AN AMENDMENT TO THE LAW OF MULTIPLE PROPORTIONS

THE chemist's law of multiple proportions, already defying succinct statement, demands a codicil, since even standard text-book problems may fail to meet the integral number test. It is possible to solve the familiar oxides of nitrogen problem correctly without obtaining values which stand to one another in the ratio of small whole numbers. The values so obtained, to be sure, bear a simple relationship to each other, but this relationship is neither necessarily obvious nor provided for by the law.

The five oxides of nitrogen obey the law when, as is usual, a definite weight of nitrogen is selected. If this weight is 28, the values for oxygen become 16, 32, 48, 64, 80, and stand to one another in the ratio of 1, 2, 3, 4, 5.

The same oxides fail to obey the law when a definite weight of oxygen is selected. If this weight is 16, the values for nitrogen become 28, 14, 9.33, 7, 5.6, and stand to one another in the ratio of the reciprocals of 1, 2, 3, 4, 5.

All that is needed, therefore, to make it effective is to amend the law of multiple proportions to read "the ratio of small integers or of their reciprocals."

E. A. VUILLEUMIER

DICKINSON COLLEGE

THE INDUCED OXIDATION OF LACTIC ACID BY ASCORBIC ACID AND THE CANCER PROBLEM

OUR researches on induced oxidation[1] and the earlier publications mentioned there have led us also to attempts to oxidize lactic acid.

The purpose of this investigation[2] was to find a method by which it might be possible to oxidize in cancer tumors the lactic acid formed there in large quantities, which acid is regarded by several authors as injurious to the surrounding cells and will perhaps further the extension of the tumor.

We observed that, for instance, sodium sulfite and also phosphorus (dissolved in castor-oil) are able to induce the oxidation of lactic acid during their own oxidation. For the above-mentioned purpose, however, our experiments with glucuronic acid and especially those with ascorbic acid (vitamin C) are promising.

In vitro a solution of lactic acid (the hydrogen ion concentration of which was brought by means of phosphate to the desired value) appeared to undergo a considerable oxidation in the presence of oxidizing ascorbic acid.

As vitamin C is a substance not strange to the human body (it is found in the adrenal cortex) and is being applied already as a remedy in connection with its anti-scorbutic activity, the question arises whether application *per os* or (and) by syringe could bring about salutary results in case of cancer.

As the oxidation of the ascorbic acid is reversible, it is possible that in the cells this substance may act as an oxygen carrier.

Of course, experiments with cancer cells cultivated in solutions and with tumors of mice are being made in the first place.

W. P. JORISSEN

A. H. BELINFANTE

THE UNIVERSITY

LEIDEN, HOLLAND

REPORTS

THE EFFICACY AND ECONOMIC EFFECTS OF PLANT QUARANTINES IN CALIFORNIA[1]

THE appearance of Bulletin 553, of the Agricultural Experiment Station of the University of California, marks an important step in the study of the problems of plant quarantine. If it be not actually the very first attempt to evaluate these measures as they apply to any particular area, it is at least one of a very few such studies and by far the most comprehensive of all. In the words of the report, its scope is "the efficacy and economic effect of interstate plant quarantines promulgated by the State of California, and the efficacy of federal plant quarantines in the protection of California." Thus limited, the report avoids some of the most difficult problems, the "rather delicate subject" of the effect of these measures on international trade relations on the one hand and the absurdities of the inter-county quarantines on the other. Thus provided with a middle road to follow, the writers have been entirely consistent throughout and have held rigidly to the prescribed course.

The report includes a sound and reasoned statement of the biological bases of plant quarantines and throughout the necessity of compliance with these bases is insisted upon. An analysis upon theoretical grounds—which are the only ones available—is made of the economic effects of such measures. The history, problems and present status of plant quarantine

[1] *Rec. trav. chim.*, 48: 711–725, 1929.

[1] Report of a committee consisting of Harry S. Smith, *chairman*, Edward O. Essig, Howard S. Fawcett, George M. Peterson, Henry J. Quayle, Ralph E. Smith, Howard R. Tolley. University of California, College of Agriculture, Agricultural Experiment Station, Bulletin 553, pp. 1–276. 1933.

[2] *Chem. Weekblad*, 28: 337, 1931; 30: 618, 1933.