ever increasing precision, a second condition must be fulfilled. As Prof. Dehmelt points out that "....such experiments (of confining particles) are of limited value unless one also devices means for first preparing the atomic systems in a certain selected state" [2]. Keeping this important condition in mind, the real start of the field of precision measurements of the electron g-factor started before traps even entered the picture. I will use a brief excursion of the development of this area as an example of a typical element of the "Trunk" of our tree, an area in which both the infinite confinement time as well as the complete isolation of the particles have played a crucial role in achieving the ultimate result.

4.1. The Electron Magnetic Moment.

According to Dirac's theory of the electron as a point like particle the g factor of the electron, the proportionality constant connecting spin and magnetic moment of the particle, was to be exactly 2. This would bring the cyclotron frequency and the spin-precession frequency (Lamor frequency) to identical values and the energy levels in Figure 3 would be degenerate. Quantum electrodynamics predicts corrections to this simple picture and the g-factor can be redefined as $g = 2(1+a)$, where a is called the anomaly, hence the expression anomalous magnetic moment of the electron. According to our simple level scheme in figure 3 one could 'simply' measure the cyclotron frequency and the Lamor frequency in separate measurements and then take the difference of these values. But because of the three orders of magnitude difference between g and a one would give up accuracy (since a 10^{-5} measurement of ω_L and ω_c would only represent a
10^{-2} measurement of ω_a). A much higher accuracy could be achieved if the frequency ω_a could be accessed directly with an accuracy similar to the measurement of spin and cyclotron frequency.

To first order a direct transition between the levels $|n, s=-1/2\rangle$ and $|n-1, s=+1/2\rangle$ is forbidden since it involves a simultaneous change of the spin quantum number and the cyclotron quantum number, therefore being a two-photon transition. But with a proper choice of the electromagnetic field configuration this transition can be driven, and the anomaly can be measured directly. A complete description of the 'experiment' now consists of: (a) trapping of the particles to allow a high accuracy despite Heisenberg's uncertainty principle, (b) preparation of an appropriate state, i.e. polarization of the sample, (c) change of spin polarization, and (d) the detection of changes of the spin polarization. As mentioned before, the zeroth order experiment (comprising only (b) - (d) was performed by H. G. Dehmelt [12]. It uses a radio-frequency discharge of a low pressure sodium gas in a magnetic field. The