, photographic, and other instruments.

Expenditures for basic research amounted to $296 million in private industry in 1958, or 4 percent of the total spent on industrial research and development. The leading industry in terms of dollar volume of basic research was the chemicals and allied products industry, which accounted for one-third of the total. Ranking next were the petroleum refining and extraction industry and the electrical equipment and communication industry.

Copies of the report are available from the Superintendent of Documents, GPO, Washington, D.C., for 10 cents.

Foreign Students and Faculty Members in U.S. Reach New High

The 48,486 foreign students and 2539 foreign faculty members in the United States during 1959–60 constituted the largest foreign academic population in the world, according to *Open Doors 1960*, the annual publication of the Institute of International Education.

Forty-five percent of the faculty members taught, or were engaged in research in, the natural sciences, while 15 percent of the students worked in this area. The fields of medical science, social science, engineering, and agriculture accounted for an additional 41 percent of the faculty members and 48 percent of the students.

The schools with the highest enrollments of foreign students were the University of California (1918); New York University (1580); the University of Minnesota (1156); and Columbia University (1146) The institutions with the most foreign faculty members were Massachusetts Institute of Technology (194); Yale University (131); and the University of California (131). The areas from which the largest numbers of foreign students came were the Far East, Latin America, and the Middle East, in that order. Students from these areas favored engineering.

Although the total number of foreign students in the United States was at an all-time high, the percentage increase was the smallest in 6 years. The rise from 1958 to 1959 was only 2.6 percent as compared with 8.8 percent for the previous period.

The number of American students going abroad to study, however, increased 34 percent from 1958 to 1959. In the past year, 13,651 students enrolled at 520 institutions in 62 countries. Better polling, the report explains, may account for a part of this apparent increase. France attracted 1832 American students; Canada, 1681; the United Kingdom, 1352. The number of U.S. faculty members abroad decreased from 1842 in 1958–59 to 1777 in 1959–60.

Biological Writing Conference

The first writing conference of the Biological Sciences Curriculum Study is meeting at the University of Colorado, Boulder, for 7 weeks this summer. The curriculum study, an activity of the American Institute of Biological Sciences, is supported by grants from the National Science Foundation.

Seventy high school and college teachers, together with a group of publication specialists, are preparing the texts and materials for three versions of a high school biology course. One version stresses the developmental approach, another the ecological, and the third the physiological.

Arnold B. Grobman, director of the study, says that a second writing conference will meet next summer after the three approaches have been tested in 105 schools during the coming year.

Science Pavilion for "Century 21" Exposition

A science pavilion will be the main feature of the United States Government's $9 million exhibit in the Century 21 International Exposition to be held in 1962 in Seattle.

The $3.5 million World of Science pavilion, a complex of five structures joined around a courtyard pool and fountains, with arching domes on the terrace entrance, will be comparable in size and scope to the American Pavilion at the 1958 Brussels World Fair. It will house the most extensive science exhibit ever assembled by the United States, to depict the role of science in modern civilization.

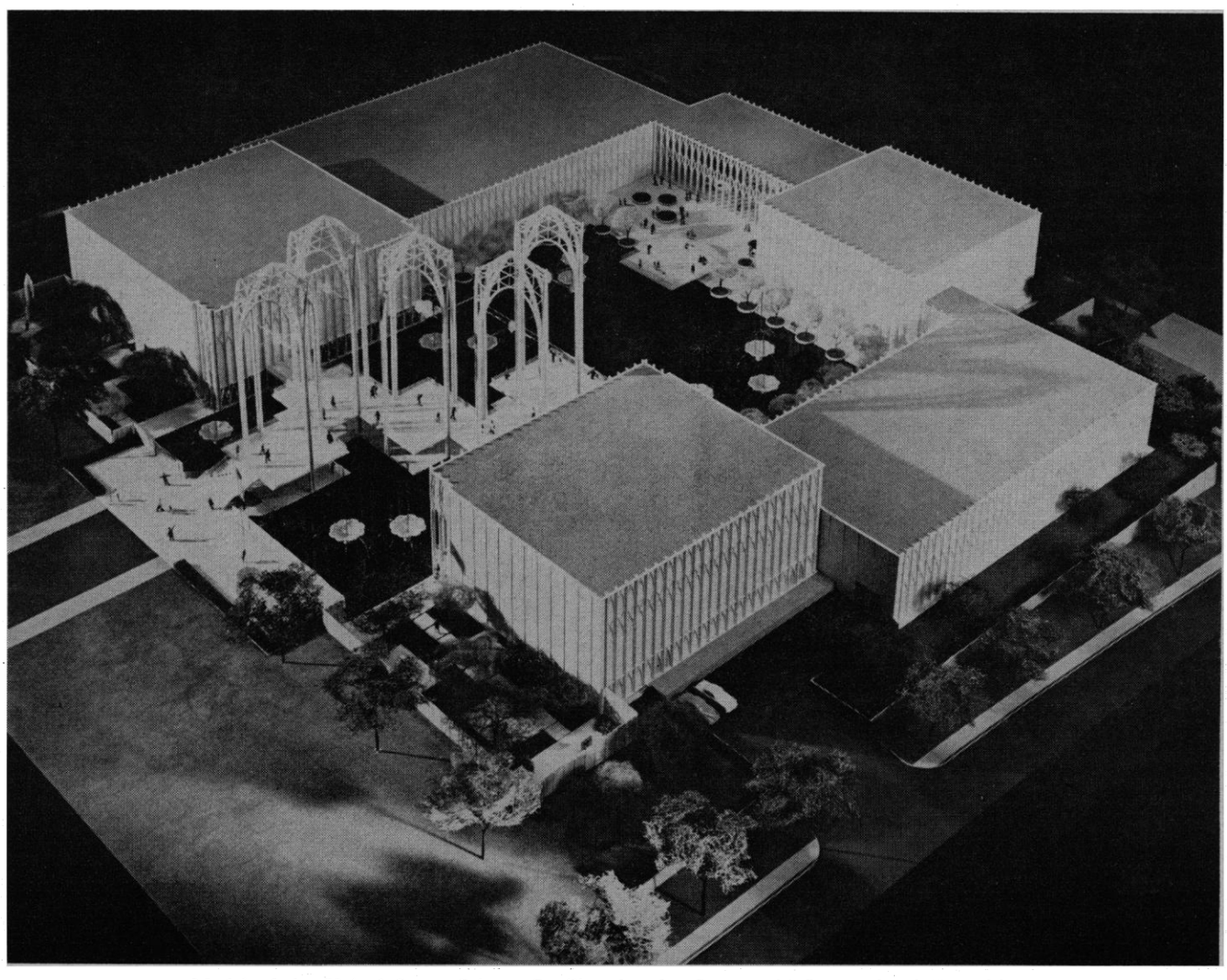
The pavilion is expected to be the dominant exhibit and the one which sets "Century 21" apart as a truly unique exposition. The $9 million to be spent by the United States represents the largest single appropriation ever made by Congress for a domestic exposition. The event itself is the first of its kind to be held in the United States since the San Francisco and New York World Fairs of 1939.

Foreign Lecturers Tour U.S.

Sixteen physical scientists, selected from 11 countries, opened an 8-week lecture tour of the United States with a 4-day conference at Temple University, Philadelphia, 28 June–1 July. This is the 2nd Visiting Foreign Staff Project of the National Science Foundation, a series begun last year to help improve science education in the U.S.

After the conference at Temple, the lecturers left for a series of one- or two-day visits at 100 summer institutes for science teachers; each visitor will lecture at approximately eight of these institutes. Six of the scientists will lecture at the summer institute of Temple, which will run until 19 August. The Temple Institute will be the only one of the institutes this year to present an advanced program of the Physical Science Study Committee.

Elmer L. Offenbacher, associate professor of physics at Temple, is director of the visiting scientists project. The 4-day briefing at Temple offered the lecturers an opportunity to test their talks before a representative group of teachers. In addition to criticism of their presentations and advice on teaching methods, the visitors were given briefings on the audiences they will face.



Model of the United States Science Pavilion for the Century 21 International Exposition.

Scientists in the News

The National Academy of Sciences has announced that four distinguished scientists abroad have been elected foreign associates, one of the highest honors that can be bestowed by the academy on a scientist who is not a citizen of the United States.

Edmond Antoine Brun, aeronautical engineer, professor, Ecole Nationale Supérieure de l'Aeronautique.

Sir **Cyril Norman Hinshelwood**, president of the Royal Society and professor of chemistry, Oxford University.

Lev Davidovich Landau, head of the theoretical section, Institute for Physical Problems of the Academy of Sciences of the U.S.S.R. and professor of physics, University of Moscow.

Luis F. Leloir, biochemist, research professor, Facultad de Ciencias Exactas y Naturales, University of Buenos Aires.

Brun is distinguished for his research in fluid dynamics and thermodynamics. Hinshelwood, who shared the Nobel Prize for chemistry in 1956, has won an international reputation for his research in thermodynamics and chemical kinetics. Landau's contributions as a theoretical physicist have been made in quantum mechanics and electrodynamics, magnetism, superfluidity, and parity. Leloir, a past president of the Argentine Association for the Advancement of Science, is known for his research in metabolism.

Two American scientists will receive honorary degrees from Oxford University on 21 July during a celebration of the 300th anniversary of England's Royal Society: **Felix Bloch**, professor of physics at Stanford University, and **Alfred N. Richards**, emeritus professor of pharmacology at the University of Pennsylvania.

Other scientists who will be honored by Oxford include **Nicolai N. Semenov** of the Institute of Chemical Physics at the Soviet Academy of Sciences; **Edgar W. R. Steacie**, president of the Research Council of Canada; and **Ojvind Winge** of the Carlsberg Laboratorium, Copenhagen.

President Eisenhower has approved the appointment of **Philip H. Abelson** as a member of the General Advisory Committee of the U.S. Atomic Energy Commission, effective immediately. Abelson is director of the Geophysical Laboratory of the Carnegie Institution of Washington, Washington, D.C.

Bernard M. Wagner, associate professor of pathology and Robert L. King professor for cardiovascular research at the University of Washington School of Medicine, has been named professor and chairman of the department of pathology at New York Medical College.

Robert B. Bennett, professor of chemical engineering at the University of Florida, will spend 2 years at the Universidade de Minas Gerais in Belo Horizonte, Brazil; he will teach chemical engineering and assist in organizing a chemical engineering laboratory and pilot plant.

Paul G. LeFevre, scientist in the physiology division of the Medical Research Center of Brookhaven National Laboratory, has become professor of pharmacology at the School of Medicine of the University of Louisville.

Dorothy M. Powelson, former associate professor of bacteriology at Purdue University, is now micro- and cellular biologist on the staff of the Stanford Research Institute, Menlo Park, Calif.

Friedrich F. Nord, professor of organic chemistry and enzymology at Fordham University since 1938, resigned at the end of June. In retirement, Nord will continue his research on lignin in his Rose Hill laboratory. Nord, who was born in Hungary and educated in Germany, is the founder of three scientific journals and the author of 360 papers.

Frank H. Connell, professor of parasitology at the University of Texas Postgraduate School of Medicine and clinical professor of parasitology at Baylor University College of Medicine, has been named assistant director of the China Medical Board of New York, Inc.

George P. Rosemond, a general surgeon known for his cancer surgery and chemotherapy studies, has been named professor and co-chairman of the department of surgery at the Temple University School of Medicine, Philadelphia.

Lester C. Mark, associate professor of anesthesiology at the College of Physicians and Surgeons of Columbia University, will spend 8 months at the Bispebjerg Hospital in Copenhagen working on studies of the effects of barbiturate poisoning on acid-base balance and kidney function.

Mahlon B. Hoagland, a biochemist credited with the discovery of amino acid-activating enzymes, has been named associate professor of bacteriology and immunology at Harvard University. Hoagland is currently assistant professor of medicine in the Harvard Medical School and at the Massachusetts General Hospital.

The following scientists retired from the faculty of the University of California, Berkeley, in June:

Margaret I. Beattie, professor of public health and director of public health laboratory courses.

Charles L. Camp, professor of paleontology and curator of amphibians and reptiles in the Museum of Paleontology.

Mary C. Jones, professor of education, lecturer in psychology, and research associate in the Institute of Human Development.

John B. Leighly, professor and chairman of the department of geography.

Austin H. MacCormick, professor of criminology and acting dean of the School of Criminology.

N. Wing Mah, associate professor of political science.

Knowles A. Ryerson, dean of the College of Agriculture and assistant director of the university's Agricultural Experiment Station.

R. Earl Storie, professor of soils and plant nutrition.

Otto Struve, professor of astronomy and former head of the department of astronomy and the Leuschner Observatory.

Two mathematicians have been named to the faculty of the College of Literature, Science, and the Arts of the University of Michigan.

Lamberto Cesari, who is on leave from Purdue University for work at the Mathematics Research Center of the University of Wisconsin, was named professor of mathematics at Michigan.

Leonard J. Savage, chairman of the department of statistics at the University of Chicago, was also appointed professor of mathematics at Michigan. Savage will have a half-time appointment in the Institute of Science and Technology during the next academic year.

Alan F. Guttmacher, clinical professor of obstetrics and gynecology at the Columbia University College of Medicine and director of the department of obstetrics and gynecology at Mt. Sinai Hospital, New York, has been named director of the Margaret Sanger Research Bureau of New York.

Lloyd A. Wood, director of the Office of Research Grants and Contracts of the National Aeronautics and Space Administration, has been named scientist for advanced technology in the Office of Program Planning and Evaluation at NASA. **Thomas L. K. Smull**, assistant chief of the grants and contracts office, will succeed Wood as director.

Ira Dyer, acoustics scientist with Bolt Beranek and Newman, received the biennial award of the Acoustical Society of America on 10 June. Dyer was cited for his work on jet engine noise analysis and noise-induced vibration in relation to missile performance.

Ralph P. Johnson, vice president and general manager of Ramo-Wooldridge, has been appointed vice president in charge of the electronics division of Thompson Ramo Wooldridge Inc.

Derrick T. Vail, professor of opthalmology and chairman of the department at Northwestern University Medical School, has been awarded the Lucien Howe Gold Medal of the American Opthalmological Society for his work as an editor, teacher, clinician, and surgeon for 35 years.

Enno Mandema, research associate in the department of medicine of the University of Illinois, has been named professor of medicine and head of the department at State University, Groningen, Netherlands.

R. E. Jentoft, of the California Research Corporation, has been named senior research chemist in the analytical and physical measurements section of the Richmond Laboratory.

Henry M. Stommel, physical oceanographer at the Woods Hole Oceanographic Institution, has been named professor of oceanography at Harvard University. Stommel is the author of the theory of ocean currents which explains the flow of warm streams in masses of colder water.

The following have been appointed to the National Science Board by President Eisenhower.

William O. Baker, vice president for research, Bell Telephone Laboratories, Murray Hill, N.J.

Rufus E. Clement, president, Atlanta University.

Conrad Elvehjem, president, University of Wisconsin.

William W. Rubey, geologist in charge, Division of Area Geology and Basic Sciences, U.S. Geological Survey.

Glenn T. Seaborg, chancellor, University of California, Berkeley.

Eric A. Walker, president, Pennsylvania State University.

Malcolm M. Willey, vice president for academic administration, University of Minnesota.

Clement and Willey will serve the remainder of terms which expire in 1962 and 1964, respectively; the others received full 6-year appointments.

Charles A. Thomas retired from the faculty of Pennsylvania State University as professor emeritus of entomology after 35 years of service, on 30 June. Thomas, who is known for his work on mushroom pests, is professor of economic entomology with the Pennsylvania Experiment Station.

Harrison M. Tietz retired from Pennsylvania as professor emeritus of anatomy and physiology after 34 years.

Recent Deaths

Walter Baade, Göttingen, Germany; 67; visiting professor of astronomy at Göttingen University; retired in 1958 after 27 years with the Mount Wilson and Palomar Observatories of the California Institute of Technology and the Carnegie Institution of Washington; renowned for observations that provided the basis for current theories of the evolution of stars and led to important corrections in the cosmic distance scale; 26 June.

Alberto C. Blanc, Rome, Italy; 53; professor of paleethnology at the University of Rome and director of its Institute of Paleethnology; honorary member of the Prehistoric Society of London; 4 July.

Edward C. Elliott, Lafayette, Ind.; 85; president emeritus of Purdue University, which he headed from 1922 to 1945; 16 June.

Raymond G. Fuller, Bar Harbor, Me.; 74; sociologist who was widely known for his work in the improvement of child labor conditions and in the promotion of mental health; 16 June.

Cruz A. Gallastegui, Spain; director, Mision Biologica de Galicia, Pontevedra, Spain; formerly a student at the Bussey Institution of Harvard University and assistant in genetics at the Connecticut Agricultural Experiment Station; 7 June.

Sol W. Ginsburg, New York, N.Y.; 60; psychiatrist and psychoanalyst who contributed significantly to research and to the development of new approaches to hospital and community mental-health services; associate professor of clinical psychiatry at the Long Island College of Medicine; 5 July.

James H. Graham, Madision, N.J.; 81; former dean of the College of Engineering at the University of Kentucky, Lexington; 24 June.

Herman E. Hayward, Riverside, Calif.; 68; director of the U.S. Salinity Laboratory in Riverside for the past 15 years and member of its staff for more than 20 years; former professor of botany at the University of Chicago; 31 May.

Frederick C. Leonard, Los Angeles, Calif.; 64; professor of astronomy at the University of California, Los Angeles, where he had taught since 1922; was organizer, first president, and for many years editor of the publications of the Meteoritical Society; 23 June.

Warren Moore, Raphine, Va.; 67; retired consulting entomologist; specialist in insecticides, insect nutrition, and insect repellents; 11 June.

Martin J. Pollak, La Jolla, Calif.; 44; senior scientist with the Inter-American Tropical Tuna Commission; research associate of the Scripps Institution of Oceanography; 5 June.

Hubert G. Schenck, Palo Alto, Calif.; 62; paleontologist; professor of geology at Stanford University; former chief of the Mutual Security Administration Commission; 19 June.

Charles Singer, London, England; 84; historian of science and professor emeritus, University of London.

Lloyd E. Thomas, Portland, Ore.; 56; biochemist at Good Samaritan Hospital, Portland; formerly on the staff of the Medical School of the University of Missouri; 13 June.

George Urdang, Madison, Wis.; 78; historian of pharmacy; retired as the University of Wisconsin's first full professor in the history of pharmacy; former director of the American Institute of Pharmacy; 27 June.