the Time of Discovery and the First Settlers"; and "Geographical and Geological Problems in Connection with Man's Work." "The Culture of the Indians before Their Contact with Europeans and in the Present" was the main subject of discussion of the congress under the leadership of Professor Dr. Sapper, Wurzburg. The congress will meet in Buenos Ayres in 1932.

THE work of the Philippine Bureau of Agriculture, for the past thirty years charged with the regulation and promotion of agricultural industries in the Philippines, according to the *Experiment Station Record,* has been divided into two parts and assigned to bureaus of plant industry and animal industry. Dr. Manuel Luz Roxas, head of the department of agricultural chemistry of the Philippine College of Agriculture, a 1911 graduate of this institution and a recipient in 1917 of the Ph.D. degree from the University of Wisconsin, has been appointed director of the Bureau of Plant Industry.

DISCUSSION

THE NEED FOR AND THE PROPOSAL OF A NEW GENETIC TERM

A PHASE in the development of genetics which is just getting under way is the analysis of genetic effects over the range of a controllable variable. The data on the effects of temperature upon facet number in the bar series of Drosophila may be quite satisfactorily fitted to the equation $y = ae^{rt}$, in which r is the relative rate of change; t, the temperature in degrees Centigrade; e, the base of the natural logarithms, and a, a constant which gives the value of y, that is, the number of facets when $t = 0$. The first derivative is given by the equation $\frac{dy}{dt} = yr$. Its value at 15° for reverted full females is -21.51 facets. Similar values for bar, ultra-bar and infra-bar females are, respectively, -12.66, -3.76 and $+8.48$ facets. It is held that such values form a better basis for the characterization and analysis of the genetic differences than average facet number, since they take into account at one and the same time not only the number of facets but also the relative rate of change with respect to temperature. From an analysis of the bar series in terms of the first derivative of facet number with respect to temperature new and interesting relations emerge.[1] The point at present, however, is that in such analysis the need is felt for a new term—one to refer to the first derivative of the phenotypic quantity (in this case, facet number) with respect to the controllable variable (temperature).

In analyzing some data on the effect of temperature upon wing-area in homozygous and heterozygous vestigial females it is found that the same equation applies. The value at 30° of the first derivative of wing-area with respect to temperature for long-winged females is -0.0564; for long × vestigial females, -0.0501, and for vestigial females, $+0.0112$ sq. mm. As in the case of the facet-temperature relation, one requires here a term to refer briefly to the first derivative of the wing-area with respect to temperature. As soon as one attempts to speak about the first derivative of such quantities a need is felt for a simple general term.

The convenience and value of a general term for such quantities is well demonstrated by the special terms used for designating the derivatives of various physical quantities with respect to an independent variable, among which may be recalled velocity, acceleration, current, specific heat, modulus, pitch.

In a conversation with Mr. Francis S. Haserot during which several possibilities were discussed he suggested that it might be well to reduce pheno-derivative (abbreviation for phenotypic derivative) simply to *phene.* The following considerations seem to indicate—if the need for such a term be granted—that the situation is perhaps adequately met by the term *phene.* (1) Its relation to the phenotypic expression of the genetic constitution is sufficiently obvious. (2) The nature of the independent variable may be readily indicated by the use of a suitable adjective or prefix, *e.g., thermophene.* (3) That it is but one syllable readily allows for its use in compounds as occasion should arise. Bar facet-thermophene and bar bristle-thermophene clearly distinguish the first derivative with respect to temperature of two different phenotypic quantities on which the bar gene produces an effect. (4) The proposed term allows easy reference to the two related quantities, the first derivative and the original quantity. The inverse of the derivative is the anti-derivative, hence *anti-phene.* For example, the phene for reverted full at 15° is -21.51 facets, and the corresponding anti-phene is 935.4 facets. (5) The word *phene* is not preoccupied, although it happens to be an obsolete chemical term. (6) It is free from any indication of a theoretical interpretation regarding how the genetic factors produce their effects.

In conclusion, the term *phene* is proposed as a word to refer to the first derivative $\frac{dy}{dx}$, in which y is a phenotypic quantity, and x an independent variable. The economy of expression attained by the use of this

[1] A. H. Hersh, "The Facet-temperature Relation in the Bar Series of Drosophila," *Jour. Exp. Zool.* (in press).

term may be indicated as follows: the cumbersome phrase, "first derivative of a phenotypic quantity (facet number, wing-area, etc.) with respect to temperature" is replaced simply by "thermophene."

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THE DETERMINATION OF CARBONATES IN SOIL

IN a recent issue of SCIENCE[1] Schollenberger discusses briefly the error obtained in the determination of carbonates in soil when a strong acid is used as the decomposing agent. He recommends the use of dilute acid and ferrous chloride at a low temperature.

The writer experienced similar difficulty several years ago in the analysis of some Illinois soils.[2] When using 1:1 hydrochloric acid in the Parr apparatus carbon dioxide was obtained from several soils distinctly acid in reaction. Similar results were obtained with sulfuric and phosphoric acids. Nor was the difficulty overcome when the decomposition was carried out at room temperature under reduced pressure. It occurred to the writer that possibly a weak acid should be used in preference to a strong one. Acetic acid was tried with success, no carbon dioxide being liberated from non-carbonate containing acid soils, and in the case of soils containing carbonates a lower value being obtained, the difference being consistent with the amount of carbon dioxide previously found in acid soils when a strong acid was used. No study was made of the causes of the error obtained with strong acids, but it was observed that the error appeared to be independent of the organic matter content of the soil.

Glacial acetic acid diluted 1:1 or 1:2 is used, no other modification in the procedure described by Hopkins[3] being necessary.

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MUSICAL PITCH AND THE PHYSICISTS

I THINK it is time to bring forward once more the desirability of a reform which has long been overdue. I refer to the absurd and unnecessary discrepancy which exists between the usages of the physical and of the musical worlds in the important matter of standard of musical pitch.

For a long time it has been the custom of physicists to make use of a standard of musical pitch based upon a frequency of 256 double vibrations per second for the note middle C, which stands number 40 on the piano keyboard. This frequency actually, however, is rather more than 6 vibrations per second lower than the actual standard frequency of the same note as now universally adopted throughout the United States and in most parts of the civilized world. This latter pitch is usually known as the A440 pitch; that is to say, it is based upon a frequency of 440 D.V.P.S. for the note A which stands number 49 on the piano keyboard. This pitch, or something extremely close to it, has been adopted by virtually all the symphony orchestras of the world, and in consequence by nearly all other musical practitioners, save in France, where the standard still remains the French "normal diapason" of 435 for the same note.

In 1918 the American Federation of Musicians adopted the A440 pitch. In 1925 a committee of the Music Industries Chamber of Commerce, of which I was secretary, representing the manufacturers of every type of musical instrument made in the United States, including the associations of piano, of organ and of wind instrument manufacturers, unanimously recommended that the A440 pitch, based upon a standard tuning fork giving this pitch at a temperature of 68° Fahr., should henceforth be the standard pitch for all musical instruments made in this country. The recommendation was adopted by the directors of the chamber. So far as I know, every manufacturer of pianos, of organs, of wind and of brass instruments in the United States is at this moment using this pitch, which in point of fact represents more nearly than anything else the prevailing standard throughout the world.

As can readily be seen, the discrepancy between this pitch and the entirely artificial pitch used by physicists in their acoustical work becomes extremely serious in the higher regions of the musical scale. Thus, for instance, the note which is represented by 440 D.V.P.S. on the standard scale above mentioned stands at 430.5 on the physicists' scale. In the higher regions the discrepancy is extremely noticeable. Thus, when I sound a fork made on the physicists' scale for the high C, which stands number 76 on the piano keyboard, and compare its sound with that of the same C on our Steinway grand, which is always kept carefully tuned to the 440 standard, the flatness of the tuning fork is extremely obvious and unpleasant, for, as can readily be seen, there is a difference of no less than 44 double vibrations per second. I assume, of course, in both cases, the universal equal tempered systems of tuning.

Instances might be multiplied, but what I have

[1] SCIENCE, 72: 13–14, July 4, 1930.
[2] *Soil Science*, 28: 149, 1929.
[3] C. G. Hopkins, "Soil Fertility and Permanent Agriculture," p. 628, 1910.