two new divisions at the Foundation: Dr. Griffis, who has been chairman of applied mechanics, will be manager of the new engineering mechanics division, while Dr. Schulz heads a division comprising two departments of which he was formerly chairman, the physics and electrical engineering division.

Tracerlab, Inc., of Boston, has announced the creation of a Research Advisory Board headed by **Karl T. Compton**, and including **Lewis L. Strauss**, **Charles D. Coryell**, and **Wendell C. Peacock**.

The Paris Academy of Sciences has elected the following *correspondents* for the divisions of *membres libres* and of the application of science to industry: **M. Dehalu**, formerly professor of astronomy, geodesy, and the calculus of probabilities at the University of Liège; **Irving Langmuir**, retired associate director of the research laboratory of the General Electric Company; and **K. M. G. Siegbahn**, director of the Nobel Institute for Physics, Stockholm.

The Brookhaven National Laboratory has announced the appointment of the following summer staff members to its physics department: **G. Chew**, University of Illinois; **M. Deutsch**, Massachusetts Institute of Technology; **D. Falkoff**, University of Notre Dame; **R. C. Garth**, Brooklyn College; **R. D. Hill**, University of Illinois; **V. P. Kenny**, Fordham University; **H. R. Muether**, Queens College; **G. Placzek**, Institute for Advanced Study; and **W. L. Whittemore**, Harvard University.

Richard F. Feynman, professor of theoretical physics at the California Institute of Technology, has been granted a year's leave of absence. He has accepted a visiting professorship at the Centro Brasileiro de Pesquisas Fisicas in Rio de Janeiro, Brazil.

Beno Gutenberg, director of the Seismological Laboratory at the California Institute of Technology, left July 2 for a trip abroad during which he will advise the Turkish government on the installation of geophysical and seismological research centers under the auspices of Unesco.

Donald H. Loughridge, a physicist and former senior scientific advisor to the secretary of the army, has been named assistant director of the reactor division of the Atomic Energy Commission. **Kenneth S. Pitzer** has resigned as director of research for the AEC to resume his teaching duties and become dean of the college of chemistry at the University of California in Berkeley. **Henry D. Smyth**, author of the Smyth Report on atomic energy and a member of the AEC since 1949, has accepted nomination by President Truman for a new five-year term on the Commission.

Robert R. Wilson, professor of physics and director of the Laboratory of Nuclear Studies at Cornell, was inadvertently referred to in last month's issue as Robert R. Williams in announcing his appointment as Walker-Ames professor for the summer of 1951 at the University of Washington in Seattle.

Meetings

HIGH POLYMER PHYSICS

APS DIVISION MEETS IN WASHINGTON

The Division of High Polymer Physics of the American Physical Society held its ninth meeting on April 26 and 27, 1951 at the National Bureau of Standards, in conjunction with the Washington meeting of the parent society. Two symposia on "Transitions in Polymers" and "The Relative Effects of Frequency and Temperature on Dynamic Mechanical Properties" were held. The balance of the program consisted of two other sessions of contributed papers on an interesting variety of structural and mechanical behavior phases and several biophysical subjects, somewhat related to our interests. In striking contrast to the Thanksgiving meeting at Chicago, where overcoats and gloves were *de rigueur* during presentation of the papers, shirt sleeves were the proper dress during the summer-like weather of the first day.

The Bureau kindly placed at our disposal the beautiful auditorium of their East Building for the two symposia held the first day. The symposium on transitions in polymers was opened with an invited paper by T. G. Fox, Jr., on the factors influencing glass formation and crystallization in polymers, in which he indicated that the Flory theory gave an adequate treatment of crystallization phenomena but that knowledge of the glassy state was still empirical and that the glass temperature, T_G, depends on the rate of making the measurement. The other papers described investigations of transitions by x-ray scattering as a function of temperature (polystyrene), pressure-volume relationships up to 10,000 atmospheres, dielectric loss factor of plasticized polyvinyl chloride as a function of temperature, and length-temperature behavior of rubbers. The degree of crystallinity in natural rubber was estimated by dilatometric methods, employing a recording photoelectric interferometer below the glass transition temperature and a volume dilatometer above T_G.

The afternoon symposium on the relative effects of frequency and temperature on dynamic mechanical properties was opened by A. V. Tobolsky, who showed that the stress-relaxation behavior of polyisobutylenes could be expressed by a master curve covering 18 cycles of logarithmic time with temperature as an interconvertible variable. He stressed that a good molecular interpretation of the behavior is still lacking and constitutes a real challenge. J. D. Ferry described the use of reduced variables to give a single curve of tempera-

ture and frequency dependence of dynamic mechanical properties. Papers followed by T. W. De Witt on dynamic studies on polyisobutylene, using vibrating crystals to determine rigidity and internal friction as a function of frequency; by R. S. Marvin on the results of a cooperative program of 20 different laboratories on the temperature and frequency effects on dynamic properties of standard samples of polyisobutylene over the range from 10^{-2} to 10^{7} cycles per second; and by A. W. Nolle on ultrasonic measurements on swollen and unswollen rubber to determine the three-dimensional diagrams of modulus, temperature, and frequency. H. S. Sack, in summary, pointed out that recovery of deformation has received an alternative treatment by Debye and Kirkwood as a diffusion process and considered that measurements were not yet sufficiently good to determine whether the glass temperature is only a rate process or a real thermodynamic transition.

An invited paper by B. A. Mrowca, reporting on the progress of the study of nuclear magnetic absorption of rubbers and polystyrene, opened the Friday morning session. Other papers dealt with the nuclear magnetic resonance absorption in proteins as a function of moisture content, the dynamic shear properties of polyisobutylenes as a function of crosslinking by means of an electrically driven tuning fork, a theoretical treatment of energy dissipation in vibrating fibers, the use of Nutting's equation to determine a material constant related to the time dependence of the deformation process for plasticized polyvinyl chloride, flow behavior of concentrated polymer solutions, sedimentation and diffusion behavior of polyelectrolytes, and a successful attempt to calculate densities, refractive indices, and optical dispersions on the basis of colligative properties of the groups making up the polymers.

In the final session, apparatus was described for determining the dielectric behavior of liquids, gels and solids over the audiofrequency range and a wide temperature range. A coaxial cylindrical rheometer for measuring dynamic viscosity and rigidities through the application of low frequency oscillations was described. The internal energy and entropy was estimated from a stress-temperature study of polyethylene. The remaining eight papers were on the general subject of biophysics and dealt, for the most part, with particle bombardment of biological material.

The next meeting of the Division will be held at Columbus, with the parent society, in March, 1952. The program committee for this meeting will be headed by R. Buchdahl.

Finally, we wish to express the appreciation of the Division to the retiring Program Committee: L. A. Wood, Chairman, J. H. Wakelin, R. S. Marvin, and H. S. Sack, who arranged the program for the Washington meeting; also, to the National Bureau of Standards for their kindness in providing the facilities for our meeting, in connection with their Semicentennial Celebration.

J. B. Nichols
E. I. duPont de Nemours and Co.

LOW-TEMPERATURE PHYSICS

WASHINGTON SYMPOSIUM REPORTED

More than 200 leading low-temperature physicists from this country and abroad attended a symposium on low-temperature physics held at the National Bureau of Standards in Washington, D. C., on March 27, 28, and 29, 1951. The low-temperature meeting, described here in a report prepared by the Bureau staff, was the first of 12 symposia scheduled for the year 1951, which marks the fiftieth anniversary of the Bureau's establishment. Sponsored by the NBS in cooperation with the Office of Naval Research, the program was under the joint chairmanship of Emanuel Maxwell and John R. Pellam of the NBS low-temperature laboratory.

Because of the many remarkable phenomena that occur at temperatures near absolute zero, and the insight they give into the ultimate nature of matter, low-temperature research is today one of the most challenging fields of pure physics. Two subjects of particular interest are superconductivity—the loss of electrical resistance at very low temperatures—and the properties of liquid helium II, a form of helium existing at low temperatures which seems to constitute a fourth state of matter. While these subjects received major emphasis at the conference, a wide variety of other topics was covered, including low-temperature magnetism, calorimetry, chemical physics, and the design of low-temperature equipment. As low-temperature physics is still in an early stage of development, the 55 technical papers were chiefly concerned with current problems.

The first day was devoted to superconductivity, and the isotope effect, which relates superconductivity to the atomic mass, was the topic of much of the discussion. The recent discovery of this phenomenon at NBS, in combination with independent results obtained almost simultaneously at Rutgers University, revealed the role of lattice vibrations in superconductivity, providing a basic concept for current theories. Results of superconductivity measurements on isotopes at Oxford, Cambridge, Rutgers, and NBS were presented, compared, and discussed. The symposium thus provided a useful orientation for mapping future research in this field.

One of the highlights of the first day was a panel discussion on the theory of superconductivity, which was conducted by John Bardeen (Bell Telephone Laboratories), Hans Frolich (University of Liverpool), and L. Tisza (Massachusetts Institute of Technology), exponents of the more important theories contending for recognition today. All three theories incorporate the concept of interaction between lattice vibrations and electrons as a fundamental building block. It was agreed that although superconductivity theory is still in a rudimentary stage, the recognition of the importance of lattice vibrations is a significant advance.

Other interesting topics in superconductivity included the superconducting properties of thin films and alloys, thermal conductivity, specific heats, high-frequency behavior of superconductors, and the discovery of new