APPENDIX III

Magnetic Spin Properties of Space–time

The lattice particle system of space–time is the electromagnetic reference frame. The charge continuum moving about this frame at the universal angular velocity Ω develops magnetic moment. Here, we assume that this is balanced by the spin of the lattice particles. This spin motion must be in the same direction but it will, of course, have to be at much higher frequency.

From Chapter 2 we have seen that the magnetic moment of any fundamental system in orbital motion has to be doubled. Thus unit charge e of the continuum moving at $\Omega = c/2r$ in an orbit of radius $2r$ relative to the lattice produces a magnetic moment of twice $(e/2c)$ times Ω times $(2r)^2$ or $2er$. From Appendix I the lattice particle spinning at angular velocity ω develops a magnetic moment $(e/6c)b^2\omega$, where b is the particle radius. This has to be multiplied by a factor γ to correct for anomaly. Equating the magnetic moments:

$$\gamma(e/6c)b^2\omega = 2er \tag{18}$$

Next, we note that the spin angular momentum of the lattice particle plus its orbital angular momentum (E and G frame components) sum to zero. The problem here is that the distribution of the angular momentum due to the mass in the field is uncertain. However, we assume that we can apply the same criterion to the mass components defined by and within the sphere of the lattice particle. The field is excluded. Now, the rest mass energy of the lattice particle is $2e^2/3b$, of which $e^2/6b$ is within the sphere of radius b and $e^2/2b$ outside. The effective mass of the particle is halved because of the "buoyancy" due to the density of the energy medium surrounding the particle. Thus, ignoring the field outside the radius b, the effective orbital mass energy of the non-field constituent, to which our zero angular momentum condition is applied, is $-e^2/3b$ due to the buoyancy effect and $e^2/6b$ due to the energy within the sphere. This tells us that the mass effect within the sphere and able to spin at ω is exactly equal and opposite in polarity to that to be considered in orbital motion with the E frame. Note that the field effects and the G frame effects are all separate. Thus, we can equate the spin moment and the velocity moments of the motion, thus:

$$\frac{2}{5} b^2 \omega = \Omega r^2 \tag{19}$$

The mass effect within the sphere is uniformly distributed, as shown in Appendix I. Note also that this negative mass effect of the orbital motion is most important for angular momentum balance. Otherwise, the unidirectional motion demanded for magnetic balance due to opposite charge polarity could not be reconciled with zero angular momentum. As it is, the field energy can have counter spin without affecting the magnetic moment and this has important bearing upon the discussion of angular spin momentum in Chapter 9.

From (18) and (19), since Ω is $c/2r$, we see that γ is 9·6. This result is used to evaluate the magnetic moment of the proton in Chapter 7.

The result that the factor relating conventional magnetic moment and true magnetic moment can be 9·6 is, to say the least, most surprising. It ought to be 2, one would think, if the assumptions in Chapter 2, as used to derive (2.7), are to be believed. Let us examine this. Rewrite (2.7) as:

$$H = C - 4\pi k(K_R)/H \tag{20}$$

Keeping C constant and differentiating for maximum K_R gives:

$$C = 2H \tag{21}$$

Then, from (20) and (21):

$$K_R = \frac{H^2}{4\pi k} = \frac{H^2}{8\pi} \tag{22}$$

if k is 2, as in Chapter 2. This result applies strictly to reaction due to *orbital* motion of charge. There is no basis for applying it if the reaction is due to spin. Hence, if the primary field C is developed by charge in spin, any parameter can relate field and charge velocity moment, as far as this particular analysis is concerned. Far from being surprised, therefore, we should be content that a way has been found for deducing the necessary constant in the case of spin. γ is 9·6, not 2, under these circumstances.

As a final word, it is to be noted that the distinction thus made between orbital motion and spin is nothing to do with the geometrical form of any movement of charge. It concerns more the ability of a magnetic field to act upon charge. Magnetic field is physically interdependent upon reaction effects in space–time. It appears that a charge moving in an orbit of radius r, that is about 10^{-11} cm, experiences normal magnetic field actions and so can develop normal magnetic field effects. A charge moving in a path of radius of the order of the electron radius, about 10^{-13} cm, has different behaviour in a magnetic field and so behaves differently in developing a magnetic field. The factor of 9·6 applies to spin and orbital motion of electric charge at small radii, probably even up to radii of the order of the lattice particle and certainly applies to the charge within this particle itself. Whether the factor of 9·6 changes abruptly to 2 at some critical radius, or whether the transition is gradual, is a matter for further research.