PDF - EARLY DAYS IN CO2 FIXATION: SOME BRIEF COMMENTS ON THE BERKELEY EXPERIENCE - researchcub.infoThe reminiscences ofSir Hans KREBS 1 concerning the discovery of CO 2 fixation by mammalian tissuesinvite a few brief remarks about this subject as seen from the perspective ofthe group which worked on carbon dioxide metabolism, primarily inphotosynthetic and bacterial systems during the period from 1937-1942. I maynote that some treatment of the early history of tracer experimentation in andaround the Radiation Laboratory at Berkeley is available in a few articles Ihave published previously 2 3, but a properly intensive and exhaustivechronicle of the Berkeley experience remains to be written. It was shortly aftermy arrival as a postdoctoral student in Berkeley at the start of 1937 to workon purely nuclear physical problems at the Radiation Laboratory that I becameaware of the Director's (E. O. LAWRENCE) intense interest in seeing thecyclotron production of radioactive isotopes exploited in biological andmedical research. LAWRENCE was aware of my training as a radiochemist and itwas not surprising that I soon found myself spending most of my time inpreparation of radioactive materials made by cyclotron activation for use byvarious investigators in and around the campus. In this connection, LAWRENCEapproached me one day (probably in the summer of 1937) with a special requestto cooperate with a young assistant professor in physiology (I. L. CnAmOFr,later to achieve considerable repute through his pioneering investigations oncarbohydrate and lipid metabolism in animal tissues using tracer methodology).The proposal was to utilize the shortlived carbon isotope (C ~ 1, zl/2 ~_ 20minutes) to study labeled carbohydrate, produced by photosynthetic CO zincorporation. He mentioned in passing that a young graduate student, SamuelRUBEN, not yet ordained as a Ph.D., was also involved. I was, in fact,collaborating with RUBEN in a research on neutron-induced radioactivities inthe rare earth elements and so learned quickly that the idea of using C 110 2in tracer studies on carbohydrate metabolism had been pressed on CHAtKOFF byRUBEN who in a characteristic excess of enthusiasm felt that the short life ofC 11 could be no insuperable handicap in obtaining adequately labeledcarbohydrates. The notion that green plant photosynthesis could be used toprepare uniformly labeled D-glucose was the basis for his optimism. To help inthis project, another young scientist–then an instructor in the Division ofSoil Science, Dr. W. Z. HASSlD–WaS impressed into service because of hisexpertise in carbohydrate chemistry. (I need not emphasize here that Dr. HASSIDwas also later to make his mark as one of the world's outstanding researchersin biosyntheses of carbohydrate.) To make a long story short, we soondiscovered that the expected production of the labeled glucose was notproceeding according to the textbook suggestions but instead there was amassive shortterm fixation of labeled carbon from CO 2 into unknown productsand that, most surprisingly, the primary chemistry involved a dark (reversible)thermal fixation of labeled carbon in a carboxyl function with subsequentlight-activated reduction of the labeled carboxyl to more reduced states ofcarbon.

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