

Abstract

The topic of this thesis is forensic ballistics, one of the oldest fields within forensic science. It examines the use of firearms, ammunition, and many other related aspects in connection with the commission of crimes. This thesis focuses on forensic ballistics itself and frequently addresses its technical aspects. Emphasizing primary sources, foreign literature, and primary research, the thesis provides a comprehensive overview of the field in seven sections.

The first section generally discusses the concept of forensic ballistics. It also addresses ballistics itself, as its definition is essential for understanding forensic ballistics, and introduces the various subfields of ballistics.

The second section presents an overview of the historical development of forensic ballistics. The first chapter describes the evolution of the field worldwide by presenting renowned experts and the cases for which they became famous. The subsequent chapter provides information on the genesis of the field in the Czech crown lands from an institutional perspective. It also generally discusses the death of countess Windischgrätz.

The third section explains ballistic traces. After an introduction to the topic, three chapters follow. First, the traces on the surface of projectiles are discussed; next, traces on the surface of cartridge cases are examined; and the final chapter categorizes traces caused by bullet impact.

The fourth section builds directly on the previous one, focusing on the objects of research in forensic ballistics. Separate chapters present firearms and ammunition, which together form the theoretical foundation for the remainder of the thesis.

The fifth section describes the issue of 3D printing of firearms from the perspective of forensic ballistics and is divided into three chapters for clarity. The first chapter provides an introduction and categorization of printed firearms. The following chapter describes the traces specific to this type of weapon, and the final chapter reflects on possible responses to this new technology.

The sixth section continues with an analysis of modern technologies and shifts focus to the role of artificial intelligence in forensic ballistics. In five chapters, it presents topics such as artificial intelligence and expert systems, its implementation, the analysis of audio traces, and concludes with a final reflection.

The final section presents unique primary research on the topic of the death of countess Windischgrätz, in which the lethal projectile was examined using two modern methods: neutron tomography and 3D scanning. This section is divided into six chapters, in which the research is described from the perspectives of methodology, results, and further possible procedures.