

who had pyrheliometers, but couldn't afford the expense of money, time, and experience necessary to really observe solar radiation satisfactorily by spectrum-energy work, might get approximate results of at least moderate value. It is to be distinctly understood that these empirical methods of solar constant work by pyrheliometry, though based on our work, are likely to yield results several per cent. from the truth, owing to differences in the atmospheric transparency due to various causes, and especially to the variable influence of water vapor. Pyrheliometric methods are mere economical make-shifts when unaccompanied by spectrobolometry.

8. You are, I am certain, misled in your attack on our use of Bouguer's formula of extrapolation when applied as we applied it to homogeneous rays. See for instance our paper "New Evidences on the Intensity of Solar Radiation Outside the Atmosphere." Logically conceived the mathematical treatment consists in diminishing the path of the sunrays in every layer of the atmosphere proportionally until none remains. The fact that this can not *conveniently* be carried through *experimentally* beyond the point corresponding to the atmospheric thickness found in a vertical solar beam does not prove that a continuation such as can be logically conceived up to the point where each thickness becomes zero is mathematically unsound. Imagine, for instance, a tube to be erected from the observer to the outside of the atmosphere, and by side tubes appropriately dimensioned let the atmosphere within the tube be exhausted until none remains. This fits the logical process applied with Bouguer's formula. No mathematician but you can see in it anything objectionable, so far as I know.

9. In order to verify, as far as could be done, the sound theoretical and experimental conclusion that if the standard pyrheliometer could be read on the moon at mean solar distance it would read there on the average 1.93 calories per square centimeter per minute, we sent up a registering pyrheliometer by balloon to 22,000 meters in 1914 and found there 1.84 calories, which is a very reasonable check.

10. You have extrapolated your thermodynamical discussion of meteorological measurements into the realms of the thin air above 22,000 meters, and into the realms of the sun, which is out of the range of laboratory conditions altogether. Your results widely disagree from those I have just quoted. It seems to me not to matter who makes the curves, whether yourself or another; by the time they get outside the well-observed range of at-

mospheric data, say 20,000 meters, even though they are sound at the bottom (and this I am not quite sure of), they rank rather as interesting speculations than as having quantitative value.

By authority of the Secretary:

Yours truly,

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Director, Astrophysical Observatory

Professor Frank H. Bigelow,

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REPLY TO PROFESSOR WILDER

BEING much interested in a short article by Professor Wilder, appearing in *SCIENCE* of April 19, on the subject of "*Desmognathus fuscus* (sic)," it occurred to me that a few remarks might not be inappropriate. The object of the nomenclatorial code in zoology, as I assume Professor Wilder recognizes as fully as any other zoologist, is primarily to afford a means of naming the various species of animals. In view of this I think it will be admitted that philological conditions should play a secondary rôle to consistency and permanence. Most zoologists are in favor of ridding nomenclature of the idiosyncrasies continually occurring in language, in order to bring about absolute uniformity so far as may be possible. This tendency can be traced easily. In former times it was the custom, for instance, to begin all specific words founded upon proper names with the capital letter; then, the desirability of uniformity becoming increasingly evident, only specific designations founded upon the names of persons were so written; at the present time, in all parts of the world excepting continental Europe, the custom prevails of beginning all specific names, including the personal, with a small letter. It is now *Omus edwardsi*, for example, and not *Omus Edwardsii*, as originally published, the adoption of the single *i* in all cases to form the genitive ending, being another recently adopted rule formulated in the sole interest of uniformity. All this should horrify the philologist quite as much as the disregarding of irregular Greek genders.

Now in regard to genders, it is considered desirable by many systematists—and their

number is continually increasing—to adopt rules as uniform as that affecting capitalization; that is to say, generic words having a given form of ending should demand a gender ending in the specific word conforming to the general Latin rule, ignoring the accidental exceptions of language. So generic words ending, for instance, in *us*, *os*, *ax*, etc., require in every case the masculine form of the specific name, those ending in *a*, *is*, *e*, etc., the feminine and those ending in *m* or *n* the neuter. Personally, I should even be in favor of writing *Venus mercenarius*, instead of *Venus mercenaria*, first of all to agree with the uniformity rule mentioned, but also, in this special case, because the goddess of love can not be a clam, and the word *Venus* in *Venus mercenarius* can not therefore stand for the goddess of love, but is merely a word resembling her designation, though masculine for nomenclatorial purposes.

Furthermore, in alluding to Greek genders it should be remembered that when a word derived from the Greek, Arabic or Hottentot, or arbitrarily composed of a pronounceable series of letters, becomes the name of a genus modified by an adjectival Latin specific name, the genus word can no longer be Greek, Arabic or Hottentot, but automatically becomes Latin and should demand gender endings in the specific word in accordance with the most general Latin rules alone. It is only by adopting rules rigidly fixed such as this that nomenclature can be rendered practically stable, and this is an end that all zoologists would rather see than strictly philologic purity, which, conforming to all sorts of linguistic vagaries, would give to it a piebald character certainly very undesirable and inconsistent with uniformity, which is the most essential requisite of any nomenclatorial code.

Finally, it might be added, biology has nothing closely in common with philology. We simply have to use words of some kind to express ideas and name the different forms of animal life, but this language should be invented by biologists for their own ends and not made to conform to the pitiful mixture of contradictions and exceptions constituting

actual human language, either ancient or modern.

THOS. L. CASEY

WASHINGTON, D. C.,
May 11, 1918

OUR NATIONAL FLOWER

TO THE EDITOR OF SCIENCE: In confirmation of the admirable plea for the columbine by Albert A. Hansen (SCIENCE, April 12, 1918) may I call attention to a few additional facts regarding its unique fitness to be our national emblem, and the support it has already received? A history of earlier efforts in The National Flower Movement is given by the present writer in the *Transactions of the Massachusetts Horticultural Society*, Part I., 1898; where will also be found a full discussion of the merits of various candidates.

The idea of having our native columbine for national flower occurred independently to several persons during the time of preparation for the Columbian Exposition at Chicago; and in 1895 there was organized the Columbine Association whose object is, by spreading information of its fitness, "to bring about the official adoption of the columbine as the national flower of the United States." The following year a National Flower Convention composed of delegates from the various states of the Union, chosen by their respective governors at the request of Governor Elias Carr of North Carolina, met from the twenty-first to the twenty-third of October at Asheville to decide upon the most suitable flower for our national emblem. With a view to helping future decision it was unanimously

Resolved, That a plant to serve properly the purposes of a national flower should meet the following conditions:

1. It should be a native of the United States, and should grow wild over the greater part of its area.
2. It should bloom on one or more of our national holidays.
3. It should be capable of easy cultivation in any garden.
4. It should not be a weed, or in any way offensive, or harmful to health.
5. It should bear what in the popular sense is called a flower, and should not be merely a foliage plant or one chiefly valued for its fruit.