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and visual examples from both East and West reveal a New Jerusalem meaning (G. Wolff and A. Hoffmann, B. Baert), and the Benedictine and Franciscan traditions of translating sacred spaces in Western Europe were also discussed (L. Evseeva, M. Piccirillo). In varied sources of non-material culture New Jerusalem themes are revealed (M. Chkhartishvily, O. Belova & V. Petrukhin). In America, at the dawn of the modern age, this theme was present in painting (G. Carr), and a hierotopic meaning was also sought for in an unrealized mid-20th-century renovation project for the Church of the Holy Sepulchre (R. Ousterhout).

Among the scholars who went furthest in their innovative interpretation was Alexei Lidov. Taking the well-known phenomenon of the Holy Fire miraculously occurring on Christ's tomb on Holy Saturdays as his starting-point, he interpreted some insufficiently elucidated phenomena such as „lanterns of the dead“, architectural structures occurring in medieval West-European cemeteries, as well as the lanterned domes introduced during the Renaissance, also explained by reference to the Resurrection Rotund in Jerusalem.

The second largest group of participants to Russia was the one from Serbia

with its five representatives whose papers attracted attention and inspired discussion. Danica Popovic was given the honour of not only a plenary paper (along with A. Lidov, R. Ousterhout, L. Belaev and G. Zelenskaya), but also of giving the concluding remarks along with her colleagues from the USA, Great Britain, Russia and Bulgaria. Given that the so-called “Belgrade school” of art history has until recently occupied a prominent place among other world's centres for Byzantine studies, it is encouraging to see it resuming its former position.

This year's conference organized in Moscow by the Research Centre for Eastern Christian Culture explored some of the fundamental phenomena associated with sacred spaces and their eschatological meaning as expressed through various ways of creating “new Jerusalems”. Seemingly static, these phenomena nevertheless functioned in a variety of ways, depending on time, place and interests of certain social groups.

Demonstrating convincingly the significance of creativity in developing new methodological approaches and scholarly communication at a global level, the activity of the Moscow Centre offers a model to be followed.

GÁBOR ÁGOSTON, *GUNS FOR THE SULTAN. MILITARY POWER AND THE WEAPONS INDUSTRY IN THE OTTOMAN EMPIRE*. CAMBRIDGE UNIVERSITY PRESS, 2005. Pp. 280.

Reviewed by Veljko Stanić

Gábor Ágoston's book emerged as a result of inadequate research into the role of military power and the weapons industry in the Ottoman Empire of the 16th–18th centuries, an epoch marked by a revolution in warfare. This Hungarian historian, currently teaching at Georgetown University, Washington, offers a historical analysis of the Ottoman gunpowder-based weapons industry and,

drawing from significant archive materials, challenges classical stereotypes about Islamic conservatism, examining in a simple and concise manner the contents and potentials of Ottoman military power, its causes and development, as well as the issue of raw materials necessary for an effective and competent equipment of the Ottoman Army with weapons based on gunpowder technology.

The main body of text, which includes 20 illustrations, 4 geographic maps and 31 tables, is divided into seven sections: *Introduction: Firearms and Armaments Industries, Gunpowder Technology and the Ottomans, Cannons and Muskets, Saltpetre Industries, Munitions and Ordnance Industries, Conclusions: Guns and Empire*. In addition to an appendix containing 69 tables, the book also includes clarifications on weights and measures, the bibliography and the index of personal and geographical names.

The use of firearms in European battles in the 1320s and 1330s, including the Balkans, had made the Ottomans recognize the necessity of equipping their army with the required arsenal by the end of the century. Adopted as a result of pragmatism and real needs, the new technology proved very efficient in the conquest of Constantinople in 1453. In the second chapter the author discusses the use of firearms by janissaries, the founding of naval and artillery forces, the role of foreigners in technology transfer and manufacture, and demonstrates that the Ottomans not only adopted gunpowder technology but even remained a powerful “gunpowder empire” until the 17th century. Resistance to the new weapons and changing styles of warfare was not caused by some distinctively Islamic mentality, indeed it is readily comparable with similar resistances offered by Europe’s disappearing feudal world. Some deeper socioeconomic and cultural reasons enabled the Empire to retain its military superiority over its neighbours until the end of the 17th century.

The third chapter, simply entitled *Cannons and Muskets*, is marked by exemplary quantitative evidence. Following his basic idea which rectifies the prevailing opinion, Ágoston analyses different types of artillery ranging from heavy and inefficient cannons to smaller mortars of different calibres, and compares them to

the weapons of the Ottoman enemies. Smaller cannons such as *şayka* and *balyemeyez* as well as the smallest ones such as *şabi*, *saçma*, *prang*, *eynek*, *misket* and *şakaloz* were also used. Heavy artillery accounted for only 10 percent of the Ottoman siege force and was mostly used in defending significant fortifications such as Belgrade. Small arms carried by janissaries, such as rifles/muskets, corresponded to the standards of Spanish and Venetian firearms. Nevertheless, gunpowder and cannon ammunition production seems to have been a more significant feature of the Ottoman military industry than the manufacture of small arms.

The next two chapters look at the necessary economic basis of the Ottoman military industry discussing the supply of saltpetre, sulphur and coal, as well as gunpowder production. Although it has been thought that the Ottomans in many ways depended on the import of armaments and new technologies, there is no evidence for that in archive materials. Many saltpetre plantations demonstrate that the Ottoman Empire was able to produce enormous amounts. In the Balkans such plantations were at Priština, Drama, Melnik, Štip and Kumanovo, but Anatolian and Arabian regions were also significant raw materials bases. But there was less sulphur. It was brought from the Black Sea area, the Van province, Moldavia, the island of Melos, and partly from the Ohrid area in modern Macedonia. Coal was derived from a special “black tree” (*kaarağaç*). After the consideration of natural resources and needs, Ágoston places them in the context of Ottoman Government connections and saltpetre production within the taxation system known as *iltizam*. He is interested in the issue of government control and security mechanisms, frauds and embezzlements, labour force, as well as tax and military exemptions for the saltpetre-producing villages. His special attention is focused

on *ocaklık* or villages situated near saltpetre plantations, forests, gunpowder manufactures, mines, fortresses and mountain gorges whose inhabitants worked on specific tasks in accordance with the intentions of the central government. Relying on the original documentary evidence, the author stresses that the Ottoman Empire was able to produce sufficient supplies of saltpetre, which was the most important ingredient of gunpowder. Even when the Empire had to purchase additional amounts, for example during the war of 1693–94, when 65% of the total amount had to be supplied in that way, this did not significantly affect the Empire's total expenses.

Developed in the gunpowder factories of Constantinople, Cairo, Baghdad, Aleppo, Yemen, Belgrade, and elsewhere, gunpowder production would intensify in times of war. Examining the infrastructure of such factories in different parts of the Empire, their typology, manufacturing processes, output and gunpowder quality, Ágoston concludes that the Empire was able to satisfy its own needs deep into the 18th century, unlike many European countries. It was only at the time of a Russo-Turkish war in 1768–74 that a shortage of gunpowder affected the Ottoman army. The second half of that century witnessed a significant decline in production, from 761–1037 metric tonnes recorded in the 17th century to 169 metric tonnes, making imports unavoidable. As a result, Selim III (1789–1807) made a reorganisation of three main gunpowder factories, in Istanbul, Selanik and Gelibolu, but the reorganisation did not prove effective enough. So a new water-powered gunpowder factory was constructed in the coastal town of Azadli. By the end of the century the factory had reached the annual output of 1692–2256 metric tonnes.

The sixth section of the book analyses ore deposits providing ingredients necessary for ammunition and firearms pro-

duction. Relying on the Ottoman sources once again, the author suggests that the Empire suffered a serious shortage of local tin, which was imported from Europe, whereas other raw materials such as steel, lead and copper were produced in sufficient amounts in the Empire. With the authentic data at hand, the author makes a comparative evaluation of the Ottoman weapons. Discussing their size, the chemical components involved and the total production, he questions the earlier historiographic views of the Ottoman army as “technologically inferior”.

The research done in this book demonstrates that the Ottoman defeats at the end of the 17th century and especially in the second half of the 18th century were not the result of technological lags or an inadequate productivity of the military industry. Their causes should be sought for in advantages that European society had after the major economic and administrative reforms of that era. Besides that, battles were not won with better weapons but with command systems, control and training of troops. More developed ways of communication and funding prevailed although the Ottoman Army won battles in the 18th century including both the one against Russia in 1717 and against Austria in 1737–39. In the second half of the 18th century the Empire was exposed to huge financial strains, which seriously weakened central power. One of the main problems was its loose control of gunpowder production. Janissaries and the ulem were against the planned reforms of sultan Selim III because they considered them aimed against themselves.

In an expert and detailed manner, Gábor Ágoston's book opens the possibility for further research. It is particularly rich in data pertinent to the military industry and warfare styles in the Balkans.