

percentage dissociation of a diatomic gas. Atomic oxygen was produced by means of the electrodeless discharge. The recombination took place on the surface of a calorimeter coated with palladium black. It has been shown that water vapor is necessary for the production or at least for the maintenance of the atomic gas.

In the preliminary experiments reported at this time 16 to 25% dissociation was realized at a distance of 10 cm. from the discharge bulb at pressures of 0.1 to 0.2 mm. of mercury. The validity of the application of Knudsen's formula for the measurement of the percentage dissociation at these pressures has been established experimentally by measuring the rate of flow of oxygen through the orifices at the two limiting pressures and also the rate of flow of hydrogen at one pressure lying between these limits. The heat of formation of molecular oxygen as given by these experiments is 7.2 (\pm 0.2) volts or 165,000 (\pm 5000) calories per gram molecular weight. It is to be noted that although this value is in good agreement with some of the older values, it is considerably higher than those reported within the last year. As it is quite possible that the presence of metastable atoms is giving too high a value, further experiments are now in progress using different pressures and different lengths of path, under which conditions the average life of a metastable atom should be changed. It is hoped in this manner either to prove the absence of metastable states or at least to be able to correct for their excess energy should they be present.

JEFFERSON PHYSICAL LABORATORY
HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

L. C. COPELAND³

RECEIVED MAY 3, 1930
PUBLISHED JUNE 6, 1930

ELECTRO-DEPOSITION OF METALLIC BERYLLIUM

Sir:

We wish to announce that as a result of work carried on for a number of years we have been able to obtain metallic beryllium by the electrolysis of solutions of beryllium salts in various organic and inorganic non-aqueous solvents. Although the solutions of beryllium salts in substituted ammonias give deposits of metal, the most satisfactory solvent is liquid ammonia itself either alone or with the addition of salts or other compounds which lower the vapor tension of the solution and increase the solubility of beryllium salts. Thus the metal has been prepared from solutions which may be electrolyzed at room temperature. The metal obtained by these electrolyses is so pure that it is insoluble in even the strongest acids unless the metal is in contact with a more electro-negative metal such as platinum. Under the microscope the metal is seen to be crystalline.

Hitherto all attempts to dehydrate beryllium salts have yielded basic

³ National Research Fellow in Chemistry.

salts, due to partial hydrolysis. We have discovered that beryllium salts may be dehydrated by heating in fused ammonium salts. Beryllium salts so dehydrated may be electrolyzed in liquid ammonia solution without removing the excess ammonium salts and yield metallic beryllium.

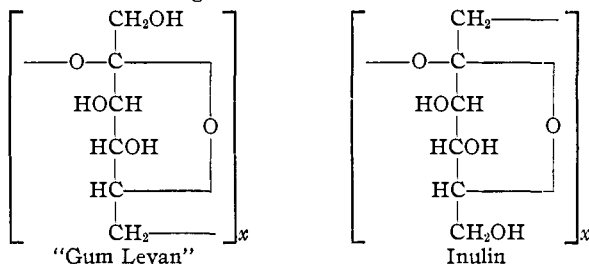
THE MORLEY CHEMICAL LABORATORY
WESTERN RESERVE UNIVERSITY
CLEVELAND, OHIO
RECEIVED MAY 16, 1930
PUBLISHED JUNE 6, 1930

HAROLD SIMMONS BOOTH
G. G. TORREY

THE STRUCTURE OF "GUM LEVAN"

Sir:

"Gum Levan," formed by the action of *Bacillus mesentericus* on cane sugar, has been definitely identified by hydrolysis, acetylation and methylation experiments conducted in this Laboratory as a polymerized anhydrofructofuranose, the linkages being at positions 2 and 6 of the fructose sugar chain, as compared with the 1,2-linkage in the case of inulin. It can be prepared in a pure state, free from nitrogen and ash, by the action of the enzyme isolated from the organism.



When submitted to the action of *Bacillus xylinum* it yields a new product, apparently more highly polymerized, which is at present under investigation.

Methylation of "levan" yields a trimethyl derivative which on hydrolysis gives a new crystalline 1,3,4-trimethylfructofuranose, m. p. 63°, the first crystalline γ -sugar to be isolated. Its constitution is confirmed by its inability to form an osazone, transformation to tetramethyl- γ -fructose, and oxidation by nitric acid to yield a dibasic dimethyl lactol acid. The diethyl ester of the latter on methylation and treatment with dry ammonia gives a crystalline diamide, m. p. 138°.

The bearing of these facts on the nature of plant synthesis is to be discussed in a forthcoming article.

Further researches in connection with the action of *Leuconostoc mesenteroides* and other bacteria (as well as their corresponding enzymes) on carbohydrates are in progress.

PULP AND PAPER RESEARCH INSTITUTE
MCGILL UNIVERSITY
MONTREAL, CANADA
RECEIVED MAY 16, 1930
PUBLISHED JUNE 6, 1930

HAROLD HIBBERT
R. STUART TIPSON