*Abstract.* The geomagnetic field can be represented mathematically by spherical harmonic expansions of scalar magnetic potentials. The mean square value of the magnetic induction represented by potential harmonics of degree n averaged over a sphere gives the spatial magnetic power spectrum at degree n on the sphere. McLeod's Rule for the magnetic field generated by Earth's core says that the internal spatial geomagnetic power spectrum of the core field at the core surface, $R_{nc}(c)$, is expected to be inversely proportional to (2n + 1) for finite degrees $1 < n \leq N_E$. We verify McLeod's Rule by using it to locate the core-mantle boundary with single epoch main field models of satellite geomagnetic data. This method is found to be more accurate than other core magneto-location methods, with the estimated core radius of 3485 km being very close to the seismologic value of 3480 km.

With the core radius fixed at 3480 km, we then calibrate McLeod's Rule and similar spectral forms against main field model values of $R_n$ for degrees 3 through 12. By extrapolation to the degree 1 dipole, we predict the expectation value of Earth's dipole moment to be about $5.89 \times 10^{22}$ $Am^2$ rms (74.5% of its 1980 value) and the expectation value of geomagnetic intensity at Earth's surface to be about 35.6 μT rms. Archeo- and paleomagnetic intensity data show these and related predictions to be reasonably accurate.

The distribution $\chi^2$ with 2n+1 degrees of freedom is assigned to $(2n+1)R_n(c)/\{R_n(c)\}$, where $\{R_n(c)\}$ is the expected power of the core field at degree n on the core surface. We extend this even to the first degree, arguing that the small tilt of Earth's magnetic dipole moment relative to its rotation axis is mainly a geometric, rather than an energetic, effect of the Coriolis pseudo-force on outer core field and flow; moreover, (i) small tilt need not imply excess dipole power, (ii) normalized dipole power can be distributed as $\chi^2$ with three degrees of freedom when the axial dipole is not normally distributed, and (iii) examples include the composite bi-Maxwellian–Gaussian distribution for the axial dipole complementing weaker, normally distributed equatorial dipole moments. According to the $\chi^2$ dipole power distribution, an exceptionally weak absolute dipole moment (≤20% of the 1980 value) will occur during 2.5% of geologic time. We estimate the mean duration for such major geomagnetic excursions, one quarter of which feature axial dipole reversal, using the dipole power time-scale from modern geomagnetic field models and a statistical model of geomagnetic dipole power excursions. The resulting mean excursion duration of 2767 years forces us to predict an average of 9.04 excursions per million years, 2.26 axial dipole reversals per million years, and a mean reversal duration of 5533 years. Paleomagnetic data show these purely geomagnetic predictions to be quite accurate.

McLeod's Rule for the core field, even when extrapolated to the first degree, led to (1) very accurate magneto-location of the core-mantle boundary; (2) fairly accurate prediction of paleomagnetic field intensity; and (3) accurate prediction of the mean frequency of major absolute geomagnetic dipole excursions and axial dipole reversals. We conclude that McLeod's Rule serves to unify geomagnetism and paleomagnetism, correctly relates theoretically predictable statistical properties of the core geodynamo to magnetic observation, and provides *bona fide a priori* information required for stochastic inversion of paleo-, archeo-, and/or historical magnetic measurements.