electrode as the cathode, for it is to this electrode that the cations, the copper ions, are migrating. No mention has yet been made of positive and negative electrodes. Actually, an electrode is negative only because it is more negative than the other electrode in the system.

Using the second definition, it is immediately apparent that the terms now indicate the chemical processes occurring in the vicinity of the electrodes—namely, oxidation in the vicinity of the anode and reduction in the vicinity of the cathode. It would seem better from the chemical point of view to label the electrodes with respect to the chemical processes occurring than by any other terms. Oxidation processes will always occur in the vicinity of the anode and reduction processes will always occur in the vicinity of the cathode if this definition is followed in the labeling of both electrolytic and galvanic cells. There can be no mistaking the processes of oxidation and reduction, since they can be defined in terms of electron loss and electron gain, respectively.

Affixing the terms positive and negative to the electrodes would be a very simple matter. In the electrolytic cell, that electrode to which electrons are being admitted is termed the negative electrode (cathode), for it is more negative than the other electrode in the cell. In the galvanic cell, that electrode at which electrons are being liberated is termed the negative electrode (anode), for it is more negative than the other electrode in the cell. The chemical processes occurring at the negative and positive electrodes in the electrolytic and galvanic cells will be different, but the processes occurring at the anode and the cathode will be the same. The diagram shown of the electrolytic and galvanic cells make clear the notation and charge of each electrode.

PAUL DOIGAN

New York University

Corrections

In the paper "Preliminary Observations on the Biological Effects of Radiation on the Life Cycle of *Trichinella spiralis*" by Alicata and Burr (*Science*, 1949, **109**, 595) the reports of earlier observations by E. E. Tyzzer and J. A. Honeij (*J. Parasitol.*, 1916, **3**, 43), B. Schwartz (*J. Agric. Res.*, 1921, **20**, 845), and others, on the deleterious effects of radiation on the reproductive tissue of *T. spiralis* were inadvertently omitted from the list of references.

JOSEPH E. ALICATA

University of Hawaii
Agricultural Experiment Station

A typographical error in Table 1 of my paper "The Validity of the Use of Tracers to Follow Chemical Reactions" (*Science*, 1949, **110**, 14), under the entries for chlorine makes the estimated maximum ratios for the tracers Cl^{36} and Cl^{38} somewhat ambiguous. The stable isotopes should be written as Cl (natural abundance). The ratios were calculated for reactions with the tracers Cl^{36} and Cl^{38} in systems containing chlorine of natural isotopic abundance. Due attention has been given to the fact that the Cl^{35} and Cl^{37} will react at different rates.

JACOB BIGELEISEN

Brookhaven National Laboratory

Book Reviews

Kinematic relativity: a sequel to relativity, gravitation and world structure. E. A. Milne. New York: Oxford Univ. Press; Oxford, Engl.: Clarendon Press, 1948. Pp. vi + 238. $6.50.

This book is a presentation of the author's theory of cosmology and physics. It is a sequel to his study *Relativity, gravitation and world structure* (1935), but can well be read independently from the earlier volume. It is a fascinating treatise, centered around a brilliant idea, excellently presented and showing unusual skill in the elaboration of some of the details. Even though the reviewer could not agree with all parts of the book, his admiration never slackened for the scope of the work and the wealth of results obtained by the author with the help of only a handful of collaborators.

The central idea of Milne's theory is a restatement of Mach's principle (cf. p. 3) that the laws of nature are a consequence of the contents of the universe. Our expanding universe is, however, an ordered structure, consisting of galaxies moving as if they had originated at a certain time at a common point (the "origin of the world") and moved away from each other henceforth. There is, therefore, it can be claimed, no purpose in establishing laws of motion which would be valid in an arbitrary type of universe or in setting up laws of invariance which disregard the structure of our universe. In our universe, a definition of absolute rest, at every point of space time, can be obtained by considering the motion of the galaxies at that point. The coordinate systems in which matter, on the average, is at rest along the time axis are, according to Milne, preferred over other coordinate systems, but are mutually equivalent. The equivalent coordinate systems form a sixparametric manifold: three parameters are necessary to give the "average material point" whose world line coincides with the time axis of the coordinate system, and three parameters give the orientation of the space axes. The equivalent coordinate systems thus form a much smaller manifold than in Einstein's special theory of relativity, in which ten parameters are necessary to describe an inertial coordinate system. In Milne's theory, coordinate systems