relations in the Coulomb gauge, we consider in the Lorentz gauge as independent fields electrons and the transverse photons. Consequently we keep the canonical equal time anti commutation (2.6c) for the electrons and (3.9) for the transverse part of ${A^L}_\mu$. Then in the Lorentz gauge we get the following equation of motion

$$\left(i\gamma^\mu \frac{\partial}{\partial x^\mu} - m_e\right)\psi_e(x) = \eta(x) = e\gamma^\mu {A^L}_\mu(x)\psi_e(x) \tag{1}$$

$$\Box_x \left(A^L\right)_i^{tr}(x) = J_i^{tr}(x) = J_i(x) - \frac{\partial}{\partial x^i}\frac{\partial J^k(x)}{\partial x^k}; \quad i = 1,2,3 \tag{2}$$

and the zeroth and longitudinal components of the photon fields are determined through the corresponding sources as

$$\left(A^L\right)_i^l(x) = \Box^{-1} - xJ_i^l(x); \quad J_i^l(x) = e\frac{\partial}{\partial x^i}\frac{\partial\left[\bar\psi_e(x)\gamma_k\psi_e(x)\right]}{\partial x_k} \tag{3}$$

$${A^L}_o(x) = \Box_x^{-1}J_o(x); \quad J_o(x) = e\bar\psi_e(x)\gamma_o\psi_e(x), \tag{4}$$

where

$$\left(A^L\right)_i^{tr}(x) = {A^L}_i(x) - \frac{\partial}{\partial x_i}\frac{\partial {A^L}_k(x)}{\partial x_k}; \quad \left(A^L\right)_i^l(x) = \frac{\partial}{\partial x^i}\frac{\partial\left(A^L\right)_k(x)}{\partial x_k} \tag{5}$$

The gauge condition (4.1) allows to redefine $\left(A^L\right)_i^l$ through the A^Lo

$$\left(A^L\right)_i^l(x) = \frac{\partial}{\partial x^i}\frac{\partial {A^L}_o(x)}{\partial x^o} \tag{6}$$

Thus we have two auxiliary fields $\left(A^L\right)_i^l$ and A^Loin the Lorentz gauge (4.1). Both of these auxiliary fields are determined through the J_o according to (3,4) and (6).

The first part of the equal time commutator (2.7a) $Y^l = Y_I^L - Y_{II}^L$ in the Lorentz gauge

$$Y_I^L = e\bar u\left(\boldsymbol{p}_e'\right)\gamma^\mu < out; \boldsymbol{p}_N'|{A^L}_\mu(0)\left\{\psi_e(0), b^+_{\boldsymbol{p_e}}(0)\right\}|\boldsymbol{p}_N; in >= e\bar u\left(\boldsymbol{p_e'}\right)\gamma^\mu u\left(\boldsymbol{p_e}\right) < out; \boldsymbol{p}_N'|{A^L}_\mu(0)|\boldsymbol{p}_N; in > \tag{7}$$

reproduces exactly the Born term V_{OPE} (2.7b).

The next part of the equal-time commutators (2.7a)

$$Y_{II}^L = -e\bar u\left(\boldsymbol{p_e'}\right)\gamma^{\mu=0,3} < out; \boldsymbol{p}_N'|\left[A^L\mu = 0,3(0), b^+_{\boldsymbol{p_e}}(0)\right]\psi_e(0)|\boldsymbol{p}_N; in > \tag{8}$$

is more complicated than Y_{II}^C (3.10c) because ${A^L}_{\mu=0,3}$ in (4) contains additional integration over the x_o' of the sources $J_o(x')$.