Council member, with the suggestion that these be submitted, if appropriate, to the Affiliated Societies for consideration along with an indication of action being taken to implement the resolutions, and with a reminder that Council members may submit appropriate resolutions originating in the Affiliated Societies for consideration by the Council or Board.

Resolution on Agenda and Resolutions Committee for 1959. Pending the report of the Committee on Council Activities and Organization, the Council requests the President to appoint a Special Committee on Council Agenda and Resolutions for 1959.

Resolution on International Travel and Communication. As indicated in the Report of the 1958 Parliament of Science, "the pursuit of knowledge is an activity of the human race, not an activity of political subdivisions." History has shown that our country has gained greatly from the visits and collaboration of scientists from other countries.

The Council of the American Association for the Advancement of Science notes with gratification that the changes in the U.S. passport regulations have improved international communication in science.

It is hoped that the issuance of visas and credentials may be further facilitated so as to permit the unimpeded travel of scientists throughout the world.

Resolution on Control of Nuclear Weapons Test. In the more than ten years of world-wide concern about the control of nuclear weapons and the exposure of human populations to increasing levels of radioactivity, scientists have carried a multiple responsibility. As scientists, it has been—and remains—our task to maintain the traditional devotion of scientific knowledge to the advancement of human welfare. This requires that the unprecedented power of nuclear energy be used for creative rather than destructive purposes. It is also our responsibility, through continuing scientific study, to extend our knowledge of the effects of radiation, including that from nuclear explosions, on human populations, and to explore techniques for nuclear controls. The reports of the United Nations Radiation Committee and the Radiation Committees of the National Academy of Sciences, which evaluate the known biological effects of radioactive exposure, and which recommend that all such exposures be kept at the lowest possible levels, represent major scientific contributions to the solution of this urgent problem.

It is our further task to help in the transmission and translation of this knowledge to the public, for the final and effective decisions on nuclear energy control must be made not by scientists alone, nor by the military, but by all citizens—and only an informed public can decide wisely.

The arena of decision now has moved to Geneva, where representatives of those nations which possess nuclear weapons are attempting to negotiate an international system to suspend the further explosions of such weapons. We believe that these negotiations represent a bright hope for the translation of scientific knowledge into effective public policy on a question which—literally—involves the survival of civilization. As both scientists and citizens, we have a deep concern with the success of the Geneva negotiations.

BE IT RESOLVED, therefore, that the Council of the American Association for the Advancement of Science express its profound hope that the Geneva Conference negotiations will prove successful.

The Council requests the President of the Association to transmit the sense of this resolution to the Geneva Conference through appropriate channels.

Resolution on Federal Aid to Education. The Council of the American Association for the Advancement of Science welcomes the National Defense Education Act of 1958 as further confirmation of the principle that the Federal Government should share in the responsibility for the support of education.

AAAS Annual Meeting Awards

The following awards were presented during the annual AAAS meeting, which took place in Washington, D.C., 26–31 December.

Newcomb Cleveland Prize. Jerzy Neyman and Elizabeth L. Scott of the Statistical Laboratory, University of California, Berkeley, received the 31st AAAS Newcomb Cleveland Prize for a paper entitled "On Certain Stochastic Models of Population Dynamics." This $1000 award is given annually by the Association to the author or authors of a noteworthy paper presented on a regular program of the meeting and representing an outstanding contribution to science.

A stochastic model of a natural phenomenon means a system of mathematically expressed hypotheses representing the given phenomenon as a particular combination of several "elementary" chance mechanisms, such as tossing a coin or drawing a ball out of a bag. With reference to biological phenomena, the credit for the hypotheses underlying the model belongs to biologists. The role of the mathematicians is limited to expressing these hypotheses in a mathematical form and to deducing verifiable consequences. The value of a model found to be consistent with a number of the manifestations of the phenomenon is partly esthetic and partly utilitarian, due to the possibility of predicting important manifestations which, momentarily, are difficult to observe.

The paper discusses three specific models with which the authors have been concerned: struggle for existence, phenomenon of clustering of populations, and carcinogenesis.

Theobald Smith Award. Albert Sjoerdsma, head of the experimental Therapeutics Section of the Laboratory of General Medicine and Experimental Therapeutics of the National Heart Institute, Bethesda, Md., received the Association's fourteenth Theobald Smith Award in Medical Sciences for his research on amines. The award, which is supported by Eli Lilly and Company, consists of $1000, a bronze medal, all travel expenses to and from the meeting, and all expenses at the meeting for its duration. It is given for "demonstrated research in the field of medical sciences, taking into consideration independence of thought and originality." The recipient must be less than 35 years of age as of 1 January of the year in which the award is made, and must be a U.S. citizen.

Sjoerdsma's interest in amines focused early on the new vaso-active amine, serotonin, prompting him to study the metabolism of patients with malignant carcinoid, a tumor of intestinal serotonin-producing tissues, the physiologic activity of which was virtually unknown before 1954. Since 1954 his studies of the serotonin metabolism of carcinoid patients have disclosed much of what is known about the role of serotonin overproduction in the symptoms of this tumor. Sjoerdsma's application to carcinoid patients of a chemical test (which he helped develop) for the urinary serotonin metabolite, 5-HIAA, has now established this ingenious test as the method for diagnosing the malignant carcinoid. This previously almost unknown tumor has consequently been found to be relatively common.

His studies of pheochromocytoma, another tumor which produces adrenalin and other catechol amines, have demonstrated in man much of the biochemistry of adrenalin metabolism which had previously been known solely from studies in animals.

His clinical and experimental studies on the amines in mast cell tumors demonstrated for the first time that serotonin is not secreted by human mast cells, as was previously believed from studies in animals. The work with the malignant carcinoid, pheochromocytoma, and mast cell tumors has made Sjoerdsma an authority on "secreting" tumors.

Another clinically important facet of his contribution to medical understanding of amine metabolism has resulted

Paul E. Klopsteg, president of the AAAS, presents the AAAS–Campbell Award to Karl Maramorosch of the Rockefeller Institute, while L. P. Reitz, chairman of the award committee, looks on. [Courtesy Chase, Ltd., Washington, D.C.]

from his work with compounds which inhibit monoamine oxidase, the enzyme primarily responsible for destroying amines in the body. The findings of Sjoerdsma and his colleagues have shown that these enzyme-inhibiting compounds —particularly ipronazid and JB-516— are capable of producing marked and sustained lowering of blood pressure in hypertensive patients. Thus the biochemical and pharmacologic studies of monoamine oxidase inhibition apparently have led to the opening of a new approach to the treatment of hypertension.

Sjoerdsma has now received a special National Institutes of Health Traineeship to work with Professor Jan Waldenström, University of Lund, Malmö, Sweden, beginning 1 June 1959.

Rosenthal Award. Harry Rubin, associate professor of virology, University of California, Berkeley, received the AAAS–Anne Frankel Rosenthal Memorial Award for Cancer Research. This $1000 award is provided by the Richard and Hinda Rosenthal Foundation and was given for the fourth time at the recent meeting.

Rubin has a basic interest in host-virus relationships. During the past several years, his research has centered on the interaction of Rous sarcoma virus and susceptible cells. Prior to the initiation of his studies in this area, investigators had worked on the problem only at the level of the whole tumor and the whole animal. Rubin, however, was interested in the virus-cell relationship at the level of the individual cell.

As a result of his inquiries, both at the California Institute of Technology in collaboration with graduate student Howard Temin and at the University of California, Rubin succeeded in developing a practical, precise, and reproducible technique for assaying in tissue culture both the amount of virus and the number of Rous sarcoma cells present. The development of this assay technique has permitted a variety of experiments that have revealed several types of important new information on the cell-virus relationship. For the first time in virus work, it was clearly demonstrated by Rubin and Temin that an infected cell could produce virus and continue to divide. This characteristic distinguishes tumor viruses from all other viruses thus far investigated.

In addition, Rubin was able to prove that a single infectious unit of Rous sarcoma virus is adequate to initiate a tumor. The virus was shown to be capable of causing either an ectodermal or mesodermal tumor in the chick embryo with equal efficiency, depending only on the type of cell infected. This was in contrast to the accepted idea that a tumor virus is restricted to one type of tissue.

Rubin also demonstrated that the Rous sarcoma virus is produced at an extremely slow rate by infected cells and is released gradually and continuously by most, if not all, of the cells derived from the tumor.

Rubin has shown, in tissue culture, that a single virus particle can infect and transform a normal cell into a malignant cell. His findings further suggest that the genetic material of the virus must be integrated with that of the cell before production of the virus and formation of the tumor can begin.

Gould Award. Robert F. Rushmer, professor in the department of physiology and biophysics, School of Medicine, University of Washington, Seattle, received the third AAAS–Ida B. Gould Memorial Award for Research on Cardiovascular Problems. This $1000 prize is supported by the Richard and Hinda Rosenthal Foundation. Rushmer was honored for developing new methods of recording heart function.

Rushmer was trained as a physician but became interested in research in problems of aviation medicine during World War II. He learned to fly and conducted research on many subjects, including "blackout." These studies required the development of new forms of instrumentation and led to a continuing interest in the application of modern technical advances to the study of function and control of the heart and blood vessels.

Most of the theories about heart function were derived from investigations on experimental animals under anesthesia. In general, anesthetics and experimental procedures depress the nervous system and distort the control mechanisms so that the heart function is highly abnormal. During the past decade, Rushmer and a group of colleagues skilled in different specialties have pioneered new methods of recording the function of the heart in intact experimental animals for long periods of time without inflicting pain or discomfort. For example, the new developments in recording techniques and electronic computers provide continuous records on moving paper of eight different characteristics of the main pumping chamber of the heart. These records constitute a veritable engineering-type analysis of the changes in the heart's performance while an experimental animal is walking, running, eating, or sleeping. A group of surgeons practicing in the community has collaborated for more than 10 years to develop painless procedures for implanting miniaturized measuring instruments. Days or weeks later, measurements are made without discomfort to the animal and with minimal interference with function. Such studies are essential to determine the importance of the brain and nervous reflexes in regulating the performance of the heart.

Campbell Award. The AAAS-Campbell Award for Vegetable Research, established last year by the Campbell Soup Company, was given to Karl Maramorosch of the Rockefeller Institute for Medical Research, New York. The award consists of $1500 and a bronze medal given for "an outstanding single research contribution, of either fundamental or practical significance, relative to the production of vegetables, including mushrooms, for processing purposes, in the fields of horticulture, genetics, soil science, plant physiology, entomology, plant pathology, or other appropriate scientific areas."

Maramorosch was honored for his paper on "Cross Protection Between

Two Strains of Corn Stunt Virus in an Insect Vector" that appeared last October in *Virology*. This report, however, simply happens to be the most recent from Maramorosch's series of studies on viruses, virus diseases, and virus transmission. In fact, he has written 56 other papers on these interrelated problems.

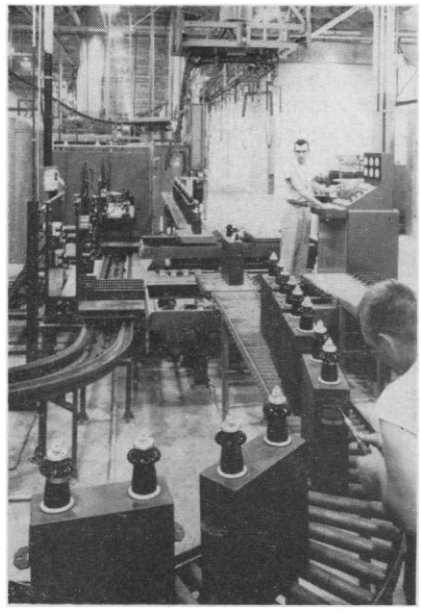
Corn stunt disease was described for the first time in 1945, when it appeared in California and Texas. A leafhopper is a vector of the causative virus. The corn stunt virus requires a very long incubation period in the maize plant and in the insect vector. It can be transmitted mechanically from insect to insect but not from plant to plant. It can be maintained in serial passages in the leafhopper. The disease is of greater economic importance in Mexico than in the United States. In a field investigation carried out in 1955, the occurrence of two strains of corn stunt virus was noticed in Mexico. Subsequent tests were carried out to investigate the interrelationships between the two causative strains of stunt virus.

For many years cross-protection tests have been used as a routine method for determining strain interrelationships of plant viruses. Two strains of corn stunt virus, designated as Rio Grande (R.G.) and Mesa Central (M.C.) are easily distinguishable in infected sweet corn plants on the basis of differences in leaf discoloration. They were therefore chosen for a study of possible strain interference in vectors. Maramorosch had previously shown that in the case of aster yellows, plant viruses multiply in their insect vectors. He established this for sweet corn stunt viruses also.

The experiments for his prize-winning work demonstrated that interrelationships between strains of viruses in arthropod transmitters may not become apparent unless the acquisition feeding periods are adequately long or adequately spaced. Protection by R.G. virus against the M.G. strain was rendered detectable only after R.G. virus was given adequate time to become well established in the insect host.

These results confirm Kunkel's original discovery that a plant virus that multiplies in its insect vector may protect this vector against infection by a related strain of virus. Whenever the strains of aster yellows virus had adequate opportunity to become established in the vector, cross-protection was complete. The relationships of R.G. and M.C. strains of corn virus, revealed by the present tests, seem to represent the first instance of a unilateral protection by a plant virus in an insect vector.

Industrial Science Award. The Westinghouse Electric Corporation won the AAAS Industrial Science Achievement Award, which is administered by Section P—Industrial Science. The company was honored for developing a machine called



An early version of Opcon "mans" one of the test stations on the capacitor production line at the Westinghouse switchgear plant in Bloomington, Ind.

Opcon (for "optimizing control") that is based upon a new concept in control systems; it replaces the pre-set, routine functions performed by a conventional system with the humanlike process of reaching a logical conclusion through experiment. The machine discovers for itself the difference between right and wrong decisions and makes impartial judgments based upon its own experience.

The idea of replacing the human function in control was first undertaken as a theoretical study at the Westinghouse Research Laboratories. About 2 years ago research mathematician, Robert Hooke, developed the required mathematical logic, which was demonstrated experimentally in a device called Automex (for "automatic experimenter"). The logic first was translated into functional apparatus under the guidance of R. E. Wendt of the Westinghouse Headquarters Manufacturing Laboratory. Then, under the direction of W. G. Evans, improved full-scale systems were developed by the company's New Products Engineering Department.

An Opcon optimizing control now is automatically performing a test on the entire output of capacitors in a new Westinghouse plant in Bloomington, Ind. For the past several months, a more-advanced version has been installed on a dehydrogenation miniplant of the Dow Chemical Company in Midland, Mich. This Opcon unit has successfully performed the difficult task of experimentally operating the miniplant at chosen optimum conditions and has good potential for full-scale plant operation. Another Opcon system is being built to run a complete distillation column in a refinery of the Sun Oil Company in Marcus Hook, Pa.

Other Prizes. Other prizes, not under AAAS sponsorship, were awarded during the Association's annual meeting.

Guy Suits, vice president and director of research, General Electric Company, received the William Proctor Prize for Scientific Achievement, which is awarded annually by the Scientific Research Society of America. It was presented at a luncheon meeting of Section X—Science in General.

John F. Fulton, Sterling professor of the history of medicine at Yale University, and for many years chairman of Yale's physiology department, received the Sarton Medal of the History of Science Society. The award, which is supported by Chas. Pfizer and Company, was presented at a joint dinner meeting of Section L—History and Philosophy of Science and of the History of Science Society.

Renalto Dulbecco, professor of biochemistry at California Institute of Technology, received the John Scott Award of the Board of City Trusts of Philadelphia, for his development of a method for demonstrating the presence of viruses in tissues. His method provided a technique for the production of plaques with animal cells. The award was presented during a dinner meeting of Section F—Zoological Sciences.

AEC and Euratom Invite Joint Research Proposals

The United States Atomic Energy Commission and the Commission of the European Atomic Energy Community have announced that they are prepared to receive proposals for research and development centered on nuclear power reactors to be built under the joint U.S.–Euratom program. This research and development program is an integral part of the joint program contemplated by the Agreement for Cooperation between the U.S. and Euratom signed in Brussels in November 1958. The over-all industrial objective is the installation within the next 5 to 7 years in the Euratom Community of U.S.-type power reactors that will have a total electrical generating capacity of approximately 1 million kilowatts.

While the agreement will enter into force only upon completion of statutory requirements in the United States and Euratom, proposals are being solicited at this time in order to expedite the process of review and evaluation so that the research and development program can be initiated promptly upon the effective date of the agreement. It is hoped that the agreement will become effective early in 1959.