FARADAY LAW

DR. CROWELL HAS POINTED OUT THAT THE R.H.S. SHOULD BE WRITTEN AS:

$$\boxed{\begin{gathered} -ig\left(c\,\epsilon_{(1)(2)(3)}\,\underline{B}^{(2)}A_0^{(3)} - c\,\epsilon_{(1)(2)(3)}A_0^{(2)}\underline{B}^{(3)} + \underline{A}^{(2)}\times\underline{E}^{(3)} - \underline{A}^{(3)}\times\underline{E}^{(2)}\right) \\ \text{et cyclicum} \\ \text{where: } \quad \epsilon_{(1)(2)(3)} = 1. \end{gathered}}$$

SO IN ORDER TO RECOVER THE B CYCLIC THEOREM WE ASSUME THE RADIATION GAUGE FOR THE TRANSVERSE $\underline{A}^{(1)}$ AND $\underline{A}^{(2)}$; TRANSVERSE $\underline{B}^{(1)}$ AND GIVING THE TRANSVERSE $\underline{B}^{(2)}$ THROUGH:

$$\boxed{\begin{aligned} \underline{B}^{(1)} &= \underline{\nabla}\times\underline{A}^{(1)} \\ \underline{B}^{(2)} &= \underline{\nabla}\times\underline{A}^{(2)} \end{aligned}}$$

IN GENERAL, AS POINTED OUT BY DR. CROWELL, ANY GAUGE CAN BE USED IN THE THEORY.

MOST GENERAL FORM OF CYCLICS

$$c\,\epsilon_{(1)(2)(3)}\left(\underline{B}^{(2)}A_0^{(3)} - A_0^{(2)}\underline{B}^{(3)}\right) + \underline{A}^{(2)}\times\underline{E}^{(3)} + \underline{E}^{(2)}\times\underline{A}^{(3)} := \underline{0} \quad \text{— (1)}$$

et cyclicum

$$\Rightarrow \quad \underline{\nabla}\times\underline{E}^{(i)} + \frac{\partial \underline{B}^{(i)}}{\partial t} := \underline{0} \quad \text{— (2)}$$

$$i = 1, 2, 3$$

IDENTITIES

$$\frac{1}{c^2}\frac{\underline{\underline{J}}^{(1)*}}{\epsilon_0} = \frac{ig}{c}\left(\epsilon_{(1)(2)(3)}\left(A_0^{(2)}\underline{E}^{(3)} - \underline{E}^{(2)}A_0^{(3)}\right) + c\left(\underline{A}^{(2)}\times\underline{B}^{(3)} + \underline{B}^{(2)}\times\underline{A}^{(3)}\right)\right) \quad \text{— (3)}$$

et cyclicum

$$\Rightarrow \quad \underline{\nabla}\times\underline{B}^{(i)} = \frac{1}{c^2}\frac{\partial \underline{E}^{(i)}}{\partial t} \quad \text{— (4)}$$

$$i = 1, 2, 3$$

EQUATIONS

TRUE FOR ALL GAUGES.

MAKES NO ASSUMPTIONS ABOUT FIELDS.

WITH THE CYCLIC CONDITIONS ONE CAN ALWAYS REDUCE THE O(3) EQUATIONS TO THREE MAXWELL EQNS.