

consideration; and further that the members of the Commission will not countenance a change in the Code which is both uncalled for and unnecessary, and which will render void much valuable work and threaten the success of the whole movement toward uniformity in zoological nomenclature.²

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THE ACADEMY OF NATURAL SCIENCES,
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"GENES" OR "GENS"?

AFTER discussing the significance of the word "phenotype" in *SCIENCE* for April 26, Dr. O. F. Cook states that

Pluralizing the word "gen" is another difficulty encountered by geneticists. Johannsen used the term mostly in its German plural form, *Gene*. Our writers have added another letter making a double plural, "genes," something like "memorandas."

This statement does not correctly represent the origin of the English word "gene" and its plural "genes," now generally used by writers of English papers on genetics. In Darwin's word "pangen" English usage renders the last syllable short, though the two halves of the word contribute equally to its meaning. When the word is transferred to the German, as has been freely done, a law of the German language makes both syllables long. On this account the German word "*Pangen*" better expresses the meaning involved than does the English word "pangen." Johannsen's word "*Gen*," like the last syllable of the German word "*Pangen*," from which it was directly de-

rived, is long in quantity. On transferring this happily chosen word to English it was desired to maintain the long quantity of the German word, and the addition of a final *e*, following a general law of English philology, was made simply for this purpose. The English word "gene" (pronounced *gēn*) is thus seen to bear no direct genetic relation to the German plural "*Gene*," and their likeness in spelling is purely a coincidence. The word "genes" is consequently not a double plural and not at all like "memorandas."

There is a further reason why the word "gene" should be preferred. This word must be used commonly in the plural form, but there is already a word "gens" in rather common literary use and having, at least sometimes, a genetic meaning.

Regarding the definition of "phenotype," few who carefully read the passage translated by Dr. Cook from Johannsen's book will agree with the translator that "phenotype" as used by its author was ever anything but an abstraction. "Centers among series of variations around which the variants are grouped" must always be abstractions, and yet they are, as Johannsen rightly says, "measurable realities." Every individual organism possesses an external appearance and a fundamental constitution, and is therefore a representative of some phenotype and of some genotype. The words "phenotype" and "genotype" were never intended to be limited to *statistically investigated* organisms. Statistical investigation may *discover*, *measure* and *describe* phenotypes, but it does not *create* them. Phenotypes and genotypes exist among Mendelian hybrids just as among all other organisms, and my use of the Mendelian categories to illustrate the proper use of these two words involves no "new version of phenotype."

G. H. SHULL

COLD SPRING HARBOR, L. I.,
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CRYSTALLOGRAPHIC TABLES

TO THE EDITOR OF *SCIENCE*: The letter of Professor Oliver Bowles, of the University

²Since the above was written I have read Professor Nutting's article in *SCIENCE* criticizing the powers of the commission and the difficulty of bringing a question of nomenclature before the congress for discussion. He fails to realize that these very facts give the code its strength and establish confidence in the permanency of nomenclature based upon it. We do not desire rules that appeal to this man or that, but rules that shall be *permanent* and the International Congress was perfectly right in making it as difficult as possible to change the code.—W. S.