Is the Electron Orbital g-Factor Equal to 1 Exactly? AYODEJI AWOBODE, University of Ibadan — An important question addressed by Kusch et al in their pioneering experiments may be put as follows: If the electron g-factors are assumed corrected such that $g_L = 1 + \delta_L$ and $g_S = 2 + \delta_S$, what are the measurable magnitudes of $\delta_L$ and $\delta_S$? To answer this question, Kusch et al used the resonance Zeeman technique with which they measured the quantity $\delta_S - 2\delta_L = a_{SL}$. At that time, no independent value of $\delta_S$ or $\delta_L$ was available, hence it was not possible to separately determine the two unknowns ($\delta_L$, $\delta_S$). It was a practical necessity therefore to assume a value for one in order to determine the other, hence it was assumed that $\delta_L = 0$. However, six decades have passed since Kusch et al skillfully measured the quantity $a_{SL} = \delta_S - 2\delta_L$, carefully eliminating bound state contributions. In sequel, experimentalists have independently of $\delta_L$, measured $\delta_S$ with increasing precision and accuracy. A culmination of these efforts is the recent measurement of $\delta_S$ by Gabrielse et al. In view of the success recorded in the measurement of $\delta_S$, the question posed by Kusch et al will be reopened/discussed: Is it empirically justified to set $\delta_L$ equal to zero exactly? If we combine the recent measurement of $\delta_S$, together with that of $(\delta_S - 2\delta_L)$, then it appears that $\delta_L = (-0.6 \pm 0.3) \times 10^{-4}$. Does this imply that the electron orbital g-factor is also corrected?