

aurora, and various problems connected with the earth's magnetism and atmospheric electricity.

Papers having possible international interest may be considered for inclusion in the program of the Association of Terrestrial Magnetism and Electricity sessions to take place during the ninth general assembly of the International Union of Geodesy and Geophysics, which is to be held in Brussels from August 21st through September 1st. The Association, which is one of seven belonging to the union, plans to hold several joint sessions with the Association of Meteorology and the Joint Committee of Physics of the Earth.

Further information may be obtained by writing to the secretary of the Terrestrial Magnetism and Electricity Section of the American Geophysical Union, L. R. Alldredge, National Research Council, Washington, D. C.

URSI AND IRE

The regular spring meeting of the U.S.A. National Committee of the International Scientific Radio Union (URSI) and the Professional Group on Antennas and Wave Propagation of the Institute of Radio Engineers will be held in Washington, D. C., on April 16, 17, and 18, 1951, at the National Bureau of Standards.

Administrative meetings will be held on Monday, April 16, and the technical sessions will take place during the two following days. An inspection trip to the National Bureau of Standards is being arranged for the afternoon of April 16; an informal social evening is planned for April 17 when a summary of the Zurich General Assembly of the URSI will be presented. Technical sessions, sponsored by four URSI Commissions, will be held on radio propagation, noise, and antennas. Advance registration cards may be obtained from the Secretary, Dr. Newbern Smith, National Bureau of Standards, after March 1st. Registration fee is \$2.00 in advance or \$2.50 at the time of the meeting.

DISCUSSION INVITED

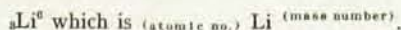
AGENDA FOR SUN COMMISSION MEETING

At the next meeting (July 1951 in Copenhagen) of the International Union of Pure and Applied Physics, the Commission on Symbols, Units, and Nomenclature will discuss and may adopt resolutions recommending the universal use of certain units and symbols of interest to many American physicists, including certain symbols and nomenclature for nuclei, and units for electricity and magnetism. Universal agreement on units and symbols is certainly desirable though admittedly very difficult of attainment. It is a policy of the SUN Commission to recommend a usage only when there is overwhelming support for it. The Commission therefore invites discussion of questions on its agenda and in particular the questions presented here. Comments and discussion may be sent directly to Professor J. de Boer, Secretary of the SUN Commission, University of Amsterdam, Holland or to the writer of this notice for transmittal to the Commission. A. Perard, Director of the International Bureau of Weights and Measures, Sevres, France, is President of the SUN Commission. Other members are: J. de Boer (Amsterdam), E. Griffiths (Teddington), H. Konig (Berne), E. Perucca (Turin) and F. G. Brickwedde (National Bureau of Standards, Washington, D. C.).

Nuclei

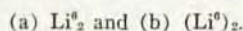
1. *Symbols for Nuclei.* It has been proposed that the "diagonal" notation for nuclei be universally adopted. An ex-

ample of this notation is:



This is already in general use by American physicists. It is objected to by French scientists, especially chemists, who indicate the atomic composition of molecules by upper right hand indices (e.g. H^2O). This upper index notation for the composition of molecules, however, is in contradiction to a previously made recommendation of the SUN Commission. Also, some American chemists prefer to reserve the upper right hand index space for the sign (+ or -) of an ion.

The indication of the atomic composition of molecules by lower right hand indices would be retained. Two suggestions for writing the atom numbers are illustrated by



The second form (b) has the advantages that it does not require the back-spacing necessary for the typing of parallel super- and sub-scripts, and it can be printed with regular superscript and subscript monotype. The parallel notation of form (a) calls for special type.

2. *Nomenclature for Nuclei.* It is proposed that the word *monobar* be universally used to indicate a single atomic species having a definite atomic number and a definite mass number as ${}_1\text{H}^1$ and ${}_9\text{F}^{19}$. It is proposed also that the word *isotopes* be used only to indicate monobars having the same atomic numbers but different mass numbers. *Isobars* would be recommended to indicate monobars having the same mass numbers but different atomic numbers.

Electrical Units

1. *The Giorgi-MKS System and the Fourth (Electrical) Unit.* The general Assembly of the International Union of Pure and Applied Physics in Amsterdam, July 1948, approved the following resolution proposed by the SUN Commission:

"The International Union of Pure and Applied Physics decides to ask the International Bureau of Weights and Measures to accept, for international use, an *international practical system* of units. It is not proposed that the CGS-system should be abandoned by physicists.

"The International Union of Pure and Applied Physics recommends as an international practical system of units the system: *metre, kilogram (mass), second* and an electrical unit of the absolute practical system (to be chosen in near future).

"The unit of force in this system (i.e. the force, which acting on a mass of 1 kg produces an acceleration of 1 m/s^2) should be called the *newton*".

The Union of Physics had two objectives in making this recommendation: (1) the elimination of other practical systems of units which use mass units as force units, and (2) the reaching of universal agreement on the fourth quantity of electrical or magnetic nature for a satisfactory description of electric and magnetic phenomena.

The above resolution of the Union made no choice for the fourth unit. There is merit in the suggestion that electric charge or electric current be used as the basis of the fourth unit. Industrial physicists have advocated fixing the numerical value of the permeability of vacuum at 10^{-7} making the practical MKS units decimal fractions or multiples of the electromagnetic CGS units.

2. *The Rationalization of the Electrical Units.* A report of the SUN Commission approved by the General Assembly of the Union of Physics, London, 1934 states that be-

cause "it appears improbable that an overwhelming preponderance of opinion either favourable or unfavourable to rationalization [avoidance of the factor 4π 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 4π 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 , ϵ , 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