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The respiratory quotient has also been measured during metamorphosis in most of the insects. They all agree in reporting respiratory quotients (RQ's) around 0.7 indicating a utilization of fat during the pupal life. In the honey bee pupa higher RQ Values may denote complications and again there are differences between the casts. During diapause in Lepidoptera, seemingly very low RQ values can be measured, down to 0.1. The main reason for these should be cyclic gigantic outbursts of CO_2, a phenomenon which seems to be wide spread in all insects under conditions when the oxygen supply is high relative to demand (Buck & Keister, 1958). However, some kind of retention of carbon dioxide may not be the whole explanation.

b) Lipids and Carbohydrates

Direct measurement of the utilization during the pupal life of the energy store accumulated in the larva underlines the importance of a fat utilization (Rudolfs, 1926, 1929, Needham, 1929, Evans, 1932; Becker, 1934; Haub and Hitchcock, 1941; Demyanovsky and Zubova, 1957; Russo-Caia, 1960; Villeneuve and Lemonde 1963). Unsaturated fatty acids should only be little used for energy production (Schmidt, 1963; D'Costa and Birth, 1966). Studies of neutral lipids and phospholipids show a changed pattern during development (Beaudoin et.al., 1968; Mankapure and Sawant 1980) and the relative amount of phospholipids increases with adult development (Castillon et.al.1979; Mankapure and Sawant, 1980).