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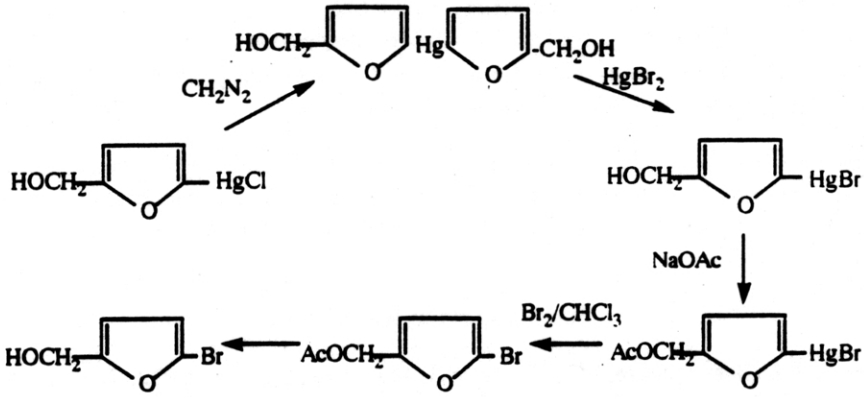
Obituary of W.J. Chute

Dr. Walter John Chute, (Secretary, 1945-1948; President 1952-1954) who died on 9th December 1991 was born on the 28th March 1914 at Brooklyn Corner, Kings County, Nova Scotia. He graduated from King's County Academy in 1931 with an average of 77% in mathematics, physics and chemistry and proceeded to the Teacher's Training College in Truro, where he was awarded a "Superior First" diploma in 1934. He then taught science in High School for a few years but was persuaded to read chemistry at Acadia University, probably by Chester Small. He graduated with honours in chemistry in 1939; unfortunately records of that time at Acadia University have disappeared.

He was appointed as a laboratory assistant by Toronto University and he began work for the M.A. degree under the supervision of G.F. Wright. Wright had been a student of Gilman and at that time he was continuing work on the displacement reactions of chloromercury derivatives; which in Chute's hands led to practical syntheses of 5-bromo, 5-iodo and 5-methylfurfuryl alcohols. 5-Bromofurfuryl alcohol, an unstable compound was prepared in good overall yield by the interesting reactions shown below.



The dechlorination with diazomethane is unusual and the selective esterification of the primary alcohol without displacement of the organometallic moiety is noteworthy. This work also led to the preparation of 5-chlorofurfural in 33% yield on the 96 g scale, by the demonstration that the reaction was catalysed in the presence of benzoyl peroxide and sulfur. This reactive compound has been used as a starting material and as an intermediate in the synthesis of many natural products. For this work Chute was awarded the M.A. degree in 1940.

He continued in Toronto with Wright as a National Research Council Scholar, to study for a Ph.D. degree, but the work was necessarily constrained by wartime conditions. The superior (to TNT) handling and explosive force of tri-N-nitrohexahydrotriazine (RDX) had ben discovered in 1899 by Henning (Ger. Patent 104280; see also Hale, *J. Amer. Chem. Soc.*, 47: 2754). The explosive was prepared by nitration of hexamethylenetetramine and Wright undertook a study of the byproducts of the reaction, the general reaction of secondary aliphatic amines with nitric acid and the mechanism of the dehydration of the nitrates initially formed. Chute's part in this

relatively large and important programme lay in the investigation of the preparation of nitramines from secondary aliphatic amines. He showed that the dehydration of nitrates was catalysed by chloride and that nitramines ($R_2N.NO_2$) could also be obtained by oxidation of nitrosamines ($R_2N.NO$) with persulfate at 25°; a procedure that might incur displeasure in administrative circles these days. This work led to the preparation of dinitroxydiethylnitramine ($(O_2NO.CH_2CH_2)_2N.NO_2$), an explosive having similar power to RDX, on the 823 g scale, the procedure involving mixing 1.6 kg of nitric acid with 2.75 kg acetic anhydride!. Chute demonstrated that most of the acetic acid byproduct of the reaction and the acetone used, could be recovered giving a final cost (excluding energy and depreciation) of 23¢ lb^{-1} (in 1943; Ph.D. thesis, University of Toronto).

In 1943 Chute was appointed as an associate professor in the Chemistry Department at Dalhousie University and for the next 36 years returned to his original vocation; teaching undergraduate organic chemistry. He became Head of the Department in 1954 and remained in that position whilst the graduate program was expanded mostly by the initiation of a Ph.D. program with the help of A.C. Neish and the National Research Council.

Chute retired in 1979 but continued to teach in the Department and these activities resulted in some interesting research closely related to that done 30 years earlier in Toronto. An undergraduate raised the question of the structure of the aldehyde bisulphite compounds which at that time were thought (Beilstein) to have the structure $R.CH(OH)\text{-}O\text{-}SO_2H$ by contrast to the nitrogen analogues ($R.CH(OH)\text{-}NH_2$). Chute prepared crystalline $HO.CH_2SO_3K$ and X-ray crystallography showed S-C bonding; hence the formula accepted for these compounds for more than 100 years was incorrect.

Walter Chute was a benevolent teacher and an understanding colleague who has been deservedly honoured by the Dalhousie University Chute graduate student award and the Chute lectureship, both of which have brought talented chemists to Halifax.

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