

Letters

Tie and Anti-tie

The image of the scientist as reflected in the increasing advertising in *Science* is beginning to distract me. Of course, it is the seemingly *de rigueur* attire of long, white laboratory coat and well-tightened necktie.

It is common knowledge that no one can perform bench work comfortably when so encumbered. I wonder whether there is an advertiser in this country bold enough to reveal a laboratory worker in a T-shirt?

Obviously, I am an anti-tie man.

J. Q. HEPLAR

Hampton Institute,
Hampton, Virginia

Latinization of Greek Words in Biological Taxonomy

Under the title "Questionable linguistics in *Bergey's Manual*," D. A. Soulides, in a letter in *Science* [135, 968 (1962)] insists that the discussion on pages 26 and 27 of the 7th edition of *Bergey's Manual of Determinative Bacteriology* is full of linguistic errors and seriously misinterprets classic Greek. The pages criticized give a much abbreviated résumé of some of the rules governing the formation of new Latin words for use in naming taxa in biology. As the author of the section so roundly censured, it seems necessary that I reply and point out the flaws in Soulides's logic and his apparent misunderstanding of the classic rules governing transliteration and latinization of Greek words. I will comment on several of the points he makes.

1) Soulides states, "I view handling of a classic language for purposes of expediency as an undesirable practice." With this statement I believe most, perhaps all, systematists in the several fields of biology will agree. There is in my discussion in the *Manual* no hint

that expediency is to be condoned. My discussion has to do solely with the formation of the scientific names of taxa.

2) All three international codes of nomenclature (botany, bacteriology, zoology) require that names of all taxa be Latin, or latinized words or words treated as Latin. The Greek language from pre-linnaean times has been used as a great reservoir of bases and stems which may be latinized and used in the construction of neo-Latin names and epithets to be used in naming taxa, primarily genera and species.

3) The Latins themselves not only transliterated great numbers of Greek words into words spelled with Latin letters but placed nouns and adjectives from the Greek into the equivalent declensions and substituted the corresponding appropriate Latin endings. The rules of all three codes specify clearly that the classic tradition of latinizing Greek words for use as Latin must be followed. One must recognize that transliteration alone often fails to form a usable Latin word from a Greek word. The transliteration *must* be latinized in the Latin tradition. Soulides fails to recognize this fact.

4) I stated (p. 27) that the Greek equivalent of the Latin word *sulfur* is *θειον*. This when transliterated becomes *theion*, latinization changes the diphthong *ei* to *i*, and the Latin neuter ending *-um* replaces the Greek neuter *on*, giving the latinized *thium*. There is no evidence that the Latins ever had occasion to use this particular latinized Greek word. I noted that *thi-* was usefully combined with other Greek stems, as in the generic name *Thioploca* and others. Soulides insists that the stem is *thio-*, not *thi-*. He states: "To the reader who knows little or nothing of Greek this would mean that the above names are composed as follows: *thioploca*. . ." This is, of course, nonsensical. The *o* is strictly a "connecting vowel" between the combining forms

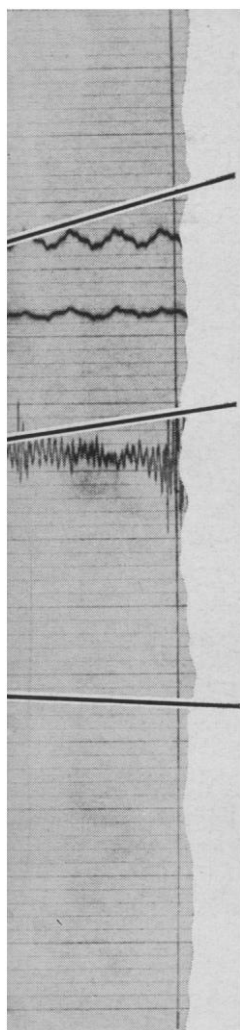
of two latinized Greek words. For the technique of composition of compounds, comprehensive treatments both in Latin grammars (such as Lane's) and Greek grammars (such as Goodwin and Gulick's) are quite adequate. In most compounds from latinized Greek words the combining vowel (where needed) is *o*, in true Latin compounds, *i*. But there are many exceptions. These problems of compounds are adequately discussed in the several nomenclatural codes.

5) Soulides is puzzled at the latinized compound *Rhabdomonas*. The student asks: "Why not *Rhabdmonas* or *Rhabdumonas* when *rhabdus* and *monas* are combined?" The reason is simple. The combining form *rhabd-* ends in a consonant, the second component *monas* has a consonant as the first letter, and the appropriate combining vowel is *o*.

6) Soulides questions the conclusion reached that *lysodicticus* would have been a better latinization than the *lysodeikticus* in *Micrococcus lysodeikticus* Fleming. The reasons for the conclusions were clearly set forth by me. I am wholly at a loss as to the pertinence of the criticism, "Probably it escaped him that the Greek language includes, together with the adjective *δεικτικός* the adjective *δηκτικός*, pronounced the same but differing both in spelling and in meaning. The first, with *ει* . . . means 'indicating,' the other with *η* means 'biting.' Consequently, the transliteration of *lysodeikticus* to *lysodicticus* would have concealed the etymology of the name [better, of the adjective] and, as a result, would have been incorrect." Certainly an example of a *non sequitur*. Soulides might have added that there are other Greek adjectives that differ in one letter only, such as *δεκτικός*, "fit for receiving," and *δεηκτικός*, "disposed to ask." Why does Soulides conclude that advocacy of the classic method of latinizing Greek words for use in new Latin is an example which "may serve to indicate the kind of pitfall one may step into in trying to force a sophisticated language like Greek into an artificial pattern"?

7) *Chlamyd-* is the stem of *chlamys*, it ends in a consonant, the connecting vowel should be *o*, and *Chlamydobacteriaceae* is correct, not *Chlamydidbacteriaceae*.

8) The summary reads, "The procedure of transliteration applied in the current edition of *Bergey's Manual* may be characterized as an arbitrary mass latinization of Greek words that puzzles



Voigt Hodgson, Research Associate, demonstrates the position of the cadaver in the ejection sled.

Professor Larry Patrick, Wayne State University, makes a notation on the Visicorder Oscillograph.

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the proficient and perplexes the uninstructed.” It seems that Soulides has failed quite completely to understand the classic techniques of latinization of Greek words for use in biological taxonomy.

R. E. BUCHANAN

Iowa State University, Ames

Use of Latin and neo-Latin nomenclature in systematic biology is a long-established practice with which I have no inclination to quarrel. My objection applies to the nomenclatural innovation which Buchanan has introduced in the current edition of *Bergey's Manual*—namely, the arbitrary latinization of the Greek nouns and adjectives from which the accepted latinized names of microorganisms originate. Let me again explain my point, with another example. On page 513 of the *Manual* we read that the species name *zooepidemicus* derives from the “Gr. noun *zōon* an animal; Gr. adj. *epidemi* prevalent” These two words are neither Greek nor Latin. They are not to be found in any Greek, Latin, English, or biological dictionary. They are personal versions of the real Greek words *zōon* and *epidemi*os. In this way hundreds of Greek words, throughout the *Manual*, have been remodeled and presented to the reader as “Greek” nouns and adjectives. In the instance of *Peptostreptococcus micros* (p. 537) the treatment was carried even farther; the phantom derivative *micrus* is given as the source of the actual Greek word *micro*s (small). In his reply Buchanan has ignored all these basic points.

The confusion resulting from this unusual procedure was adequately discussed in my original letter.

I would like to renew my plea that, in the interest of established scientific scholarship, the innovation in question be discontinued and the accepted system, used in the previous edition of the *Manual*, be restored.

D. A. SOULIDES

U.S. Soils Laboratory, Agricultural Research Service, Beltsville, Maryland

Water Conduits and Collectors

I would appreciate clarification of a point discussed in Robert Adams's informative article, “Agriculture and urban life in early Southwestern Iran” [*Science* 136, 109 (13 Apr. 1962)]. Adams writes of the “extensive use of

tunnels with periodic vent holes” both as water conduits and as ground-water collectors. Reference here is obviously to the famous *kharez*, *kanats*, or *fog-garas*. These are usually described in the literature only as collectors and conduits for ground water, not as part of a system for transporting surface runoff. For example, Tolman [*Ground Water* (1937) pp. 12–15] mentions the *kanats* of Dizful extending under the gravel bars of the Ab-i-diz River rather than diverting surface water from the river itself. It would be extremely interesting if *kanats* were integrated with systems of surface stream diversion, with some of the tunnels serving two functions, as it were. This last is the implication I read into Adams's article.

I will be grateful for confirmation or clarification of this point.

BERL GOLOMB

Center of Latin American Studies, University of California, Los Angeles

Golomb's inference is partly correct. The technique extensively applied in Iran for the construction of ground-water collectors also was applied in Khuzestan for surface diversion from the larger streams. I have entered and followed long-disused sections of major supply tunnels serving the Sassanian and early Islamic irrigation systems from their inlets along the Karkheh, Diz, and Karun river banks, and from the level of their beds it seems clear that these tunnels served as direct off-takes from the rivers themselves. How they were kept from being choked with silt under such circumstances is not entirely clear; presumably their gradients were great enough to prevent this.

On the other hand, I know of no evidence that these same major supply tunnels also were fed by branching networks of smaller tunnels serving as ground-water collectors. The straight parallel rows of surviving vent holes on the air photographs suggest, instead, that they were used simply as underground conduits. Elsewhere in the area, to be sure, there were smaller systems of tunnels serving the more usual purpose of collectors. For example, one of apparent Sassanian date lay along the north slope of a low ridge north of the Shaur River (see Fig. 5 of the article).

With regard to the contemporary use of *kanats* in the area, I have no first-hand information.

ROBERT M. ADAMS

Oriental Institute, University of Chicago, Chicago, Illinois