News and Notes

Rochester Conference on High-Energy Physics

THE Third Annual Rochester Conference on High Energy Physics was held at the University of Rochester December 18–20, 1952. Over one hundred representatives from 45 high-energy physics laboratories throughout the country attended, as well as representatives from eight foreign countries. The informal sessions centered on our increasing experimental and theoretical insight into the problems of pion production and pion nucleon scattering, and the new experimental information concerning the various classes of unstable particles. The conference, organized by R. E. Marshak, Chairman of the Rochester Physics Department, was jointly supported by the National Science Foundation and by the group of Rochester industries which had made possible the previous conferences in this series.

E. P. Wigner (Princeton) presided over the opening Thursday morning session on "Charge Independence and Saturation of Nuclear Forces," a subject about which he justly remarked "never has there been as much theoretical thinking done on a subject the experimental foundation of which is as inadequate as this one." Christy (CIT) showed that certain missing particle groups in the reactions $O^{16}(d,\alpha)N^{14}$ and $B^{10}(d,d')B^{10*}$ are evidence of the operation of charge independence selection rules, whereas the observed dipole transitions in O^{16} could be a violation of them; however, Kroll (Columbia) pointed out that in these systems, since they contain an equal number of neutrons and protons, the selection rules are already a consequence of the equality of *n-n* and *p-p* forces and do not require the full charge independence hypothesis. Blatt (Illinois) indicated that the equality of the *n-p* and *p-p* singlet effective ranges was the firmest evidence, although subject to some experimental uncertainty. Bethe (Cornell) remarked that the approximate equality of the scattering lengths is still suggestive, although not conclusive, because subject to shape and magnetic interaction corrections. Pais (Institute for Advanced Study) reviewed Lévy's charge independent model which is calculated from PS(PS) meson theory but contains two phenomenological constants (core radius and radiative correction) in addition to the coupling constant. Jastrow (Berkeley) has shown that the fit this model gives to the low-energy data is extremely insensitive to the radiative corrections, provided that compensating adjustments are made in the other parameters. As Wick (Carnegie Tech) pointed out, the attempted extension of this model to explain the 18 and 32 Mev *p-p* scattering data is inconclusive because of the use of Born approximation for the higher phases. Feldman (Rochester) indicated that the charge independence hypothesis requires the 90° *n-p* scattering cross section to be greater than one-quarter the corresponding *p-p* cross section, which has not yet been proved experimentally at high energies. Weisskopf (MIT) reported on calculations of Drell and Huang, showing that inclusion of three-body forces analogous to the two-body forces used by Lévy leads to approximately the correct density and nucleon energy in infinite nuclear matter.

During the Thursday afternoon session, presided over by E. Fermi (Chicago), H. Anderson (Chicago) presented data obtained by Hildebrand showing that the angular distribution of the reaction $n + p \rightarrow \pi^0 + d$ coincides with that for $p + p \rightarrow \pi^+ + d$, as required by charge independence. Van Hove (Institute for Advanced Study) discussed the general restrictions charge independence places on pion production. Experiments on charged and neutral photomeson production in hydrogen were described by Goldschmidt-Clermont (MIT), Silverman (Cornell), Goldwasser (Illinois), Osborne (MIT) and Wilson (Cornell), and Bacher (CIT) reported on the π^0 measurements up to 450 Mev, where the cross section at 90° is down by a factor of four from the peak value at 315 Mev. Fermi presented improved measurements of π^- scattering in hydrogen leading to new high-energy pion-nucleon phase shifts. Barnes (Rochester) reported that the π^+ and π^- total cross sections in hydrogen are practically equal (≈ 20 mb) at 37 Mev, and Tinlot (Rochester) stated that the charge exchange scattering cross section is 5 ± 2 mb at the same energy.

With C. D. Anderson (CIT) as chairman, neutral *V* particle data were presented Friday morning. Peyrou (MIT) has definitely established the coplanarity of the V^0_1 decay using a multiplate cloud chamber and he finds $Q = 37$ Mev and a lifetime of $3.5 \pm 1.5 \times 10^{-10}$ sec. The V^0_1's are apparently not produced in pairs, but a large fraction (possibly all) of the V^0_2's could be accompanied by V^0_1's. Leighton (CIT) finds a V^0_1 lifetime of $2.5 \pm 0.7 \times 10^{-10}$ sec. He has two or three cases of Q values definitely greater than 37 Mev, and three or four cases of $V^0_3 \rightarrow K^- + \pi^+$, where K^- is definitely heavier than a π meson but could be a negative proton. Thompson (Indiana) has five cases where the mass of the positive particle is definitely less massive than a proton. He also presented a method of plotting the data directly observed which should do much to resolve the existing uncertainties if applied to all data.

On Friday afternoon, J. R. Oppenheimer (Institute for Advanced Study) presided over a session on the "superheavy mesons" and the theoretical aspects of the pion problem. Perkins (Bristol) presented the evidence for two decay schemes for the *K* particles (masses 1000 to 1500 m_e), namely $K \rightarrow \mu + 2\nu$ since the μ meson energy is not unique, and $\chi \rightarrow \pi + (?)^\circ$ with a π meson energy of 115 ± 10 Mev. The rate of production of *K* particles relative to π's seems to increase with energy, as would be expected. In a critical

survey of the K particle data, LePrince-Ringuet (Paris) concluded that, whereas the upper limit of the energy spectrum of μ mesons from K decays is uncertain, there are at least four certain μ daughters and two certain π daughters of K particles. Amaldi (Rome) surveyed the data on τ mesons and concluded that, although the process $\tau \rightarrow \pi + 2\mu$ cannot be excluded with certainty, the $\tau \rightarrow 3\pi$ decay scheme is very probably correct. During the second part of the session, Feld (MIT) discussed the phenomenological connection between the photoproduction of pions and pion-nucleon scattering. Chew (Illinois) has obtained agreement with the p-wave pion scattering data in a theory using an arbitrary cutoff on relativistic momenta, by taking into account correctly all successive processes in which only zero, one, or two mesons are present in the field at a time. Dyson (Cornell) has used the same Dancoff approach to derive an integral equation for the pion-nucleon system that takes the relativistic properties of the nucleons seriously. When a variational principle is used to calculate the phase shifts, the results agree with those of Chew, but more exact numerical results demonstrate extreme sensitivity of the phase shifts to the high-energy part of the wave function, in contradiction to Chew's basic postulate. For the $I = 3/2$ (I is the isotopic spin) p states, agreement with experiment is obtained with $G^2/4\tau = 14$ (the only parameter in the theory), but self-energy divergences have not been separated unambiguously from the $I = \frac{1}{2}$ equations. The s state results confirm those of Drell and Henley, giving essentially hard sphere scattering at the proton Compton wavelength, in disagreement with experiment. The experiments are therefore very interesting in showing the existence of a long range force between pion and nucleon. Qualitatively and phenomenologically the inclusion of the meson-meson interaction would work in the direction of explaining the experiments, but quantitatively the strength of the interaction as indicated by the theory is so strong as to preclude exact treatment at this time.

Saturday morning was a continuation of the Friday afternoon session. Fermi presented the new phase shifts that had just been calculated with the Los Alamos computer on the basis of his new experimental values for the pion-nucleon scattering. The alternative Yang (Institute) set of phase shifts does not represent the data so well as his choice, but is still well within experimental error. The smooth, rapid rise of the $I = 3/2$ s phase shift is no longer so striking, but is still suggestive of Marshak's hard core plus attractive-tail phenomenological potential, or the expected result of including the meson-meson interaction in Dyson's equation. Marshak pointed out that the sign of the s phase shift at low energy could be unambiguously determined by measuring the coulomb-nuclear interference. Bethe indicated that the sign of the high-energy phase shifts could be inferred from the measured attractive potential scattering in carbon, assuming that this is predominantly p-wave scattering; further, the interference term in photomeson production favors the Fermi rather than the Yang type phase shifts, if a particular model is used for the photoeffect. Leighton (CIT) presented the first evidence for a charged analog of the V°_1 particle. Rossi (MIT) showed that at least some S and charged V mesons observed in a multiplate cloud chamber are the same, and that several of them are probably identical with the χ-mesons observed in emulsions. Shapiro (NRL) has two directly produced $\kappa \rightarrow \mu + ?$ mesons, and two cases that can be interpreted as $\zeta^\pm \rightarrow \pi^\pm + (\pi^\circ\ ?)$ with 40 Kev $< Q <$ 6 Mev and a lifetime of about 10^{-11} second. Perkins presented two similar cases, but feels a statistical survey is needed for positive identification.

Saturday afternoon was devoted to separate experimental and theoretical sessions. H. A. Bethe presided over the theoretical session at which Low (Illinois) outlined a program for a covariant calculation of pion-nucleon scattering. Watson (Indiana) indicated another approach to the problem, using Goldberger's formal algebraic methods to separate out sequentially a series of scattering problems in which the virtual intermediate mesons are scattered in the previously calculated equivalent potential. This series is more likely to converge than the usual perturbation expansion, but whether it is renormalizable is an open question. Dyson discussed in more detail the integral equation he had already presented, and Bethe gave a differential equation that approximates it. In particular, Bethe has shown that the equation predicts an antiresonance following closely after the resonance, much as is found in the CIT π° photoproduction data, though the exact connection is not clear. Wentzel (Chicago) showed that the strong coupling approach can also lead to qualitative agreement with experiment, but that corrections to Lévy's potential are likely to be quite large. In the experimental session, with B. Rossi in the chair, Rainwater (Columbia) discussed x-rays from μ mesic atoms, and Platt (Rochester), x-rays from π-mesic atoms. The former give a precise measurement of the radii of heavy nuclei, and the latter measure the mesic interaction in p states, although as discussed by Roberts (Rochester), they exhibit peculiar "molecular" effects in hydrogenous materials. Direct production of electron pairs in π° decay and the π° lifetime were discussed by Schein (Chicago), Ritson (Rochester), Perkins, A. Sachs (Columbia), and Fermi. Schein also presented evidence of possible V°_1 production by π mesons from the Chicago cyclotron, and Segrè (Berkeley) had two similar events from Illinois, but Fermi reported a failure to detect V°_1's by a different method. Perkins presented two cases that look like the direct production of μ mesons, but indicated that there is no longer any direct evidence for the existence of ζ°. Walker (Rochester) finds that less than 0.25% of the shower particles from carbon consists of correlated pairs. Reynolds (Princeton), Lederman (Columbia), and Shutt (Brook-

haven) discussed data on π and μ interactions in various elements.

A comprehensive report of the proceedings of this conference has been prepared by three Rochester staff members, H. P. Noyes, M. Camac, and W. D. Walker, and is available through Interscience Publishers (New York).

H. P. Noyes

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Scientists in the News

Edward M. Corson, senior scientist in mathematical physics at the New York University Institute for Mathematics, has been appointed adjunct professor in theoretical physics in the School of Graduate Studies.

Three scientists in Great Britain and Ireland have recently received new appointments. **C. D. Darlington,** director of the John Innes Horticultural Institution, will succeed **T. G. B. Osborn,** who is retiring as Sherardian professor of botany in the University of Oxford. **Donald Cecil Pack,** lecturer in mathematics in the University of Manchester, has been appointed to the chair of mathematics in the Royal Technical College, Glasgow. During 1951–52, Dr. Pack was a visiting research associate professor at the University of Maryland. **T. E. Nevin** has succeeded the late **J. J. Nolan** in the chair of experimental physics in University College, Dublin.

Gustav Egloff, director of research of Universal Oil Products Company, has been elected an honorary member of the Association Française des Techniciens du Pétrole, Paris.

Haven Emerson and **Irving S. Wright** have received awards from the American Heart Association in recognition of scientific contributions to the association's heart program. Dr. Emerson received a Gold Heart Award and Dr. Wright a Distinguished Service Silver Medallion.

Ernst Jokl has been appointed chief of the Department of Clinical Psychology at the Valley Forge Heart Institute and Hospital, Fairview Village, Pa. Dr. Jokl has conducted extensive investigations into the normal and pathological physiology of exercise.

Celestino Kalinowski of the Department of Zoology, Chicago Natural History Museum, has left on an expedition to collect mammals and birds in the mountains of south central Peru. The present expedition, which will take a year, supplements a series of Peruvian mammal surveys by other collectors for the museum, begun in 1912.

I. F. Kinnard, engineering manager of the Meter and Instrument Department, General Electric Company, West Lynn, Mass., has been awarded the 1952 Lamme Gold Medal, by the American Institute of Electrical Engineers, for design and developments in instrumentation and measurements.

Roger A. Lewis, formerly of Yale University, has been appointed visiting professor of pharmacology at the Seth G. S. Medical College, Bombay, India. This post is under the auspices of the Division of Education and Training Services, World Health Organization.

Catharine Macfarlane, research professor of gynecology, Woman's Medical College, Philadelphia, was selected to receive the first annual Silberman Memorial Group Award for her work in cancer detection.

Elizabeth Gregory McGill, consultant aeronautical engineer in Toronto, has been chosen by the Society of Women Engineers to receive their 1953 Award for Meritorious Contribution to Engineering. Miss McGill was honored for her work in airplane engineering and production during and after World War II.

Frank W. Newell, ophthalmology associate at Northwestern University Medical School, has been appointed associate professor of ophthalmology at the University of Chicago, effective May 1.

Howard W. Odum, head of the Department of Sociology and Anthropology, University of North Carolina, has been granted the fifth annual O. Max Gardner Award by the trustees of the university, in recognition of his contribution to the development of American sociology.

Bernard G. Peters, head of the Department of Nematology at the Rothamsted Experimental Station, Harpenden, England, has joined the staff of the Connecticut Agricultural Experiment Station for three months, as a special adviser and consultant. Dr. Peters will give most of his attention to the problem of the tobacco cyst nematode, a new species of parasitic worms discovered by **Benjamin F. Lownsbery,** plant pathologist at the station.

John L. Rich, professor of geology, University of Cincinnati, has been named an honorary member of Sigma Gamma Epsilon, national earth sciences honorary fraternity. Dr. Rich is the seventh person awarded an honorary membership in 40 years, and was cited for his work in economic geology.

Jose Romero, chemical engineer of the Agriculture Experiment Station, Tingo, Lima, Peru, was a recent visitor at the U. S. Bureau of Agricultural and Industrial Chemistry's Eastern Regional Research Laboratory, Philadelphia.

Will H. Shearon, Jr., has been appointed managing editor of the American Chemical Society monthly, *Industrial and Engineering Chemistry.* Mr. Shearon has been an associate editor of both the monthly magazine and the weekly, *Chemical and Engineering News,* and has been in charge of the society's Houston editorial office since its opening in 1946.

Courtney Craig Smith, American secretary of Rhodes Trustees, has been elected president of Swarthmore College, effective Sept. 1. Dr. Smith was a Rhodes Scholar in 1938–39 at Merton College, Oxford, and obtained his Ph.D. at Harvard. He has served as assistant professor of English, and as national director of the Woodrow Wilson Fellowship program, at Princeton. At 36, he becomes one of the youngest college presidents in the country. He succeeds **John W. Nason,** who resigned to become president of the American Foreign Policy Association (SCIENCE, 116, 702).

Robert G. Tischer, formerly professor of food technology at Iowa State College, has been named director of Food Laboratories for the Armed Forces Quartermaster Food and Container Institute.

James C. White, assistant professor of surgery, Harvard Medical School, will give the annual Hughlings Jackson Memorial Lecture at the Montreal Neurological Institute on May 13, at 5:00 P.M. His subject will be "Pain Conduction in Man: Studies on its Transmission in Spinal Cord and Visceral Plexuses."

Gene M. Wild has joined the Antibiotics Manufacturing and Development Division of Eli Lilly and Company as a biochemist. Dr. Wild previously taught chemistry at Iowa State College, where he also received his Ph.D. early this year.

John Xan, head of the department of chemistry, Howard College, has been chosen by the Northeastern Section of the American Chemical Society to receive the James Flack Norris Award for achievement in the teaching of chemistry.

Grants and Fellowships

The **Damon Runyon Memorial Fund for Cancer Research** has made research grants to: Duke University, $37,000, to support a continuing project by Marcus E. Hobbs, for a study of "The Properties on Some Smoke Aerosols"; the University of Cincinnati, $9700 for a project, "Cytologic Diagnosis of Carcinoma of Digestive Tract," under the direction of Leon Schiff; the Montreal Cancer Institute, $5000, for a study of "Relative Distribution of Mononucleotides in Nucleic Acids of Rat Liver during Preneoplastic and Malignant Hepatoma Stage," under Antonio Cantero; Providence College, $1550, for "Metabolism of C-14 Labeled Cholesterol and Iodine Metabolism," under Frederick C. Hickey; and Immaculata College, at Immaculata, Pa., $1500, for the purchase of a research phase microscope for the continuance of a project, "The Mechanism of Action of Spleen Extract on Fatty Acid Metabolism of Normal and Tumor Tissues." Fellowship grants include an allocation of $4100 to Chiyeko Okawa, of Tokyo, to bring her to the Oak Ridge Institute of Nuclear Studies to do research on "Bone Marrow Physiology," under the direction of Marshall Brucer, chairman of the medical division at Oak Ridge. Other fellowships were granted to Gaston De Lamirande, $4800, and to Roger Daoust, $4500, both of the Montreal Cancer Institute; to Zacharias Kominos, of the New England Center Hospital, Boston, $4200; to Celia White Tabor, of George Washington University, Washington, D. C., a supplementary allocation; and to Elizabeth Pillers at the University of Cambridge, England, $3000.

The **Mount Desert Island Biological Laboratory,** Salisbury Cove, Me., announces receipt of a three year grand awarded by the American Cyanamid Co. (Lederle Laboratories Division). Each year $500 will be available for general support of the summer program which features basic research in the fields of renal physiology and electrolyte balance, and tissue culture.

The **Union Carbide Educational Fund** will inaugurate a new undergraduate scholarship program this year. About 400 scholarships will be awarded in 24 selected colleges and universities at an annual cost of around $500,000. Applicants for the four-year full-tuition awards (plus allowances for books and required fees) must satisfy the college's scholarship requirements and must be interested in careers in business. The fund will match each scholarship with a $600 annual grant to the institution.

Meetings and Elections

The Summer General Meeting of the **American Institute of Electrical Engineers,** Atlantic City, June 15–19, is being arranged by the Philadelphia Section of the institute, which will celebrate its 50th anniversary. A special effort is being made by the committee to interest student engineers, and arrangements have been made to have at least 40 from various engineering schools attend the meeting as guests of the Philadelphia Section. Technical sessions will be devoted to electronics, computers, facsimile, electrical techniques in medicine and biology, television, management, broadcasting, land transportation, magnetic recording, communications, power generation, power transmission and distribution, basic science and other fields of electrical engineering and the allied arts.

The annual foray and business meeting of the **Central States Section of the Botanical Society of America** will be held in the Black Hills at Frank Troxell's Guest Ranch, Nemo, S. D., June 22–24. Participants will assemble June 21. The program includes field excursions to several of the interesting forest, sagebrush, marsh, and semidesert locales, from altitudes of 7242 ft at Harney Peak to 3259 ft at Rapid City. All are welcome to attend. Queries may be directed to the chairman of the section, John Winter, Department of Botany, University of South Dakota, Vermillion.

The Mathematics Department of the **University of Michigan** is sponsoring a conference on functions of a complex variable, with emphasis on topological methods. The conference will run for approximately

two weeks, beginning June 17. The program will consist of a group of invited addresses and of sessions for contributed papers of 20 minutes. Among those who will present longer addresses are L. V. Ahlfors, L. Bers, A. Beurling, S. Bochner, S. Kakutani, C. Loewner, M. Morse, Z. Nehari, R. Nevanlinna, M. Ohtsuka, P. Rosenbloom, H. L. Royden, L. Sario, D. C. Spencer, and G. T. Whyburn. Anyone interested in presenting a contributed paper is requested to send an abstract to W. Kaplan, 274 West Engineering Building, Ann Arbor, Mich.

Miscellaneous

The **American Museum of Natural History** has begun work on a unique series of exhibition halls devoted to the study of man. John D. Rockefeller, 3rd, a trustee, through a gift of approximately $95,000 has made possible the preparation of a Hall of the Biology of Man. The first in a series of five to be devoted to the study of man, the new hall will initiate a comprehensive, three-dimensional interpretation of modern anthropological research, which views man as an integral part of the world around him rather than as something separate and isolated from his environment. To be planned and executed under the supervision of Harry L. Shapiro, chairman of the museum's Department of Anthropology, the new hall will be concerned with human evolution and biology and the relation of man to his environment, including the effect of nutrition, the mobilization of the organism against disease, and disease vectors. Later halls will deal with man's behavior, social organization, and cultural history, with the fifth hall to be devoted specifically to American culture. The exhibits to be created with the Rockefeller gift will be divided into three parts to show the evolution of man from the lower forms, the physical structure and workings of the human organism, and the group aspects of human life. Models, demonstrations, and new exhibition techniques will be used to present an integrated view of the various factors contributing to the physical make-up of man as he is today.

The **Canadian Ministry of Health and Welfare** has announced a flying public health expedition under the Indian Health Services, to carry out an extensive x-ray survey for tuberculosis among the Eskimos along the shores of the western Arctic and Arctic islands. The group, headed by L. Christensen, Indian Health Service doctor at Aklavik, N. W. T., will diagnose tuberculosis among the native population and arrange hospital care.

The **Commonwealth Scientific and Industrial Research Organization,** Australia, will make a survey to assess the agricultural potential of the various regions of Papua and New Guinea, in collaboration with the Department of Territories. This project follows the success of similar survey work in the Darwin-Katherine region, the Barkly Tableland, the Kimberleys, and other areas of northern Australia. The survey party will progressively map the country, classify the land according to its inherent qualities, describe its permanent characteristics, and assess its possibilities for agricultural development. The CSIRO team, under the direction of C. S. Christian, will receive cooperation from the RAAF Photographic Unit, which has been asked to make an aerial survey of terrain to be covered by the land party. Use will be made of aerial reconnaissance to select areas for detailed examination.

The Polish People's Republic has proclaimed 1953 **"Copernicus Year,"** and meetings and conferences are now under way in commemoration of the Polish astronomer. The 400th anniversary of the death of Nicolaus Copernicus (Mikolaj Kopernik) occurred on May 24, 1943, during the Nazi occupation of Poland. For obvious reasons the anniversary could not be celebrated at that time by Polish scientists or the Polish community. Now, a decade later, Polish science headed by the newly organized Polish Academy of Sciences has made plans to mark the anniversary. Among the events announced are: The Polish Association of Astronomers is completing arrangements for a conference of Polish and foreign astronomers. The meeting will take place in Krakow, at whose Jagiellonian University Copernicus received his training in mathematics and astronomy. Also scheduled in Krakow is the opening of an extensive exhibition under the title "Nicolaus Copernicus and the Epoch of the Renaissance." During 1953 a new and definitive volume from Copernicus' chief work, *De Revolutionibus Orbium Coelestium*, Book VI, will be published in Latin and Polish, with the editors making use of a Copernicus manuscript found about a century ago in a private library in Prague. Also being prepared by the State Science Publishing House is a new translation from the Italian of the *Dialogues* of Galileo. Other publishing ventures include a new edition of Copernicus' writings on economics, as well as an illustrated album on his life and work.

The Committee on the Survey of Food and Nutrition Research of the Food and Nutrition Board of the **National Research Council** reports excellent progress on the Third Survey of Food and Nutrition Research in the United States. About 3000 research projects have been listed to date. July 1 has been set as the deadline for receipt of information. In the forthcoming publication, the project titles will be arranged in 11 sections: Nutritional Requirements; Digestion and Metabolism; Nutritional Deficiencies; Nutrition Surveys; Methodology Pertaining to Nutrients; Enzyme and Hormone Chemistry; Food Composition; Factors Affecting Nutritive Value; Microbiology; Food Acceptance; Nutrition Education. A register of workers in this field, a list of organizations conducting or supporting the research, and a subject index will be included. A new feature will be the inclusion of suggested food and nutrition research projects in areas where further work is indicated.