

CALCULATING FIRING TABLES IN 18TH AND 19TH CENTURIES

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In this talk, I would like to explore the various methods used during 18th and 19th centuries to numerically integrate the ballistic differential equation and to calculate firing tables for the needs of artillery.

Throughout this period, there has been an interesting interaction between analytic theory of differential equations, numerical and graphical techniques of integration, and empirical research by means of experimental measures. Mathematicians, ballisticians and artillerymen, although belonging to different milieus, collaborated and inspired themselves mutually. All this led however to a relative failure, both experimentally to find a good law of air resistance, and mathematically to find a simple solution of the ballistic equation.

Mathematical research on the ballistic equation has played nevertheless the role of a laboratory where the modern numerical analysis was able to develop. Mathematicians have indeed been able to test on this recalcitrant equation all possible approaches to calculate the solution of a differential equation. There is no doubt that these trials have helped to organize the domain into an autonomous discipline at the beginning of the 20th century.