ditional advantage that carbon forms many more hydrides than any other element, so that an easy reference line for doublets can be produced at almost every mass number up to $A \sim 120$. Many stable nuclides in the mass region $120 < A < 240$ can also be measured in reference to ^{12}C by pairing in doublets their doubly charged ions with singly charged ions of $^{12}C_n$ or of $^{12}C_nH_m$ fragments. Use can then be made of nuclear disintegration data to obtain accurate masses of many other, especially unstable, nuclides.

With ^{16}O as the official reference nuclide, mass spectroscopists have been forced to spend much time and effort in measurements of the ^{12}C to ^{16}O mass ratio, which is needed in order to use their other results. This state of affairs is the more disagreeable since for some reason or other this mass ratio appears to be rather elusive. The proposed definition would put an end to this unfortunate situation.

Chemistry

From a chemical point of view, the opinion has been expressed that the most suitable reference substances for atomic weights are those elements which in nature are anisotopic. However, this seems to be based on an assumption that the only alternatives are natural polyisotopic elements, whose isotopic composition may be variable. If individual nuclides can be accepted, the argument loses its force. The most accurate chemical atomic weights are at present derived from physical data, and for those cases where a chemical determination might still be more precise (for example, Cl, Br, Ag), the physical determination of the atomic weight of a natural carbon isotope mixture in terms of the ^{12}C mass can be made with more than adequate precision; if necessary, the preparation of separated ^{12}C in adequate purity and quantity would be quite feasible.

Conclusion

The adoption of the proposed redefinition of the atomic weight scale should cause very little difficulty for chemists, because the changes would be small in relation to the precision of most chemical data. The present chemical atomic weights can be converted to the new scale by dividing by 1.000043; changes of more than one unit in the last figure of the official 1957 values would be required for only five elements (Cl, Ar, K, Br, and Ag—the latter changing from 107.880 to 107.875). Quantities whose magnitudes are proportional to the size of the mole must similarly be divided by the same factor; in most cases the changes will be insignificant.

For physicists, however, the changes in the mass values would be enormous in relation to the uncertainties in the data, and the new definition would be generally useful for them only if tables of nuclidic masses in the new scale were available. Two of us are considering the compilation of such tables. These data being available, we are inclined to think that neither chemists nor physicists should have objections to the new definition (*5*).

References and Notes

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3. A. O. Nier, University of Minnesota, private communication; A. Olander, Stockholm, private communication.
4. J. Mattauch, Addendum No. 2, Report for 1957, Commission on Atomic Weights, International Union of Pure and Applied Chemistry, *Comptes Rendus de la Dix-Neuvième Conférence, Paris 16–25 Juillet 1957*, p. 153.
5. A more detailed discussion of the problem of the scales of atomic weights and nuclidic masses is being prepared by one of us (J.H.E.M.).

George Malcolm Stratton, Social Psychologist

George M. Stratton, who died 8 Oct. 1957, was the last of a pioneer group of students of the renowned German psychologist Wilhelm Wundt who were credited with having introduced experimental psychology into the United States. True to the experimental emphasis of the Leipzig School, Stratton established and equipped at the University of California one of the first laboratories of experimental psychology in America. Throughout his long and productive career he applied the experimental method to a variety of areas in human behavior, with particular efforts to study the intangible determinants of social behavior.

It was in 1896 that he published his first experimental study. This research was concerned with "vision without inversion of the retinal image" and was the starting point of an extended and significant series of studies in visual space. The original study is today considered a classic in the field. Stratton is credited in this experiment with having "settled both Kepler's problem of erect vision with an inverted image and Lotze's problem of the role of experience in space perception." Although Stratton's studies on binocular vision and depth perception have had the greatest single impact on the thinking and research of his colleagues in psychology, he himself probably considered of greater importance his studies in the fields of emotions, social values, and international conduct. He staunchly believed that the understanding of the impulses, instincts, and motives of man merited the same careful scientific analysis as did sensation and perception, intellect and ability, and learning and memory. It was in these latter fields that most of the early experimental psychologists had directed their energies.

Very early in his career Stratton became interested in studying volitional behavior as it is manifested in drives, impulses, and emotional reactions. Here he found it possible to apply experimental and laboratory techniques to many of the problems, but in studying volitional behavior in social contexts he was confronted with the need of proceeding from the behavior of the individual to the behavior of the group, and group behavior did not readily yield to experimental attack. To these problems of group behavior Stratton brought the objective, factual approach that had characterized his laboratory studies. His theory of group behavior was an extension of the theories he had derived to explain

the volitional behavior of the individual, as this behavior is modified by interactions among few or many persons in the form of either loosely or tightly knit institutional organizations. His theoretical approach was opposed to the then popular theory of group behavior which postulated "group will" and "group consciousness" as characteristics apart from the individual.

In his book *Experimental Psychology and Its Bearing upon Culture* (1903), Stratton made his first systematic excursion into the realm of social behavior, giving a thorough description of the then known experimental findings in such fields as mental measurements, unconscious ideas, illusions, memory, imitation and suggestion, and color and the fine arts. In connection with each subject he showed the significance the results had for the everyday cultural life of the individual. In this treatment he refuted many erroneous ideas found in the culture of that period, as, for example, that the mental life (mind) cannot be quantitatively described, that experience is a direct impression of external nature upon passive recipients, that the blind person has no space sense, or that the enjoyment of form can be attributed to a mathematical proclivity for certain number relations.

Stratton's first systematic account of volitional responses is found in his book *The Psychology of the Religious Life* (1911). In the absence of any experimental procedure, his approach was a sociophilosophical one. It consisted in a thorough factual accounting of the creeds and motivations to be found in the great religions of the world. In contrast with other early scientists in this field who had restricted their psychological studies to Judaism and Christianity, his analyses included, besides these, Zoroastrism, Taoism, Vishnuism, Buddhism, Confucianism, and the Islamic religions. The book was published at a time when scientists were being severely criticized as godless persons. Stratton believed that an objective scrutiny of religious doctrine was needed and that a comprehensive analysis would yield valuable information on the nature of human impulses, instincts, and motives. Certainly his book gives an accurate and vivid impression of the war of motives that characterizes religious behavior.

Stratton's participation in the psychological program of the Army in World War I increased his interest in the psychology of international affairs and particularly in the problems of world peace. His many publications on these subjects include such titles as "Control of the Fighting Instinct" (1914), "The Psychology of the War Spirit" (1915), "Human Nature and War" (1926), "Re-education for International Affairs" (1929), "Public Opinion in Times of National Crises" (1932), "Problems of War and Peace in the Society of Nations" (1937), "Is World Peace an Attainable Ideal?" (1938), and "Violence between Nations: the Way of Liberation" (1944). In these papers we find applied the same logical and factual approach that characterized his experimental studies. Stratton strongly believed that the time had come when the scientific psychologist should contribute his talents to man's efforts to avert war. A systematic treatment of his points of view in regard to the psychological bases for establishing lasting peace is presented in his book *Man, Creator or Destroyer* (1952). Although written for the general reader, the book presents current scientific knowledge about the creative and destructive aspects of human life and points up the way for man to achieve ultimate peace through a mastery of his creative and constructive powers. From our scientific understanding of the psychological determinants of violent and peaceful actions as seen in children's behavior and in delinquency and crime, industrial disputes, racial segregation, and similar behavioral situations, Stratton develops an inclusive common explanation that he extends to the understanding of the conduct of nations. In simple words, his theory revolves around the establishment of various kinds of communal ties: political, economic, educational, and cultural. In true scientific spirit he produces facts to substantiate his theory in the behavior of two groups of nations, a warless circle of nations and a mutually belligerent group. It is to be noted that in the recent formation, by certain European nations, of a frontier-free common market, and of Euratom as a means of cooperation in developing atomic energy, there is found a demonstration of the kind of communal ties which Stratton years ago stressed as the essential basis for the establishment of lasting peace among nations.

At the time of his death Stratton was completing a book which dealt with "The Divisive and the Unifying Forces of the Community of Nations." Written for the general reader, it gives a comprehensive description of the problems faced today by the society of nations and urges immediate intensification of various unifying forces by which it should be possible to avert further world-wide devastation.

Stratton was held in high esteem by his many colleagues and students. He was very generous with his time, and his practice of psychology frequently extended to helping others in their educational and vocational problems. His lectures on the campus were not only popular but also very telling in their import. Those of us fortunate to have been his associates owe much to his inspirational teaching and leadership.

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