

## WAR SURPLUS BARGAINS

Government's 7 X 50 Binoculars

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**MOUNTED ANASTIGMAT LENSES**—Use for Projectors, Enlargers, Copying Cameras. Complete with Shutter and Diaphragm. Value about \$20. An excellent buy. **WE WILL INCLUDE FREE ILLUSTRATED BOOKLET on HOW TO MAKE YOUR OWN ENLARGER.**

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**SLIDE PROJECTOR SETS**—Consist of all unmounted lenses you need to make the following slide projectors:

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**Stock #4029-K**—35 mm.....\$2.85 Postpaid

**BUBBLE SEXTANT TYPE A-8A.** Excellent condition but may be slightly used. Each has been carefully checked and collimated. Averaging device for night-time use. Carrying Case and instruction booklet included. Gov't. cost about \$325.00

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**NEW BULLETIN on our BIG VARIETY OF PRISMS**—Over 50 different right angle Prisms, Rhomboidal, Binoocular Porro, Leman, Porro-Abbe, Brashear-Hastings, Penta, Dove, Pentagon, Ocular, and Amici Roof Prisms, Also Beam Splitters, Wedges and many others.

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## PHYSICISTS

During the coming year the Armour Research Foundation is planning to expand considerably its research activities in the following fields: nuclear physics, electricity and magnetism, acoustics and vibrations, optics, spectroscopy, and high-pressure phenomena. Unusual opportunities are available for fundamental and applied research and for professional advancement. The Foundation will welcome applications from persons with several years of research and/or administrative experience.

**Write:**

**Chairman, Physics Research  
Armour Research Foundation  
35 West 33rd Street  
Chicago 16, Illinois**

In a series of three articles of which the present one is the last, Richard C. Tolman has presented a quasi-thermodynamic analysis of the structure of the transition zone between a liquid and its vapor which leads to the important conclusion that the superficial density is generally positive. Hence the surface tension of small drops is less than that when the liquid has a plane surface and decreases with decreasing droplet size. The effect is small but it is not negligible for embryo droplets in the borderline between the macroscopic and the microscopic. For drop radii of the order of magnitude of several hundred Angstrom units, decreases in surface tension of a few percent are to be expected in representative cases.

Tolman's analysis is based upon the hypothesis, which he recognized to be only approximately valid, that macroscopic thermodynamics can be applied to each layer of the transition zone between liquid and vapor. The thermodynamic functions are thus supposed to have values identical with those of the fluid in bulk appropriate to the given temperature and the local density of the layer.

JOHN G. KIRKWOOD

The Effect of Droplet Size on Surface Tension. By Richard C. Tolman. *J. Chem. Phys.* 17: 334, March, 1949.

## Polymer Chains

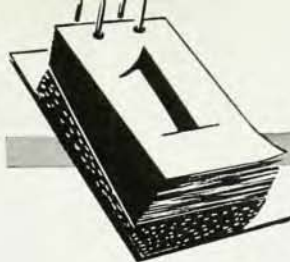
The thousands of atoms in long chain polymer molecules are connected to one another by valance bonds about which they may rotate. The configuration of these molecules has customarily been studied by an analogy to the diffusion of a particle which moves about in successive displacements of equal length but in random directions. The diffusion problem and the polymer configuration problem differ, however, in one important respect not ordinarily taken into account. Whereas a diffusing particle may cross its previous path with impunity, there obviously cannot be a configuration in which two elements of the polymer chain occupy the same space. The modification of the configurational dimensions resulting from this stipulation has been investigated by an approximate statistical method and the results confirmed by numerous experiments.

P.J.F.

The Configuration of Real Polymer Chains. By Paul J. Flory. *J. Chem. Phys.* 17: 303, March, 1949.

## Visual Ultrasonics

The problem of detecting and measuring the wavelength, intensity, and absorption of ultrasonic vibrations has been solved in a number of ingenious ways. Mechanical methods, involving the use of dust figures, the condensation of alcohol mist at the loops of stationary waves, and the measurement of sound radiation pressure by radiometers have been used frequently. Electrical and visual methods, however, are more versatile and have proved considerably more successful. The technique described in the present paper employs a visual method which appears capable of rather widespread application.



## CALENDAR

### of EVENTS

More than eighty years ago, Toepler availed himself of Foucault's method for rendering visible minute optical disturbances and perfected the so-called "schlieren method" which has made possible the visualization in a transparent medium of those regions which have a refractive index differing only slightly from the surrounding regions. During recent years, the method has been used with spectacular success in air-flow analysis and correlated aerodynamic problems. As shown by numerous workers, the technique can also be employed for the study of ultrasonic phenomena.

The authors have described a method similar in broad general outline to that described by G. W. Willard, although differing in certain details which appear to lend convenience in operation and increased versatility in application. A series of photographs has been prepared which illustrates the close analogy existing between light waves and ultrasonic waves with respect to the wave phenomena of refraction, diffraction, and interference. The authors feel that this technique may be a considerable aid to students of optics in visualizing many complex optical effects.

C.J.B.

Visual Methods for Studying Ultrasonic Phenomena. By R. Bowling Barnes and Charles J. Burton. *J. App. Phys.* 20: 286, March, 1949.

### Cosmic Ray Protons

Relative intensities of various types of cosmic ray particles at different atmospheric levels give clue to the collision processes and nuclear interactions which cause them. These intensities are most often determined by using cloud chambers or proportional counters to measure the specific ionization of the particles. The counting efficiency of a Geiger-Mueller counter can be made to depend heavily upon the specific ionization of a particle by filling it with a lighter gas at a lower pressure than usual.

A counter telescope designed to measure the counting efficiency of such a low pressure counter has been operated at 4300 meters atop Mt. Evans in Colorado. An excess in counting efficiency over that expected for mesons alone was observed for various thicknesses of lead ranging from ten to thirty-four centimeters.

This excess is attributed to more heavily ionizing particles than either mu or pi mesons. Assuming they are protons, the data indicate that they comprise seventeen (plus or minus five) percent of the total radiation penetrating fifteen centimeters of lead. This value is in excess of previously determined proton intensities at this altitude. The proton absorption curve obtained is in agreement with that for the radiation producing bursts measured under large thicknesses of lead at the same altitude by other observers. This supports their view that the burst primaries are protons.

F.L.H.

The Intensity of Heavily Ionizing Penetrating Particles at 4300 Meter Altitude. By Frank L. Hereford, *Phys. Rev.* 75: 923, March 15, 1949.

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|-------------|------------------------------------------------------------------------------------------------------------------------------------|
| April 4-6   | Second Symposium on Plasticity, Brown University, Providence, R. I.                                                                |
| April 4-8   | Society of Motion Picture Engineers, New York City                                                                                 |
| April 11-12 | American Institute of Electrical Engineers Conference on the Industrial Application of Electron Tubes, Buffalo, New York           |
| April 11-13 | Society of Automotive Engineers (Aeronautics and Air Transportation), New York City                                                |
| April 11-14 | National Association of Corrosion Engineers Annual Conference and Exhibition, Cincinnati, Ohio                                     |
| April 11-15 | American Society for Metals, Los Angeles, California                                                                               |
| April 12    | American Ceramic Society and Pittsburgh Physical Society (Joint Meeting) Symposium, Physics and Ceramics, Pittsburgh, Pennsylvania |
| April 15-16 | American Physical Society (Southeastern Section), Clemson, South Carolina                                                          |
| April 19-21 | American Institute of Electrical Engineers (Southwestern District), Dallas, Texas                                                  |
| April 19-22 | American Society of Biological Chemists (Annual Meeting), Detroit, Michigan                                                        |
| April 20-22 | American Geophysical Union, Washington, D. C.                                                                                      |
| April 20-23 | American Society of Civil Engineers, Oklahoma City, Oklahoma                                                                       |
| April 21-23 | American Philosophical Society, Philadelphia, Pennsylvania                                                                         |
| April 22-23 | American Physical Society (Spring Meeting New York State Section), Syracuse, New York                                              |
| April 24-28 | American Ceramic Society, Cincinnati, Ohio                                                                                         |
| April 25-27 | Radio Manufacturers Association and Institute of Radio Engineers (Annual Meeting, jointly sponsored), Philadelphia, Pennsylvania   |
| April 25-27 | National Academy of Sciences, Washington, D. C.                                                                                    |
| April 25-28 | Technical Association of Pulp and Paper Industries (Coating Conference), Grand Rapids, Michigan                                    |
| April 28-29 | Illuminating Engineering Society (Canadian Regional Conference), Toronto, Ontario                                                  |
| April 28-30 | American Physical Society, Washington, D. C.                                                                                       |
| April 29-30 | American Mathematical Society, Philadelphia, Pennsylvania, and Lawrence, Kansas                                                    |
| April 30    | American Mathematical Society, Stanford University, California                                                                     |
| May 2-4     | International Scientific Radio Union and Institute of Radio Engineers (Joint Meeting), Washington, D. C.                           |
| May 2-4     | American Society of Mechanical Engineers (Spring Meeting), New London, Connecticut                                                 |
| May 4-5     | National Association of State Universities (Annual Meeting), Chicago, Illinois                                                     |
| May 5-7     | Acoustical Society of America (Twentieth Anniversary Meeting), New York City                                                       |
| May 6-7     | American Council on Education (Annual Meeting), Washington, D. C.                                                                  |
| May 8-12    | American Institute of Chemical Engineers, Tulsa, Oklahoma                                                                          |
| May 8-12    | American Society of Chemical Engineers, Tulsa, Oklahoma                                                                            |
| May 9-12    | American Oil Chemists' Society (Annual Meeting), New Orleans, Louisiana                                                            |
| May 12-13   | Instrument Society of America (Spring Meeting), Toronto, Canada                                                                    |
| May 13-14   | Illuminating Engineering Society (Northeastern Regional Conference), Hartford, Connecticut                                         |
| May 23-24   | Illuminating Engineering Society (Great Lakes Regional Conference), Rochester, New York                                            |
| June 1-3    | Canadian Association of Physicists, Quebec, Canada                                                                                 |
| June 2-3    | Illuminating Engineering Society (East Central Regional Conference), Harrisburg, Pennsylvania                                      |
| June 5-9    | American Society of Refrigerating Engineers (Spring Meeting), S.S. Richelieu, cruising St. Lawrence and Saguenay Rivers            |
| June 5-10   | Society of Automotive Engineers (Summer Meeting), French Lick, Indiana                                                             |