TABLE V

ENERGY BALANCE SUMMARY—PHOTOSYNTHETIC CARBON REDUCTION CYCLE

Reaction (from Table IV)	*E (number of times per cycle)*	*ΔG′ (kcal)*	*ΔG° (kcal)*	*EΔG′ (kcal)*	*EΔG° (kcal)*	
(A) Ribulosediphosphate carboxylase	3	−8.43	−9.8	−25.3	−29.5	(R)
(B) 3-Phosphoglycerate reduction	6	+4.32	−1.6	+25.9	− 9.4	
(C) Triosephosphate isomerase	2.5*	−1.82	−0.2	− 4.5	− 0.4	
(D) Fructosediphosphate aldolase	1.5*	−5.25	−0.4	− 7.9	− 0.5	
(E) Fructosediphosphatase	1.5*	−3.44	−6.5	− 5.2	− 9.8	(R)
(F) Transketolase	1	+1.47	−0.9	+ 1.5	− 0.9	
(G) Sedoheptulosediphosphate aldolase	1	−5.63	−0.2	− 5.6	− 0.2	
(H) Sedoheptulosediphosphatase	1	−3.44	−7.1	− 3.4	− 7.1	(R)
(I) Transketolase	1	+0.10	−1.4	+ 0.1	− 1.4	
(J) Ribosephosphate isomerase	1	+0.54	−0.1	+ 0.5	− 0.1	
(K) Pentosephosphate epimerase	2	+0.24	−0.1	+ 0.5	− 0.2	
(L) Phosphoribulokinase	3	−5.24	−3.8	−15.7	−11.5	(R′)
(M) Hexosephosphate isomerase	0.5*	−0.50	−0.3	− 0.3	− 0.2	
(N) Glucosephosphatase	0.5*	−3.29	−7.2	− 1.7	− 3.6	
Totals				−41.1	−74.8	

		ΔG′	*ΔG°*
Energy input:	6 ($NADPH + H^+ + \frac{1}{2} O_2 \rightarrow NADP^+ + H_2O$)	−315.5	−306.9
	9 ($ATP^{4-} + H_2O \rightarrow ADP^{3-} + P_i^{2-} + H^+$)	− 68.8	−120.1
	Totals	−384.3	−427.0
Energy stored:	3 ($CO_2 + H_2O \rightarrow [CH_2O] + O_2$)	+343.2	+352.21
Energy expended in cycle		− 41.1	− 74.8
Energy expended in postulated regulated steps (R)			− 46.4 (62 %)
Energy expended in postulated regulated steps (R) + (R′)			− 57.9 (77 %)

* 0.5 represents formation of 0.5 mole of glucose as end product from 1 mole of 3-phosphoglyceraldehyde. Actually, glucose is not an end product (glucose 6-phosphate is converted to polysaccharides), but its formation is included for "bookkeeping" purposes.