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B.Sc. 'D II'  
Topic

Cascade theory of showers  $\rightarrow$  H.J. Bhabha and Heitler (England) and Carlson and Oppenheimer (America) are happening first suggested the theory of showers as a cascade process in 1934. Shower production involves two processes pair production and radiative collision.

When a fast electron passes through matter, it emits photons due to its acceleration in the Coulomb field of the atomic nuclei of the material. Each of the photons again reproduce electron through the pair creation process, so that as a result of these interactions, the numbers of both electrons and photons increase. This phenomenon is called an electron shower (cascade shower of electrons photons is built up).

There want was to interpret cosmic ray phenomena like showers and burst bursts which are characterized by the production of many particles in the material by a single incident particle, and to test the applicability of quantum electrodynamics at the high energies involved.

These effects and especially the intensity-altitude curve of cosmic ray with its peak intensity around 100 mb as observed by balloon experiments were well interpreted by the electron showers if one assumed that the primary cosmic rays were all electrons. Thus a cascade showers of electrons photons is in fig.

