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.