S U M M A R Y

A new air shower observatory developed at North Bengal University (latitude $26^{0}45'$N and altitude 91m.a.s.l.) during 1980 - 1983 is described. Efforts have been concentrated on measurements of smaller air showers in the size range 10^4 - 10^5 electrons using a closely packed detector array. The characteristics of showers such as local age parameter, average age parameter, electron lateral distribution and size spectrum have been determined and compared with such results obtained by similar such arrays by other groups. A comparison of existing theoretical electron distributions is presented to indicate their interrelation and their present status in relation to the new experimental data. The thesis presents the results of an independent determination of characteristics of small showers and an independent substantiation of lateral distribution and size spectrum in the size range 10^4 - 10^5 electrons.