

cause "it appears improbable that an overwhelming preponderance of opinion either favourable or unfavourable to rationalization [avoidance of the factor  $4\pi$  in Maxwell's equations] will be manifested in the near future", further action should be deferred until agreement on this matter has been reached. Though the situation has not changed much it is probable that rationalization of the electrical units will be discussed again at the Copenhagen meeting in July.

It may be helpful to reach agreement first on a few general principles governing the choice. Two principles suggested are:

(a). Physical equations in textbooks and scientific journals should be mathematical relations between physical quantities and hence be independent of the system of units used for the numerical evaluation of the quantities.

(b). Unit-systems should always be coherent or germane, i.e., should not require the introduction of numerical conversion factors different from unity in the unit equations defining the derived units in terms of the fundamental units of its own system. The electrostatic and electromagnetic CGS units and the Giorgi-MKS units are each coherent unit systems. The volt as a unit of kinetic energy of an electron is an incoherent unit since the equation defining it in terms of the regular units of energy involves the charge of the electron as a numerical factor.

On the basis of these principles, rationalization should be considered as a change in the definition of some physical quantities, as:

$$\begin{aligned} D' &= D/4\pi & \epsilon' &= \epsilon/4\pi & \rho' &= \rho/4\pi \\ H' &= H/4\pi & \mu' &= 4\pi\mu & M' &= (B - \mu_0 H') = 4\pi M \end{aligned}$$

This makes the factor  $4\pi$  disappear from Maxwell's equations and reappear in the force laws between electrical charges and currents and in problems involving spherical symmetry.

As it is to be expected that the quantities defined according to the rationalized equations will be used at the same time as the classical definitions, it is very important that the rationally defined quantities should be given a *new name* (an adjective of prefix to the classical name) and a *modified symbol* (suggestions: upper index  $r$ , prime—as in the paragraph above—or another symbol, such as might be had by combining a solidus with  $D$ ,  $H$ ,  $\epsilon$ , etc. in analogy to the Dirac  $\hbar$ ).

It is of interest to note that at the meeting of Technical Committee Number 24 (Electric and Magnetic Magnitudes and Units) of the International Electrotechnical Commission, held in Paris July 1950, the following conclusions were reached:

1. It was recorded that "newton" was finally adopted as the name for the unit of force in the Giorgi system.
2. The ampere was adopted as the fourth principal unit of the Giorgi system.
3. The so-called total rationalization of the Giorgi system was adopted.
4. An Experts Committee was set up to study the rationalization process and prepare questions to be considered at the next meeting.

Although such recommendations of the IEC can have no legal force, they will doubtless be used by many engineers and writers of text books as a guide to preferred practice. It is very fortunate that Professor de Boer could participate in the meetings last July and is (as observer) a member of the "Experts Committee".

F. G. Brickwedde

# Calendar of events

## March

- 8-10 American Physical Society, Pittsburgh, Pennsylvania
- 11-14 American Institute of Chemical Engineers, White Sulphur Springs, West Virginia
- 13-15 Institute of Metals, Annual General Meeting, London, England
- 16 Institute of Aeronautical Sciences, Sixth Annual Flight Propulsion Meeting, Cleveland, Ohio
- 19-22 Institute of Radio Engineers, National Convention, New York City
- 19-23 American Society for Metals, Western Metal Congress and Exposition, Oakland, California
- 27-28 Association for Computing Machinery, Joint meeting with the Industrial Mathematics Society, Wayne University, Detroit, Michigan

## April

- 1-5 American Chemical Society, Boston, Massachusetts
- 2-5 American Society of Mechanical Engineers, Spring Meeting, Atlanta, Georgia
- 3 Society for Applied Spectroscopy, New York City
- 5-7 American Physical Society (Southeastern Section), Chattanooga, Tennessee
- 5-7 American Physical Society, Spring Meeting, Rensselaer Polytechnic Institute, Troy, New York
- 6-11 Physical Society of Great Britain, 35th Annual Exhibition of Scientific Instruments and Apparatus, London, England
- 8-12 American Chemical Society, Cleveland, Ohio
- 11-13 Faraday Society, on Hydrocarbons, Oxford, England
- 14 Institute of Radio Engineers, Fifth Annual Spring Technical Conference, Cincinnati, Ohio
- 14 American Association of Physics Teachers (Chesapeake Section), University of Delaware, Newark, Delaware
- 16-18 U.S.A. National Committee of the International Scientific Radio Union and the Professional Group on Antennas and Wave Propagation of the Institute of Radio Engineers (Regular Spring Meeting), Washington, D. C.
- 18-20 Technical Association of the Pulp and Paper Industry, Boston, Massachusetts
- 19-20 American Philosophical Society, Annual General Meeting, Philadelphia, Pennsylvania
- 20-21 American Mathematical Society, New Orleans, Louisiana
- 22-26 American Ceramic Society, Inc., Chicago, Illinois
- 23-25 National Academy of Sciences, Washington, D. C.
- 23-26 Society of Exploration Geophysicists joint meeting with American Association of Petroleum Geologists and Mineralogists, St. Louis, Missouri
- 25-28 American Physical Society, Division of High-Polymer Physics, Washington, D. C.
- 26-28 American Physical Society, Washington, D. C.
- 27-28 American Mathematical Society, New York City and Chicago, Illinois
- 28 American Mathematical Society, Stanford, California
- 30-2 American Geophysical Union, Washington, D. C.
- 30-4 Materials Handling Conference and National Materials Handling Exposition, sponsored by American Material Handling Society and Material Handling Institute, respectively. International Amphitheatre, Chicago, Illinois
- 30-4 Society of Motion Picture and Television Engineers, New York City

## October

- 23-27 20th Anniversary American Institute of Physics. Joint meeting member societies, Chicago, Illinois