

in antiquity and the Middle Ages, and diving and swimming in Renaissance Genoa. Chapter 8, 'Inventive Professionals', describes Renaissance engineers. This is followed by 'Ancient Ship Types Analyzed and Reborn'. Chapter 10 is about Lilio Gregorio Giraldi (1479–1552), from Ferrara, who wrote a treatise on ancient seafaring, and other authors who discussed the Nemi ships. Chapter 11, 'New Arts and New Opportunities', covers Renaissance diving and salvage, both theoretical and practical. A Conclusion summarizes the contents of the book, and in its final two pages describes later work on the Nemi ships.

The text is dense, with small type on large pages with narrow margins. The few illustrations consist of a map, a family tree and contemporary engravings. Although reproduced on the same paper, so they could have been inserted at appropriate points in the text, they are clustered as if they were photographic plates. The 171pp. of text and 6pp. of illustrations are followed by 73pp. of notes and bibliography and a 12-page index.

Though the subject of some of the texts discussed could be described as early archaeology, this is very much a work of history and of textual analysis. The author assumes the reader has some background knowledge of the period, the history of Italy and of the Catholic church, as well as classical texts, history and archaeology. Many archaeologists may not have the background necessary to appreciate the detailed scholarship of this work. There are places where it is perhaps too detailed, where the reader just wants to get on with the story, and not be led sideways. There is quite a bit of repetition, and tighter copy-editing would have improved the book's readability, particularly as there is an index to provide cross-referencing when necessary. This book contains no actual archaeology, though tells the interesting story of early attempts at underwater archaeology as part of the Renaissance interest in classical culture, and the development of engineering.

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I Cannoni di Venezia: artiglierie della Serenissima da relitti e collezioni in Italia, Israele, Malta e Spagna

CARLO BELTRAME and ROSSELLA SCORDATO

138pp., numerous b&w photos and line drawings,
All'Insegna del Giglio, Venice, 2016, €32 (hbk), ISBN
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The Arsenal of Venice was an industrial complex on a scale rarely seen before the Industrial Revolution of the

18th and 19th centuries. From the 12th century it was both a naval dockyard and a store for the city's arms and armour. Taking up a sizeable proportion of insular Venice, it came to employ a workforce of up to 2000 people. The specialization of labour for the making of particular parts and the concept of series production there prefigure the factory system of the more modern period. It is perhaps not surprising that an industrial concern of this size was not merely a manufactory but a research and development hub, and one that continued to innovate. According to as great a scientist as Galileo, 'mechanics might be profitably studied at the Arsenal in Venice' (A. R. Hall, *Ballistics in the 17th Century*, Cambridge, 1952). Guns manufactured in the Arsenal thus promise to be of great interest. Despite the ease of recycling bronze and its always high value, the large number of surviving Venetian guns is witness to the importance the Senate gave to its artillery. Maritime archaeology has contributed greatly to the number now recorded, guns lost at sea remaining out of reach until relatively recently.

This handsome volume follows that covering Venetian artillery from wrecks and surviving in museums and private collections (reviewed in *IJNA* 45.1). Both authors are highly respected in this field; in addition, there is a chapter by the Israeli archaeologist Ehud Galili. The book is a result of an impressive research and publication project under the *aegis* of Ca' Foscari University, Venice; it is heartening to see that the publication was publicly funded by the Regione del Veneto, under its initiative to make known the historic, cultural, architectural and artistic heritage of Venice.

The introductory essay by the distinguished scholar Marco Morin discusses the importance of both gunmaking as the major heavy industry and gunpowder production as the major chemical industry of the Early Modern period, and places them in their historical and cultural context. The innovative character of Venetian gunfounding is rightly pointed out. An example is the introduction by Sigismondo Alberghetti of *cannoni di nuova invenzione* (shell-firing guns) for sea-service; on these the Russian *Licorne* of the 18th century was based, still in service during the Crimean War. It also prefigured the Scottish 'carronade', originally intended as a shell-gun; the Royal Navy refused to use shells at sea except in bomb-ketches, until forced to by their introduction into the French navy by Paixhans after the Napoleonic Wars. One of the carronade's noted features, the use of a lug cast under the barrel for a mounting pin, instead of trunnions, was also pioneered in Venice.

Venetian gunmaking was kept at the cutting edge of technology by several means: by experiment on the part of the skilled gunfounding dynasties; by international links—Sigismondo Alberghetti was sent to the Weald of England to investigate and participate in cast-iron gunfounding, and was in correspondence with the great Dutch scientist Christiaan Huygens; and by the

use of experts in related fields. Galileo was employed by the Venetian Senate as a professor of science. It was in Venice that Galileo famously demonstrated his own improved version of Hans Lippershey's telescope. The Senate was delighted: his salary was doubled. He also advised on hull-design and gunnery at the Arsenal.

Morin stresses that Venice, a populous city-state of limited territorial extent, was dependent on its trading success for its wealth and indeed survival. To protect its trade routes and maintain its independence a strong navy was necessary, hence the early creation of the Arsenal, and it was here that the gunfoundries and forges were established by the Senate in 1463. This was the time when gunpowder artillery had at last to be accepted, if reluctantly in some aristocratic quarters, as a major force in warfare. Venice had close links with Constantinople; the events of the Ottoman siege of 1453 were closely followed. While the fall of Byzantine Constantinople was not attributable solely to the young Sultan Mehmet II's great bombards, their contribution could hardly be denied. And despite the failure of Mehmet II's siege of Belgrade in 1456, his siege-train of 22 bombards and seven mortars was highly effective. Hunyadi's brilliant relief operation included turning the Ottoman guns against their owners. But it was to be many years before the Ottoman navy was defeated at sea.

The *Premessa* is followed by ch. 1, summarizing the history of artillery production in Venice. For a fuller account, the reader is referred to the earlier volume. Nevertheless, this chapter gives a very useful summary; it includes a section on the naval use of guns, illustrated by a fascinating engraving of 1515 depicting a Venetian merchant galley entering Antwerp under sail, a large gun prominent at the bow. It is perhaps worth mentioning, for those whose Italian is sketchy, that Morin's 'Morphology and Constructive Techniques of Venetian Artilleries in the 16th and 17th centuries ...' is available in English in *Ships & Guns* (C. Beltrame and R. G. Ridella (eds), Oxbow, 2011), which contains many other papers of interest to the maritime archaeologist.

Chapter 2 introduces the catalogue, in which 16 of the 53 guns were recovered from the sea. There is a useful 1p. table of the guns giving nature, material, founder and founders' initials, date and location; opposite is a map showing the current location of each gun. The founders appointed by the Senate had their own premises within the Arsenal. A detail of a plan by Paolo Rossi of 1754 (fig. 8) shows the Mazzaroli foundry there. Adjacent to the Mazzaroli site, part of the 'foundry where the Albergetti work' can be seen. Perhaps the Senate considered that having more than one 'public founder' working in close proximity would tend to create competition and thus avoid the problem that arose later in the case of the first gunfounder established in the Royal Arsenal, Woolwich; here, the long-lived Andrew Schalch became set in his ways. I would

have liked to see included the fascinating engraved perspective plan of the Arsenal as it was immediately before the sacking of Venice by Napoleon's troops, since it shows the artillery sections in great detail. It is displayed in the Museo Storico Navale, Venice, alongside the companion piece showing the Arsenal devastated by the French.

It is interesting to find a brief reference to Colonel (later General) James Pattison, Royal Artillery. When I was in the Arsenal many years ago I saw a plaque on one of the then-derelict foundry buildings recording in Latin his role as superintendent inspector of artillery there. Pattison was in fact a distinguished Scottish officer. Major Francis Duncan's history of the Royal Artillery (London, 1874, vol. I, p.326) states merely that he was sent to Venice in 1769 to superintend the Venetian Artillery, and that he firmly, but presumably diplomatically, overcame local difficulties with the authorities. It would be interesting to know how the appointment came about, but clearly the Royal Artillery chose well. He is mentioned in this book for his commendable foresight in creating a museum in 1772 to preserve from recasting some of the most important historic bronze guns he found in the Arsenal.

Ehud Galili's ch. 3 gives a detailed account of the Megadim site off the Carmel coast and excavated from 1985. It is broadly dated as from the mid-15th to the mid-16th centuries. As well as fine bronze guns and three breech chambers, a chain and deadeye, rare survivals from this period, were recovered and are discussed. The bronze chamber contained remains of gunpowder but there is no comment on its composition; perhaps it was not worth analysing. However, more study is needed on early gunpowder to help explain changes in gun design; without propellant, the gun, beautiful as are many in this splendid catalogue, is simply a lump of metal.

After the catalogue, but better read before, is an 'essential nomenclature for Venetian muzzle-loading guns of the 16th–17th centuries'. It is just that. 'An innovative methodology for the documentation of historic artillery' constitutes the appendix. This sets out the methods of three-dimensional recording and the use of the internet for creating an archive of interactive images of historic artillery. Technical details are given. The images freely available from Rosella Scordato on Sketchfab could as stated be opened to give three-dimensional views. There is, as one would expect, a full bibliography.

But the bulk of the book is, of course, devoted to the catalogue. To obtain sufficient information to create 53 full catalogue entries for pieces dispersed over such an area—Cadiz to Haifa—is an impressive feat of organization as well as scholarship. One feels for the authors when reading of their difficulties in getting to see some of the guns, and that the only piece for which good photographs were not available was in Italy; for this reason it appears at the end of

the catalogue, not with the other guns surviving in Italy, which appear first. The only other guns without drawings are two in Cadiz, but they do boast excellent photographs.

The format is consistent and easy to use: each full entry fills a double-page spread. On the left, all the key statistics are set out—although the diagnostic length/calibre proportion is not stated, this is easy to calculate. Description and discussion, footnoted, follow; below are two photographs, one full-length and the other a detail, often including the coat-of-arms, but chosen according to the gun described. The photographs are remarkably clear, despite the difficulties of photographing artillery pieces. On the facing page are excellent line drawings. These give a side and top view of each barrel; also a muzzle-on and breech-on view; coats-of-arms, inscriptions and decoration are also drawn when present. For technical reasons, the scale is not the same for every gun-drawing, but the scale is given (usually 1:10). But there is no scale bar that you can use a pair of dividers on (nor was there in the first volume); for those who like the convenience of dividers, as for navigation and carpentry, this is a pity, especially since such scales would have been easy to include.

This catalogue is a real achievement and gives substance to my already high opinion of Venetian gunfounding. But there are still surprises, such as the early cast-iron mortars (nos 8–10), thought before X-ray examination to be forged. Also the gun, one of a batch ordered from Thomas Western, looking like an English ‘Rose & Crown’ gun but with instead the Lion of St Mark on the second reinforce (no 48, in Malta). The quality of the 18th-century Venetian cast-iron guns by Carlo Camozzi is impressive. The standard of design of the bronze guns by the great gunfounding dynasties—Alberghetti, di Conti, Mazzaroli—is consistently high. The bold, yet not at all coarse, character of the decoration is perfectly suited to the material and the purpose, and there is wonderful freedom of invention. Two examples. The diagonal ‘signature’ of Galeazzo Alberghetti (d. 1523) on the chase of one of the two *aspide* (no. 24, short length/calibre); and the perfect combination of decorative elements adorning the *cannone da 20* by Giacomo II di Conti, of c.1530 (no. 43).

From a functional point of view, it may be assumed that casting quality was excellent, given the cumulative knowledge acquired by the gunfounding dynasties and the use of only the best materials. The impression I get, to be verified by more study of the statistics, is that Venetian guns were generally made as light as possible consistent with durability; the omission of dolphins simplified the casting process and gave a very clean appearance to the gun. But dolphins were cast onto ‘commercial’ pieces if required (e.g. no. 44). I wholeheartedly recommend this book to maritime archaeologists and students of the history of artillery.

But simply to turn the pages and enjoy the richness and variety of the guns produced by the Serenissima, so beautifully illustrated and so expertly catalogued, is a real delight.

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The Social History of English Seamen 1650–1815

CHERYL FURY (ed.) with 10 Contributors

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This is volume II of *The Social History of English Seamen*. Volume I, covering the period 1485–1649, with the same editor, was published in 2012 and reviewed in *IJNA* 41.2. Like its predecessor, this book, in its aim to be comprehensive and balanced, includes some material already published elsewhere (for example the first footnote in N. A. M. Rodger’s ch. 3 explains that ‘This is substantially based on the relevant chapters of my *The Command of the Ocean* ... where full references can be found’). In a few cases this means that chapter topics do not cover the precise period in the book’s title.

The volume contains ten papers, two written by contributors to the earlier volume, plus an Introduction and Conclusion by the editor. There is a useful consolidated bibliography (25pp.) and an index which while short (3pp.) clearly helps the reader to follow topics such as seamen’s health throughout the various chapters. However, while its predecessor included a chapter on ‘The Men of the *Mary Rose*’, by Ann Stirland, this volume contains no mention of archaeology. The papers are wholly based on documentary history, mainly central government records, which are much fuller for this period than for the earlier one. Apart from published personal reminiscences, the authors have generally not felt the need to add information from less official sources, far less the growing body of material cultural evidence from shipwrecks. The only illustrations are three bar charts in ch. 8. As a result the seamen can seem rather characterless. We learn nothing, for example, about how they spent their leisure time, although shipwrecks have yielded evidence for a range of musical instruments. Archaeology has the potential to add sounds and even smells to the documentary evidence.

This book, however, provides useful contextual data within which archaeological finds can be set. The scene is set in ‘The Development of Sea Power, 1649–1815’,