DISCUSSION

AMERICAN STANDARD LETTER SYMBOLS FOR HEAT AND THERMODYNAMICS

THERE recently has been issued by the American Standards Association, 29 West 39th Street, New York City, "Letter Symbols for Heat and Thermodynamics Including Heat Flow," Z10.4–1943, price 55 cents. This is in continuation of a project initiated some years ago—"Standardization of Scientific and Engineering Symbols and Abbreviations"—under the sponsorship of the American Association for the Advancement of Science, the American Institute of Electrical Engineers, the American Society of Civil Engineers, the American Society of Mechanical Engineers and the Society for the Promotion of Engineering Education; to be carried out under the procedure of the American Standards Association.

As a result, there were issued lists of American Standard Symbols in a number of fields. Some recently have been revised and re-issued: "Letter Symbols for Hydraulics," ASA Z10.2–1942, price 35 cents; "Letter Symbols for Mechanics of Solid Bodies," ASA Z10.3–1942, price 25 cents; "Illuminating Engineering Nomenclature and Photometric Standards," ASA Z7.1–1942, price 25 cents; and now the Thermodynamic Symbols above mentioned. Other revised lists of previously issued standards and some new lists are in progress.

A letter symbol is defined as "a single character, with subscript or superscript if required, used to denote a physical magnitude in mathematical equations and expressions." A person who uses thermodynamics, or any other engineer or worker in applied sciences, has an infinite number of problems, each in the content of his own rapidly expanding specialty. So he can concentrate his brains on his specialty, if mathematics and symbols are standardized so as to be labor-saving tools. Then he doesn't need to spend mental effort on the language or form of a formula, but only on its underlying principles.

The most important way in which this standardization helps scientists and engineers is the arrangement that all authors writing on a given subject shall use the same meanings for the letter symbols in their formulas. For example, D in a formula always denotes "Diameter." Readers readily learn such a set of standard symbols when the same ones are used in all publications, and are thereafter saved an appreciable amount of mental effort.

At the present time a university student who may be taking courses in engineering thermodynamics, physical chemistry, theoretical chemistry and chemical engineering usually finds an entirely different set of symbols used for given concepts in each of the fields mentioned. The mental readjustment that is required each time a student starts a new recitation gives a handicap which symbols standardization eliminates.

A completely logical list of symbols would have a single symbol for every concept, no matter in what field it might be used, and would have all symbols selected on a sound theoretical basis, regardless of present usages. But in default of an International Dictator to enforce such an allegedly logical list, it just wouldn't be accepted. Lots of symbols lists have been set forth by committees who proposed to reform symbols usages, which have accomplished nothing beyond collection of dust on volumes of "Proceedings" in technical libraries. But we expect that the American Standard lists of letter symbols are going to merit actual use, and so we have tried to make a realistic compromise between existing usages, and idealism.

INTERNATIONAL SYMBOLS STANDARDIZATION

In many cases letter symbols are the initial letters of names. The fact that different languages use different names has started the use of completely different letter symbols for the same concept in nations using different languages. For this reason, international standardization of symbols for all fields of science and technology seems impossible at the minute. However, in the case of people using the English language, the possibilities are much brighter.

At the present time, even though people in the United States, Canada, England and other parts of the British Empire speak nearly the same language, there is great diversity in the letter symbols used in textbooks and other scientific publications. This is in spite of the fact that books published in each nation are used freely in the other, that colleges exchange students, and that commercial concerns in each country have affiliates overseas. Hence, standardization by both nations in cooperation would be very advantageous.

With this in mind the Royal Society of England arranged that the British Standards Institution start collaboration on lists of letter symbols for the English language, with other Empire standards associations, the Canadian Engineering Standards Association and the American Standards Association. The two latter bodies accepted the proposition.

The writer was in England in 1938 as delegate to a meeting at Torquay of the International Electrotechnical Commission, where symbols for electrical quantities were pretty well settled internationally. While in England the writer participated in the above-mentioned arrangements for symbols for the English language for other fields, and definite progress was made in this direction. However, the impact of war on England presently compelled postponement of the

project there. The American and Canadian Standards Associations have continued, with such information about the English point of view that it is hoped that the ASA lists being issued will require but little addition when letter symbols for the English language again come to be considered. Furthermore, the American lists will give standards for our use until this happy time comes, and will furnish a definite statement of the American point of view when it does come.

Further information about the details of the American Standards Association symbols project, with reasons for the selections in particular cases of the symbols for heat and thermodynamics, are given in articles appearing in the September issues of *Mechanical Engineering,* published by the American Society of Mechanical Engineers, the *American Journal of Physics* and *Industrial Standardization.*

SANFORD A. MOSS

GENERAL ELECTRIC COMPANY,
WEST LYNN, MASS.

A TEXAS SKELETON

HIGH water on June 24 caved off the nearly vertical bank of the Brazos River sixty miles northeast of Abilene, Texas, and exposed a flexed human skeleton at a depth below the present soil surface of twenty-one feet. The top of the bank at the site is thirty-two feet above low-water level; and the bands of silt formation above the grave are regular and unbroken for considerable distances on each side and above the burial. Where the burial was made the silt banding rises to a somewhat higher level than the same bands do a short distance above and below it. Evidently burial was made in a shallow grave on a slightly higher point along the river bank and subsequently twenty-one feet of river silt has covered the whole valley floor. There were no stones, shells or artifacts in the grave. The head was buried a little higher than the body, which lay flexed on the left side, and surrounded by ashes and charcoal. The bones are hard and evidently somewhat mineralized.

The skull was exposed by high water and most of the hand bones—the hands were usually placed on each side of the face in Abilene region flexed burials—were washed away. Part of the skull top and the left side of the skull were also washed away. The frontal bone, the lower jaw and teeth, and the right side of the skull and other parts were found still embedded in the bank eleven feet above low-water level by a boy swimming below it. The boy, James Putnam, and a companion dug out the remaining skull bones with pocket knives; and his uncle, J. C. Putnam, took them sixty miles to Abilene on the 26th. Mr. Putnam has watched the river banks for bones ever since 1929, when the writer excavated two peculiar skeletons buried six and a half feet deep in a Brazos River bank.[1, 2]

In 1939 Mr. Putnam had also brought information of the washing out of another skeleton in a river bank near by at below nine feet from the soil surface.[3]

On June 27 the writer and a local geologist, H. H. Adams, went to the site, photographed the plainly seen skull mold, and with the assistance of J. C. Putnam and James P. Putnam, the ranch owners, excavated the remainder of the skeleton, which lay farther back in the bank. The condition of the caving bank did not justify delay and another rise might have removed the bones.

Most of the long bones were found, and these have some peculiar curvatures and torsions, which call for careful study. On the skull the brow ridges are thick, and the upper portion of the frontal bone near the articular surface is more than three eighths of an inch thick.

There is a thick stratum of ashes eight feet beneath the burial which bands the bank for a considerable distance, but whether this is due to human or natural agencies is not yet known. This burial is far deeper than any previously found in the Abilene region.

Dr. Frank H. H. Roberts, Jr., of the Bureau of American Ethnology, was asked to inspect the site, and he came on July 7 and remained five days studying the burial site and also many other deeply buried midden strata in various stream banks of the Abilene region. The skeleton will be sent to Dr. Roberts at the Smithsonian Institution for scientific study.

CYRUS N. RAY

ABILENE, TEXAS

TRANSLITERATION OF ENGLISH NAMES INTO RUSSIAN

IN the September 3d issue of SCIENCE, there is a note by the late Aleš Hrdlička on the transliteration of English names into Russian. The author states, quite rightly, that there is no "w" in Russian, and that this sound in his opinion should be represented by "v," while Russians in general represent it by "u," the examples mentioned being "Wendell Willkie" and "New York." Possibly there are some who do transliterate Willkie as Uillkie, but it is far from general. For instance, in the Russian newspaper, "Novoye Russkoye Slovo," published in New York, this name is transliterated as "Vilki." "W" in this first example sounds more like "v" than "u." In the second example, in "New York" "w" sounds more like "u," and so it is usually transliterated as "Niu." The use of "v" in this word would make it sound like

[1] Cyrus N. Ray, *Scientific American,* May, 1929.

[2] J. Alden Mason, *The Museum Journal,* September–December, 1929, The Museum of The University of Pennsylvania.

[3] Cyrus N. Ray, Plate 52, *Bulletin* of Texas Archeological and Paleontological Society, Vol. 11, 1939.