News and Notes

Report on Como Conference on Cosmic Radiation

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From September 11 to 16 some of the world's foremost physicists gathered at Como (Italy) to celebrate the 150th anniversary of Volta's discovery of the electric pile. The main topic of discussion was the field of cosmic radiation, with particular emphasis on its elementary particle aspects. The conference was organized by the Italian Physical Society, under the sponsorship of the International Union of Physics (Unesco) whose president, H. A. Kramers (Holland), originally suggested the idea of holding an International Colloquium on Cosmic Rays this year. G. Polvani (Milan), president of the Italian Physical Society, presided over the conference and he, together with E. Amaldi and G. Bernardini (Rome) were the chief organizers of the scientific meetings.

During the conference a number of social events took place which were characterized by extraordinary hospitality and cordiality extended to all participants by the Italian scientists, the Italian government, and Italian industry. Every one of us who attended the conference will vividly remember the great informality of the meetings and the cordial atmosphere among physicists traveling to Como from all over the world.

The Volta Celebration at Como was preceded by a Conference on Nuclear Physics and Electrodynamics held in Basel from September 1 to 10. These two conferences represented the first really large international gatherings of physicists since World War II. The meetings demonstrated that an exchange of ideas is badly needed, and that true cooperation between scientists is of the greatest importance for the future progress of science.

More than 400 physicists attended the Como conference. A few of their names might make for orientation: E. Fermi, I. I. Rabi, J. Schwinger, E. M. McMillan, R. B. Brode, E. Segre, G. Placzek, and M. Schein (United States); G. Polvani, E. Amaldi, G. Bernardini, and B. Ferretti (Italy); W. Pauli, P. Scherrer, P. Huber, and F. Fierz (Switzerland); J. Clay and H. A. Kramers (Holland); G. P. Thomson, P. M. S. Blackett, C. F. Powell, J. G. Wilson, G. D. Rochester, and D. E. Perkins (England); L. Leprince-Ringuet, M. Morand, J. Daudin, R. Maze, and A. Rogozinski (France); W. Heisenberg, W. Bothe, G. Molière, W. Gentner, E. Bagge, and F. Bopp (Germany); L. Meitner, I. Waller, and H. Alfvén (Sweden); G. Occhialini, M. Cosyns, and C. Manneback (Belgium); L. Janossy (Ireland); C. Moeller (Denmark).

Most of the meetings took place in the famous Villa Olmo; in addition some evening sessions were organized in the Tempio Voltiano (Volta Shrine).

On September 11 the conference was officially opened by Enrico Fermi, who urged a closer cooperation among scientists of the world. The scientific meetings started on September 12. The morning session was devoted to the question of the origin of cosmic rays. E. Fermi (Chicago) presented a very clear picture of the present status of the problem, and he discussed some of the important ideas which have been proposed so far. He pointed out that his own theory, in which he proposes a new mechanism of accelerating charged particles in magnetic fields of our galaxy, gives a rather satisfactory explanation of cosmic ray observations made on primary protons. However, considerable difficulties arise in applying this mechanism to the heavy nuclei present in the cosmic radiation.

H. Alfvén (Stockholm), the discoverer of the magnetohydrodynamic mechanism of accelerating charged particles in free space, discussed the possibility that cosmic radiation may originate in the solar system. The main acceleration is supposed to take place in the sun's magnetic field. Solar activity, in particular magnetic storm effects, was also discussed.

E. Bagge (Hamburg) proposed that most of the cosmic radiation may originate beyond our own galactic system. His conclusions were mainly based on experiments of W. Rau, who claims to have found a variation of 0.7 percent in the intensity of the hard component with sidereal time.

J. Clay (Amsterdam) presented new data on the increase of the sea level intensity of cosmic rays during solar flares. In more than thirty instances, small variations of a few percent were noticed. Marcel Schein (Chicago) mentioned in the discussion that during a balloon flight on May 11 an increase of 50 percent occurred in the rate of nuclear disintegrations close to the top of our atmosphere (95,000 feet). This unusual increase must have been due to the large solar flare observed by A. H. Shapley (National Bureau of Standards) a few hours before the balloon flight took place (*Science*, 1949, **110**, pp. 159–161).

In the afternoon and evening sessions, problems concerning giant atmospheric showers and mesons were discussed. J. Clay introduced the subject of extensive showers by emphasizing the complexity of phenomena occurring in these very energetic events. He presented a number of new results on the absorption of secondary electrons and photons in air showers. E. Amaldi reported an experiment of the Rome group in which the frequency of high energy electrons occurring in extensive showers was studied. The results indicate that there are more electrons of very high energy present in these showers than expected from cascade theory alone. This result might, therefore, be considered as pointing in the direction of the assumption that extensive showers originate from nuclear collisions between very high energy particles.

J. Daudin (Paris) showed a number of interesting cloud chamber pictures of penetrating showers and discussed the relation between penetrating showers and air showers. R. Maze (Paris) reported on his counter studies of extensive showers.

C. Franzinetti (Bristol) and S. Rosenblum (Paris) presented the results of their experiments on the magnetic deflection of charged particles studied by the method of placing photographic plates between the pole faces of a large electromagnet. The magnet is located on Jungfraujoch at an altitude of 12,000 feet. According to Franzinetti and Rosenblum, it was not possible definitely to identify any new electrically charged elementary particles in addition to those already known to exist (electrons, μ-mesons, π-mesons, and protons). In particular there does not seem to be clear-cut evidence for the existence of the τ-meson of a mass around 1,000 electron masses, on the basis of these investigations. Further experiments are needed to settle this important question.

Another group of papers presented by the Bristol and Brussels groups dealt with the problem of the spontaneous decay and nuclear capture of μ-mesons. A. L. Hodson and A. Loria (Manchester) presented a paper in which they described a new method of controlling a Wilson cloud chamber by an internal counter. The interesting feature of this new method is that one can see the cloud chamber tracks of minimum ionization particles inside the counter. The counter itself consists of an inside wire of tungsten surrounded by six rods placed at the corners of a hexagon.

The meeting on September 13 was opened by C. F. Powell, who gave a detailed account of the work carried out under his direction in Bristol on transmutations produced by cosmic ray particles of great energy. A number of interesting new events of nuclear disruptions, found in electron-sensitive emulsions, were discussed. Some of these events are of particular importance, since they represent phenomena in which several mesons and nucleons are emitted from a single parent nucleus hit by a very high energy particle. A very spectacular nuclear disintegration (star with more than 50 prongs) of this type was described by L. Leprince-Ringuet (Paris) who reported on his investigations of high energy nuclear phenomena in cosmic radiation. The experiments were carried out partly in free balloons up to an altitude of about 96,000 feet. A picture of an interesting star of 52 prongs was shown, in which the collision of an energetic heavy nucleus of charge $Z \approx 17$ with a silver nucleus was clearly visible.

M. G. E. Cosyns (Brussels) gave an account of his investigations of stars containing showers of relativistic particles. A special analysis was made in order to establish the nature of the relativistic particles. By using the methods of grain counting and multiple scattering of tracks in photographic emulsions it was found that most of the particles carrying an ionization less than two times the minimum are mesons and those carrying an ionization between two and five times the minimum are protons. At mountain altitudes, most of these stars are generated by neutral primaries.

G. Occhialini (Brussels) gave a progress report on the techniques involving electron-sensitive nuclear plates. These plates have been available for a little more than a year. It is astounding what has already been accomplished in high energy physics through the efficient use of electron-sensitive emulsions. Occhialini discussed some new possibilities for the future, such as the magnetic deflection of tracks inside the emulsion. He pointed out that measurements on relativistic pairs seem to show that in this region of energy the grain density is not very sensitive to variations in the specific ionization.

G. Bernardini (Rome) presented interesting new data on cosmic ray stars having a smaller number of prongs (small stars). He discussed the nature of these stars and their origin in connection with the nucleonic component of the cosmic radiation.

M. Morand (Paris) gave a detailed description of a new method by which the east-west asymmetry is cosmic radiation was determined with the aid of tracks in nuclear emulsions. The results obtained so far indicate that we are dealing here with a promising method for future use in this field of cosmic ray research.

The reports on September 13 clearly demonstrated the usefulness of the photographic emulsion technique in the field of high energy physics.

The day of September 14 was devoted to an excursion to the University of Pavia, where a special celebration was held in honor of Volta's scientific achievements. The key address was delivered by L. Leprince-Ringuet, who was delegated by the French Academy to speak for M. de Broglie on the subject, "Deux grands savants d'il y a 150 ans: Laplace et Volta, tous deux membres de l'Institut de France."

The meeting on the 15th was opened with an address by P. M. S. Blackett (Manchester), who spoke on cloud chamber studies of penetrating showers at sea level. The measurements were carried out with a cloud chamber in a magnetic field of 7,000 gauss. A number of new results concerning the sign and charge of the penetrating particles, their momentum spectrum, and their angular distribution were presented. According to Blackett, the number of protons and mesons in penetrating showers is about equal at sea level. Some very interesting pictures were shown in which penetrating showers appeared to be produced by negative particles. Whether one is dealing with negative protons or negative mesons could not be decided from the evidence at hand.

R. B. Brode (Berkeley) reported on a number of interesting new investigations carried out in his laboratory. The mass spectrum of mesons was studied by means of accurately controlled cloud chambers on White Mountain (California) at an elevation of 12,000 feet. Some indication was found that singly charged particles of mass between 600 and 1000 electron masses (τ-mesons) may exist in the cosmic radiation. It seems remarkable, however, that all particles of this kind found so far carry a positive charge. By deflecting charged particles in magnetized iron an accurate measurement of the positive excess of mesons was carried out at sea level. Brode found a value of 1.32, which is somewhat higher than the value

previously reported by Bernardini and his collaborators. Brode mentioned that W. B. Fretter obtained some interesting cloud chamber pictures of penetrating showers originating in carbon.

The afternoon session was opened by a lecture of W. Heisenberg (Göttingen) on the problem of the creation of mesons in multiple processes. Heisenberg's ideas are based on the fundamental assumption that in a collision of a very high energy nucleon (proton and neutron) with another nucleon several mesons can be emitted. Heisenberg's theory leads to simple predictions regarding: (a) the frequency of meson showers (b) the angular distribution of emitted mesons, and (c) the energy spectrum of mesons. His theoretical predictions can be compared directly with the existing experimental material on large stars containing relativistic particles. A basically different point of view concerning the production of mesons was expressed by L. Janossy (Dublin) who presented the results of a joint paper with W. Heitler (Zurich). According to these authors, only one meson is produced in a single collision between two nucleons. That one actually observes several mesons emerging from the same nucleus must then be due to the fact that successive nucleon-nucleon collisions occur inside the same nucleus (plural production). Since meson production has not heretofore been studied on the hydrogen nucleus, Janossy pointed out that present-day evidence does not rule out the possibility that mesons of all energies are produced singly. On the contrary, Heitler and Janossy argue that the existing experimental data on the exponential absorption of the nucleonic component in our atmosphere can be deduced from their calculations based on the assumption of plural meson production.

G. Salvini (Milan) described a series of cloud chamber experiments on nuclear explosions which were carried out in the Italian High Altitude Laboratory at Testa Grigia (11,000 feet). According to Salvini, the ratio in the frequency of high energy nuclear events originating from lead to those from carbon was found to be about 2. This ratio can be deduced approximately from the theory of multiple as well as from the theory of plural production of mesons. Hence experiments of this kind do not enable us to decide which one of the two theories is the correct one.

O. Piccioni (Brookhaven National Laboratory) gave an account of his counter studies concerning the structure of penetrating showers. Piccioni used the method of delayed coincidences in carbon and sulfur to identify the π-mesons in penetrating showers. His experiments show that most of the particles traversing a few inches of lead are π-mesons. Piccioni found that the nuclear absorption in iron was considerably smaller for π-mesons than for nucleons.

G. D. Rochester (Manchester) reported some interesting observations on cosmic ray stars in photographic emulsions. The absorption of the star-producing radiation in air and in lead strongly indicates that most of the smaller stars in the lower atmosphere are produced by neutrons. A detailed analysis of stars shows that the proportion of α-particles is greater for small stars than for large ones, and it remains approximately constant for stars of more than six prongs. This is explained on the assumption that light nuclei are easily broken up by cosmic ray neutrons. Rochester made an energy analysis of a group of stars and he found that the majority of the charged particles below 30–40 Mev come from the evaporation of the atomic nucleus. The average nuclear temperature of a group of stars having from 7 to 17 prongs was found to be 5 Mev. A new important result was reported regarding the ratio of the number of recoil protons directly ejected from the nucleus to the number of particles evaporated from it. Rochester found that this ratio is of the order 1: 10.

D. H. Perkins (London) presented a number of interesting new results regarding nuclear explosions at high energies. In the small cosmic ray stars the energy distributions of α-particles and protons are consistent with a process of evaporation. In large stars there is a marked change in behavior between protons and α-particles; a mechanism different from evaporation has to be postulated for the emission of α-particles. It was found that the ratio of α-particles to protons increases with the prong number up to a maximum at nine prongs, and then decreases for larger star sizes. Perkins found that nuclei heavier than α-particles are ejected from stars in both ground and excited states. Particles of charges up to $Z = 10$ and energies up to 300 Mev have been observed. For example, among these nuclear fragments Be^8, Be^9, and C^{12} have been found. In contrast with α-particles in large stars, most of the heavier splinters have energies in excess of the Coulomb barrier potential.

On September 16 the first speaker was L. Janossy (Dublin) who discussed the question of the possible existence of a very lightweight meson (λ-meson) in extensive showers. Janossy pointed out that his recent experiments do not support his former conclusions regarding the presence of such particles in large air showers.

Marcel Schein (Chicago) presented a paper on the production of nucleons and mesons in cosmic radiation. He described a number of experiments carried out by the Chicago group in free balloons up to an altitude of 100,000 feet. It was found that the frequency of smaller nuclear explosions as a function of altitude follow an exponential increase up to the highest elevations reached. This result shows that at altitudes as high as 100,000 feet a large number of secondary neutrons and protons are present in the atmosphere. These secondaries must arise in part from the large nuclear disintegrations produced by the primary radiation and in part from the breaking-up effect of heavy nuclei in the highest layers of our atmosphere. Schein then discussed the problem of the production of low energy mesons studied in photographic emulsions. A number of events were shown in which a collimated beam of relativistic particles was visible. It was pointed out that events in which a very narrow bundle of such particles occur represent some evidence for the multiple production of mesons. The quantitative data obtained on the prong distribution of minimum ionization particles and on the zenith angle effect of the large stars could not be compared with the theories of

Heisenberg and Heitler-Janossy, as these theories were not known to the author before the meetings at Como.

E. P. George (London) spoke on nuclear interactions of cosmic ray particles. A number of interesting experiments on penetrating showers were carried out at sea level and on Jungfraujoch. Transition curves of penetrating showers in Pb, Al, and paraffin approach the same limiting value at large absorber thicknesses. According to George, this fact supports the concept of multiple rather than plural meson production. George studied nuclear explosions in photographic emulsions at a depth of 60-meter water equivalent below the surface of the ground. A small number of stars were found at this depth. It was proposed that there may exist a small interaction between μ-mesons and nuclei, which may account for the presence of stars underground.

J. G. Wilson (Manchester) described a series of very accurate experiments carried out on the positive excess of mesons. He used a specially constructed magnetic spectrograph which enabled him to determine the positive excess as a function of meson energy. Wilson found that the positive excess reaches a maximum of 1.32 at meson energies around two Bev. The drop toward higher energies is very slow and somewhat faster on the low energy side. Wilson's results on the positive excess are of importance for our understanding of the mechanism of meson production in the energy range of several Bev.

This summary represents only a selection of the many interesting papers which were given at the meetings. The writer wishes to apologize for the fact that not all of the papers could be included in this present report. The great majority of the lectures were given in English.

The scientific sessions closed at noon with an enthusiastic speech by Bernardini (Rome), who summarized the achievements of the conference. The afternoon was devoted to an excursion on beautiful Lake Como to the famous resort town of Bellaggio, where a splendid farewell dinner was offered, embellished by speeches from our hosts and from some of the leading participants of the meetings, expressing gratitude and appreciation in the name of all who had been present.

After the official closing of the conference more than a hundred of the scientists joined in a second excursion, this time going to the Italian High Altitude Laboratory at Testa Grigia (11,000 feet) which is beautifully located on the west side of the Matterhorn. Everyone was impressed with the great amount of work going on there.

We all should be very thankful to those men who expended so much effort to make the Como Conference a memorable occasion.

Report on International Symposium on the Biology of High Altitudes

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Under sponsorship of Unesco and the government of Peru, an international symposium was held in Lima, Peru, November 23–30. The organizing committee, appointed by the Peruvian government, was headed by Carlos Monge M., director of the National Institute of Andean Biology. Bernardo A. Houssay of Argentina was honorary president of the symposium.

Delegations represented most of the countries of North and South America as well as Switzerland, France, and Italy. The U. S. sent an official delegation of six, headed by Harry G. Armstrong, Surgeon General of the U. S. Air Force. Eighteen other scientists represented the Air Force, the Navy, the Army Chemical Corps, the Research and Development Board, and the Aero-Medical Association. This party included a member of the British Joint Services Mission. Other U. S. agencies represented included the National Institutes of Health, the U. S. Department of Interior, the Carnegie Institution, and the Institute of Inter-American Affairs.

The program centered around man at rest and at work in the environments characteristic of different altitudes. The subjects included adaptation and acclimatization to altitude in man and animals; the acute and the chronic effects of altitude in rest and work; the relations between fertility and altitude; and the special problems of aviation medicine.

About half of the scientific program was devoted to 15-minute papers, with plenty of time for discussion. In other sessions, experts led round table discussions of selected general topics. Some papers were presented in English. A translated summary of Spanish papers was frequently provided. These, with brilliant off-the-cuff translating by Albert Hurtado of the Andean Institute and E. S. G. Barron of Chicago, lowered the language bar to interchange of ideas.

Dr. Monge philosophized on the Incan organization for protecting their people against what he termed climatic aggression. Physical training was made a routine part of living; wedding ceremonials favored survival of the fittest; the colonization system recognized the phenomenon of acclimatization. Dr. Monge also described chronic mountain sickness, first recognized by him in 1928 and now known as Monge's disease. It illustrates failure to resist climatic aggression and its specific cure is residence at sea level.

Dr. Hurtado led a stimulating discussion of chronic anoxia as seen in the Indian miner at Morococha, 14,900 feet. His acclimatization depends on ancestry, on uninterrupted hypoxia from the beginning of fetal life, and on hard physical work. In his acclimatized state, he exhibits hyperventilation, appreciable in rest and marked in exercise; increased alveolar volume; normal pH; polycythemia; normal resting cardiac output; and greater vascularity of tissues. At that altitude the Indian miner has as great a work capacity on the treadmill as the Indian at sea level, and he is more efficient. This new

finding has raised unsolved questions about the possibility of fundamental changes in the biochemical processes of energy transformation.

In a study participated in by Dr. Rotta, it was found that the Morococha miner has an absolute as well as a relative increase in blood hemoglobin. He has three-eighths more red cells per unit volume of blood and seven-eighths more red cells in circulation. His blood volume is two liters greater; the increase is entirely red cells. In terms of hemoglobin he has about 1,450 grams, as compared with about 800 grams in his sea-level cousin.

The dynamic state of man is well illustrated by his hemoglobin response. A new balance must be struck between rate of formation and rate of destruction; this balance must also adjust to the increase in the capillary volume. This process and the numerous other steps in acclimatization take months, possibly years, for attainment of equilibrium. Sometimes there is failure of some element. Then physiology retreats before pathology.

Through the hospitality of the institute, the delegates were privileged to visit the remarkable high altitude laboratories at Huancayo (3,200 meters), Morococha (4,540 meters), and Ticlio (5,030 meters). The party witnessed the dedication of the new building of the Morococho laboratory. These laboratories have been made possible by the government of Peru, the Rockefeller Foundation, and Don Manuel Peilago of Huancayo. Staff members expressed the hope that scientitsts interested in any phase of high altitude biology will make use of the laboratories.

All of the delegates were impressed by the high quality and wide range of the institute's research program, the excellence of laboratory facilities at Lima and at altitude, and the generous hospitality of the people of Peru. The Institute of Andean Biology will undoubtedly become as famous internationally as the Naples Biological Station, the Jungfraujoch, and the Woods Hole Biological Laboratory.

About People

Erwin E. Nelson, adjunct professor of pharmacology at the George Washington University School of Medicine, has been appointed medical director of the Food and Drug Administration of the Federal Security Agency. Dr. Nelson assumes his new duties this month when the resignation of **Robert T. Stormont** becomes effective.

Griffith Conrad Evans, professor of mathematics, has been named Faculty Research Lecturer on the Berkeley campus of the University of California for 1949–50. Dr. Evans, who is an authority on potential theory, will deliver his lecture in March.

Guido Castelnuovo, professor emeritus, Department of Mathematics, University of Rome, and president of Accademia Nazionale dei Lincei, has been made Senator in recognition of his achievements in mathematics.

Walter M. Scott and **John R. Matchett** have been appointed assistant chiefs of the U. S. Department of Agriculture's Bureau of Agricultural and Industrial Chemistry. **Charles H. Fisher,** head of the Carbohydrate Division of the bureau's Eastern Regional Research Laboratory, at Wyndmoor, Pennsylvania, will succeed Dr. Scott as director of the Southern Regional Research Laboratory in New Orleans.

Dr. Matchett was formerly coordinator of food research at the bureau's Western Regional Research Laboratory in Albany, California.

Neil M. Judd, a member of the U. S. National Museum anthropological staff, since 1911, and curator of archaeology since 1919, retired on December 31 to devote his full time to writing. Dr. Judd was named honorary associate in anthropology at the museum on January 1.

William James Price, former research engineer with the Battelle Memorial Institute, and **David W. Lueck,** research associate at the University of Washington, have been appointed staff members of the College of Engineering Sciences, U. S. Air Force Institute of Technology, Wright-Patterson Air Force Base, Dayton, Ohio.

Herta Meyer, of the Research Association of the Institute of Biophysics, University of Rio de Janeiro, has been a visitor the past two months in the Tissue Culture Laboratory, University of Texas. Miss Meyer has developed important new research techniques for the study of intracellular parasitism which are being adapted by the laboratory to methods of tissue culture. Miss Meyer will visit medical centers here and in England before returning to South America.

Grants and Awards

The American Institute of Electrical Engineers will present its 1949 **Edison Medal** to Karl B. McEachron, of the General Electric Company, at its January 30–February 3 meeting in New York City. Dr. McEachron will receive the medal for his contribution to the advancement of electrical science in the field of lightning and other high voltage phenomena and for the application of this knowledge to the design and protection of electric apparatus and systems.

Wendell P. Woodring, geologist, U. S. Geological Survey, and an authority on the paleontology of the West Indies, has been awarded the **Penrose Medal of the Geological Society of America.** Dr. Woodring was honored for his researches in the West Indies and Central and South America. The medal, which is the society's highest award, is bestowed only in those years when an outstanding candidate for the honor is presented.

The $1,000 prize of the American Association for the Advancement of Science, given each year for a noteworthy paper presented at the AAAS annual meeting, was awarded at the close of last week's New York meeting to Armin C. Braun, associate member of the Rockefeller Institute for Medical Research. Dr. Braun's paper described his experiments on the development and poliferation of plant cancers caused by crown-gall bacteria—studies which the prize committee called "models of simplicity—and so well designed that they chart a basic course in man's understanding of the greatest human malady."

Two factors influencing crown-gall development were found: one changing normal cells to cancer cells, the other (probably a hormone) making it possible for the transformed cells to multiply. The first factor was stopped by exposing the plant to a temperature of 30 degrees Centigrade or more but the second factor was not, so that it was possible to study the two processes separately.

The studies also showed that a wound in the plant was required to introduce the bacteria and that a time factor was involved in the cancer development. "Very little, if any, transformation occurs during the first twenty-four hours after inoculation," Dr. Braun stated. "It is during the subsequent ten and more hours that measurable changes take place. As a result of this work it is possible to show that a definable threshold concentration of tumor-inducing principle is necessary to transform normal plant cells to tumor cells.

"Further experiments revealed that the host cells became immune from carcinogenic influence of the bacteria four days after inoculation. This occurred despite the fact that many virulent bacteria were in intimate contact with the host cells after the fourth day. During the four-day period the plants were grown at a temperature inhibiting the cancer-producing principles.

"It appears, therefore, that it is before and during early stages of active wound healing that normal cells are converted into tumor cells."

Dr. Braun also observed that growth of the transformed cells was independent of the inciting bacteria and that bacteria-free tumor cells maintained in culture for more than five years "retained undiminished their capacity for rapid, unrestrained, and uncoordinated growth."

Georg von Bekesy of the Harvard Psycho-Acoustic Laboratory has been named the first recipient of the **Shambaugh Prize** recently established by the family of the late George E. Shambaugh, noted otologist. The prize is awarded biennially for outstanding research in hearing. The recipient is chosen by the Collegium Oto-Rhino-Laryngologicum, Amicitiae Sacrum.

The Theobald Smith Award in Medical Sciences for 1949 was presented to Seymour S. Kety, professor of clinical physiology, Graduate School of Medicine, University of Pennsylvania, at the annual meeting of the AAAS, held in New York City last week. The award, consisting of $1,000 and a bronze medal, was established in 1936 by Eli Lilly and Company and is given for "demonstrated research in the field of the medical sciences, taking into consideration independence of thought and originality." It has been five years, owing to the war, since the award has been granted. Dr. Kety was cited primarily for his investigative work on "The Quantitative Measurement of Blood Flow and Oxygen Consumption of the Human Brain." He has been author or coauthor of 44 publications dealing with this research problem.

Past recipients of the award are Robley D. Evans, professor of physics, Massachusetts Institute of Technology, Cambridge; Charles F. Code, Department of Astronomy and Astrophysics, Yerkes Observatory, Williams Bay, Wisconsin; Albert B. Sabin, professor of pediatrics, Children's Hospital Research Foundation, Cincinnati, Ohio; Herald R. Cox, director of virus research, Lederle Laboratories, Inc., Pearl River, New York; and Sidney C. Madden, professor and head of the Department of Pathology, Emory University School of Medicine, Atlanta, Georgia.

Fellowships

The Conway MacMillan Memorial Research Fellowship in Botany is being offered at the University of Minnesota to doctoral students for the year 1950–51. This $1,200 award was established in 1946 by the late Charles J. Brand, of Washington, D. C. According to the terms of the gift, special mention is made of students from the University of Chile and the Catholic University of Chile. Applications should be made by *March 1.* Inquiries should be addressed to A. O. Dahl, Chairman, Conway MacMillan Fellowship Committee, Department of Botany, University of Minnesota, Minneapolis 14.

The following postdoctoral fellowships and scholarships are available at **Ohio State University** for 1950–51: *University Postdoctoral Fellowship,* $3,000, October 1, 1950–June 30, 1951, for research work in any of a variety of fields of academic interest. *Elizabeth Clay Howald Scholarship,* $3,000, July 1, 1950–June 30, 1951, for research in any of a number of fields. Several *Mary S. Muellhaupt scholarships,* July 1, 1950–June 30, 1951, with stipends ranging from $1,800 to $3,000, for research work in bacteriology, botany and plant pathology, physiology, and zoology and entomology.

Application blanks may be obtained from the Dean of the Graduate School, Ohio State University, Columbus, Ohio. Applications must be filed by *April 1.*

Industrial Laboratories

Charles E. Dutchess, medical director of Schenley Laboratories, Inc., has been elected president of the Association of Medical Directors, which represents the principal pharmaceutical firms in the nation. Dr. Dutchess was vice president of the association during the past year.

Zay Jeffries, vice president of the General Electric Company in charge of the Chemical Department, retired from the company December 31. **Dr.** Jeffries has been a member of the company's four-man committee

which administers the Nucleonics Project.

Richard H. Zinszer, formerly director of research for the Union Oil Company at Wilmington, California, has accepted the position of technical director of the **Arabian-American Oil Company,** New York City.

Meetings and Elections

A symposium on recent advances in cardiovascular surgery will be held January 21 at the Mayflower Hotel, Washington, D. C., under the sponsorship of the Surgery Study Section, National Institutes of Health, Bethesda, Maryland. Frederick A. Coller, University of Michigan, is chairman of the section, and Claude S. Beck, of Western Reserve University, is chairman of the Arrangement Committee. Further information can be obtained from J. Marshall Ellis, Executive Secretary, Surgery Study Section, National Institutes of Health.

The Tennessee Academy of Science at its recent meeting elected the following officers for the ensuing year: president, Samuel L. Meyer, Department of Botany, University of Tennessee; vice president, M. L. McQueen, Mathematics Department, Southwestern College; secretary, Arlo I. Smith, Biology Department, Southwestern College; treasurer, James J. Friauf, Biology Department, Vanderbilt University.

The Institute of Medicine of Chicago elected the following officers for 1950 at its annual meeting this month: Henry T. Ricketts, chairman of the board; Stanley Gibson, president; Otto F. Kampmeier, vice president; George H. Coleman, secretary; and E. Lee Strohl, treasurer.

The American Standards Association elected three new members to its board of directors, to take office January 1 for a three-year term: Maurice Stanley, chairman of the board of the Fafnir Bearing Company, represents the Antifriction Bearing Manufacturers Association, Inc.; J. G. Vincent, vice president, Packard Motor Car Company, represents the Automobile Manufacturers Association; and B. S. Voorhees, vice president, New York Central System, represents the Association of American Railroads.

Miscellaneous

The National Bureau of Standards is now making available high purity standard samples of organic sulfur compounds to industrial laboratories. The compounds are prepared under the sponsorship of the American Petroleum Institute, by the Bureau of Mines, U. S. Department of the Interior, where they are used for the measurement of needed physical, thermodynamic, and spectral properties. Instructions for ordering may be obtained from the National Bureau of Standards, Washington 25, D. C. Directions for transferring the samples in vacuum are also available from the bureau on request.

Invertebrate zoologists and students of biogeography will be interested in recent developments in the reconstitution of the **Zoologisches Museum of Hamburg,** as reported by G. E. Hutchinson, of the Yale Zoology Department, who visited the museum during his recent visit abroad.

The Zoologisches Museum housed the greatest collection of Oligochaets in the world, amassed, among other important material, by the late Wilhelm Michaelsen. In view of the importance of the earthworm in the study of zoogeography and evolution, as well as its economic and ecological importance, Dr. Hutchinson considers the fate of this collection of unusual scientific interest.

"The Michaelsen collection," stated Dr. Hutchinson, "along with other very important collections in liquid preservative, numbering in all about a quarter of a million jars, was stored during the war in an abandoned subway. Some postwar loss of alcohol was reported on account of attempts by blackmarket liquor dealers to steal the preservative from a part of the collection. The loss, however, was not serious. But is was feared that ordinary evaporation would lead to complete deterioration of the collections if they remained inaccessible. Since the museum building was entirely gutted as the result of aerial attacks during the war and the greater part of the library destroyed, there appeared no immediate possibility of rescuing the collection. During the summer the British authorities at Hamburg became interested in the matter and Professor B. Klatt, the distinguished director of the museum, now writes that he has been assigned a disused bunker or concrete air raid shelter to which the collections are being transferred. This will make possible the unpacking and proper care of the material. At a time when every available structure in the city is in demand, this far-sighted action on the part of the British Commissioner, John K. Dunlop, will be appreciated by zoologists throughout the world."

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