The Professionalization of Cryptology in Sixteenth-Century Venice

IOANNA IORDANOU

This article examines the evolution of cryptology as a business trait and a distinct state-controlled and -regulated profession in sixteenth-century Venice. It begins by briefly discussing the systematic development of cryptology in the Renaissance. Following an examination of the amateur use of codes and ciphers by members of the Venetian merchant and ruling classes, and subsequently by members of all layers of Venetian society, the article moves on to discuss the professionalization of cryptology in sixteenth-century Venice. This was premised on specialist skills formation, a shared professional identity, and an emerging professional ethos. The article explores a potential link between the amateur use of cryptology, especially as it had been instigated by merchants in the form of merchant-style codes, and its professional use by the Venetian authorities. It also adds the profession of the *cifrista*—the professional cipher secretary—to the list of more "conventional" early modern professions.

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In one of the most widely cited scholarly works on the historical development of cryptology, David Kahn argued that the "growth of cryptology resulted directly from the flowering of modern diplomacy."[1] While this contention remains the conventional wisdom, it does not adequately explain the distinctive course that professional cryptology took in a commercial and maritime empire like Renaissance Venice. There, the ruling class, which was actively engaged in international trade,[2] did not see a distinction between trade and politics, as political affairs could affect one's business and livelihood, and commercial pursuits could have diplomatic implications.[3] For this reason, protecting vital information though code-words and symbols was not an uncommon commercial practice. For example, Andrea Barbarigo, a renowned Venetian merchant, by the 1430s was using his own cipher for his confidential communication with his business agent in the Levant.[4] In the early 1500s, Andrea Gritti, a young merchant and future doge of Venice, used commercial jargon as a code to send intelligence to his motherland from Constantinople.[5] The Venetians even coined a term for this encoding approach: *lettere mercantile* (mercantile letters).[6] The same Venetian ruling class that invented amateur ways of concealing trade secrets through mercantile letters prompted the development of a full-fledged, state-controlled and -regulated professional cryptology department housed in the Doge's Palace. What was the link between such commercial encryption practices and the professionalization of cryptology in sixteenth-century Venice?

In Renaissance Venice, business—that is trade and industry—and statecraft were vaguely intertwined. Historical academic literature has overwhelmingly ignored any commercial origins of the development of cryptology, focusing primarily on the gradual increase in complexity and sophistication of ciphers, as they developed through the centuries. Indeed, in more than one thousand pages of his path-breaking book—a work of gargantuan extent, both in chronology and geography—David Kahn offers a sweeping review of cryptology's historical

1. Kahn, *Codebreakers*, 108.

2. On Venetian patricians, see Romano, *Patricians and Popolani*, and bibliography therein.

3. Sardella, *Nouvelles et spéculations*, 90.

4. The cipher is in *Archivio Grimani-Barbarigo*, busta 4, Reg. 1, c.158 r., Archivio di Stato, Venice (hereafter ASV). See also Lane, *I mercanti di Venezia*, Illustration 2. On Barbarigo, see Lane, *Andrea Barbarigo*.

5. Davis, "Shipping and Spying." A code is a method of altering the meaning of a message, while a cipher is a technique that hides the message by changing the characters in which it is presented. See Kahn, *Codebreakers*, xiii–xv.

6. See, for example, *Consiglio dei Dieci* (hereafter CX), *Deliberazioni Secrete*, Reg. 9, cc.126 v.–127 r. (January 26, 1571), ASV. All dates have been adjusted to the Gregorian calendar.

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development from ancient times to the present.[7] In his discussion of the evolution of early modern cryptology, however, Kahn overlooks a significant development of that period: the progressive transformation of the discipline from an intellectual activity of a handful of gifted individuals in the employ of Italian and European princes into a profession premised on specialist skills through professional training.

More specifically, Kahn's synthetic account of cryptology in the early modern era centers on three distinct characteristics: (1) cryptology as an emblem of the intellectual prowess of spirited philomaths and polymaths who operated within the broader context of erudition that pervaded the Renaissance period; (2) cryptology as an instrument of statecraft, used by governments to protect *arcana imperii* (secrets of the state); and (3) the gradual sophistication of early modern ciphers. Undoubtedly, the instrumentalization of cryptology for political imperatives intensified after the fifteenth century in a period that saw the systematic development of embassies and, by extension, diplomacy.[8] It is not accidental, therefore, that scholars who explored the development of cryptology in that period, on whose work Kahn built his own narrative, focused on these particular aspects of cryptology.[9] A fresh attempt to explore extant archival material, however, reveals an overlooked facet of the evolution of cryptology: its systematic development into a distinct professional service.

Combining an analysis of early modern archival material with modern sociological concepts and theorizations of professionalization and secrecy, and piecing together scattered information from the most renowned historical works on the subject, this article revisits the history of early modern cryptology and reveals its professionalization, that is, its systematic organization and development into a distinct professional service based on "cognitive specialization."[10] This service was annexed to the Venetian ducal chancery, the civil service organization that housed the Venetian state bureaucracy, and oversaw several cryptology functions, including cryptography, cryptanalysis, deciphering, and, astonishingly, the development of

7. Kahn, *Codebreakers*.

8. On the development of diplomacy in the late medieval and early modern period, see the classic work of Mattingly, *Renaissance Diplomacy*. For recent revisionist debates, see Lazzarini, *Communication and Conflict*; Lazzarini, "Renaissance Diplomacy"; Frigo, "'Small States' and Diplomacy"; Senatore, "*Uno Mundo de Carta*."

9. Among the most comprehensive works on early modern cryptology are Cecchetti, "Scritture occulte"; Meister, *Die Geheimschrift*; Kahn, *Codebreakers*, especially Chapters 3 and 4.

10. Larson, *Rise of Professionalism*, 3.

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a well-defined training and development regime for state cryptologists.[11] As such, this article adds the profession of the *cifrista*—the professional cipher secretary—to the list of more "conventional" early modern professions, such as those of priest, lawyer, doctor, secretary, notary, accountant, and, of course, merchant.[12]

To this date, aside from a few scholarly accounts that reveal only certain aspects of its history,[13] no historian has attempted to reconstruct the full picture of the Venetian cryptology service. In consequence, understanding of the systematic professionalization of cryptology by the Venetian authorities remains limited. In addressing this lacuna, this article reveals three idiosyncratic characteristics that distinguish this service from some of the more rudimentary cryptologic pursuits of other early modern states. The first characteristic was the gradual transformation of cryptology from an intellectual pursuit into a state-controlled and -regulated profession that was grounded on *ammaestar*,[14] that is, to "achieve mastery of" the "difficult and most significant science" of cryptology through professional training and development.[15] It was also based on mainstream human resource management practices, such as talent acquisition, recruitment and selection, and performance appraisals, among others. The second characteristic was the social construction of the professional identity of the cifrista, which was premised on intergenerational nepotism and professional isolationism. The third was the development of an internal school of professional cryptology for the professional training of specialist cryptologists and all other state secretaries, whose professional responsibilities included enciphering and deciphering official documents.

The article's main contention is that it is this third aspect, in combination with a nascent professional identity, and even an incipient professional ethos and philosophy, that signifies the emergence of a stand-alone profession of cryptology in early modern Venice.

11. The historiography on the Venetian ducal chancery is vast. For an overview, see De Vivo, "Ordering the Archive"; De Vivo "Coeur de l'Etat." For a fresh historiographical perspective on chanceries in late medieval and early modern Italy, see De Vivo, Guidi, and Silvestri, *Archivi e archivisti*.

12. On "learned professions" and professionalization in the early modern period, see O'Day, *Professions in Early Modern England*, 18–43. On professions in Renaissance Italy, see Biow, *Doctors, Ambassadors, Secretaries*. On professional notaries in early modern Venice, see Pedanis Fabris, *"Veneta Auctoritate Notarius."* On the emergence of professional accounting, see Goldthwaite, "Practice and Culture of Accounting." The bibliography on professional merchants in the late medieval and early modern period is vast. For emblematic case studies, see Lane, *Andrea Barbarigo*; Lane, *I mercanti di Venezia*.

13. See, for example, Cecchetti, "Scritture occulte"; Pasini, "Delle scritture"; Preto, *I servizi segreti*, 268–279.

14. CX, *Deliberazioni Secrete*, Reg. 19, cc. 18 v.–19 r. (July 30, 1636), ASV.

15. Ibid., Reg. 14, c. 127 r. (August 31, 1605), ASV.

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This was clearly distinct from the widely diffused yet amateur use of codes and ciphers by members of all layers of Venetian society. The idiosyncrasy of this amateur approach was in the use of commercial jargon, as it was pioneered by Venetian merchants to protect secret communication. The article explores the suggestion that this amateur use of codes as a mercantile custom, in combination with sixteenth-century political and economic value judgements, may have influenced, or even conditioned, the gradual professionalization of cryptology in sixteenth-century Venice.

The article starts by briefly introducing the broader sociopolitical context in which the professional use of ciphers proliferated. It then examines the amateur use of codes and ciphers primarily by members of the Venetian ruling class who were actively involved in international trade, and by members of all layers of Venetian society who, schooled in the city's mercantile traditions, used commercial jargon to camouflage clandestine communication. Subsequently, the article discusses the systematic evolution and organization of a distinct cryptology department, created, managed, and protected by the Venetian government. It concludes with some reflections on a potential link between the amateur use of ciphers and the professionalization of cryptology in sixteenth-century Venice.

The Professional Use of Ciphers in the Renaissance

The proliferation of the professional use of codes and ciphers started in the long quattrocento, which saw the methodical systemization of diplomatic activities, both in Italy and in Europe.[16] The gradual intellectualization of cryptology in that period, which steadily made its way through the printing press, was instrumental in this proliferation. More specifically, the publication of several cryptologic treatises and manuals penned by Renaissance polymaths, including Leon Battista Alberti's *De componendis cifris* (1466) and Johannes Trithemius's *Polygraphia* (1518), influenced significantly the transformation of cryptology from an esoteric practice to an applied *scientia*.[17] Of great importance in this process was the publication of Cicco Simonetta's (1474) *Regulae extraendis litteras zifferatas sive exempio* (*Rules for Deciphering Enciphered Documents Without a Key*).[18] Simonetta, a longstanding state secretary in the duchy of Milan, one of the most meticulously informed cities in the late medieval period, was one of

16. Lazzarini, *Communication and Conflict*.
17. On cryptology as an esoteric practice, see Jütte, *Age of Secrecy*.
18. See Perret, "Les règles."

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the first professional cryptologist employed in state administration.[19] Especially under Francesco Sforza, "the *signore di novelle* [master of news] par excellence,"[20] an efficient network of intelligencers and diplomats contributed to a steady stream of information for political and diplomatic purposes.[21] For this reason, Milan pioneered the systematic use of clandestine modes of communication, on which overseas diplomatic missions were based.[22] Simonetta was primarily responsible for the Milanese secret chancery in the second half of the fifteenth century.[23] Likely under his direction, the numerous ciphers of the Milanese secret chancery were systematically ordered and classified for the benefit of diplomats and military governors of the Sforza.[24]

Sophisticated ciphers for diplomatic purposes were in use in the Italian peninsula from the beginning of the fifteenth century. By 1401 the dispatches from Mantua to Mantuan Chancellor Simone de Crema were encrypted through multiple cipher representations, rendering the task of codebreaking extremely arduous.[25] At the dawn of the sixteenth century, the professional operation of ciphers by specialist operatives was, in a way, formally sanctioned by the emergence of the term cifrista. The term seems to have been created in Venice,[26] and half a century later it was widely used in Rome, where the Office of Cipher Secretary to the Pontiff was introduced in 1555. The pope's first recorded cipher secretary was Triphon Benicio de Assisi.[27] Still, it was Giovanni and Matteo Argenti, uncle and nephew (who between them served five popes from 1585 to 1605), who lay claim to fame as Rome's most renowned cipher secretaries in that period.[28]

Professional cipher secretaries were employed in several European princes' courts, especially those with vast territorial states. Henry III and Henry IV of France found their expert code-breaker in the mathematician and lawyer François Viète de la Bigotière (1540–1603).[29] Spain's systemization of the professional use of ciphers took place

19. On Simonetta and cryptologists of the Milanese chancery, see Cerioni, *La diplomazia Sforzesca*, Vol. 1. On state secretaries in early modern Europe, see the essays in Dover, *Secretaries and Statecraft*.

20. Lazzarini, *Communication and Conflict*, 47.

21. Senatore, *"Uno Mundo de Carta."*

22. Ibid.

23. Cerioni, *La diplomazia Sforzesca*, Vol. 1, xviii–xix.

24. Ibid., ix–xx.

25. Kahn, *Codebreakers*, 107. On diplomacy in late medieval Mantua, see Frigo, "'Small States' and Diplomacy."

26. Preto, *I servizi segreti*, 268–269.

27. Mollin, *Guide to Secrecy*, 58.

28. On Matteo Argenti, see Meister, *Die Geheimschrift*, 148–170. On Matteo Argenti's codes, see Villain-Gandossi, "Les dépêches chiffrées."

29. Devos, *Les chiffres*, 29–30.

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primarily under the reign of Philip II. Coded diplomatic correspondence was managed in the *Despacho Universal* (Universal Office), a specialist branch of the *Secreteria de Stato* (State Administration).[30] Eventually, the emergence of Black Chambers—the secret rooms where professional cryptologic pursuits took place—from the seventeenth century onward is suggestive of the systematization of the professional use of ciphers.[31]

While historiography has explored the professional use of ciphers in the early modern period, the evolution of the discipline from an intellectual activity to a stand-alone profession has received less attention. Two reasons can account for this. First is the conventional portrayal of early modern bureaucracies as unsystematic and lacking professional specialization.[32] However, to overwhelmingly dismiss early modern state bureaucracies as "unsystematic" because they did not display the high levels of rationality, maturity, and sophistication of contemporary ones entails discounting *tout court* the value of an historical understanding of more distant administrative practices on which nascent state bureaucracies were premised throughout the early modern period.

Second, early modern codes and ciphers have been deemed too unsophisticated by contemporary standards to merit comprehensive study by historians.[33] This contention, however, fails to account for the systematic proliferation of Black Chambers in several areas of central Europe from the seventeenth century onward or the widespread diffusion of cryptology in eighteenth-century political practices.[34] Surely, cryptology has historical origins and, in order to investigate them, it is necessary to zoom out of the narrow focus on the level of complexity (or simplicity) of early modern codes and ciphers in order to explore the political and wider socioeconomic contexts in which they developed. In the following section, I start from the latter in order to understand the socioeconomic landscape in which clandestine written communication proliferated in that period. For Venice, one of the most potent commercial powers in the early modern world, the use of codes and ciphers seems to have been instigated, even sanctioned, by merchants, primarily to conceal information that influenced their business affairs.

30. On Spanish ciphered correspondence, see Allaire, "Le Décodage." On the ciphers of Philip II, see Devos, *Les chiffres*. For a general overview, see Couto, "Spying in the Ottoman Empire," 296–299.

31. The history of Black Chambers is substantial. Among others, see Vaillé, *Le cabinet noir*; De Leeuw, "Black Chamber."

32. See, for example, Carter, *Western European Powers*.

33. See, for example, Buonafalce, "Bellaso's Reciprocal Ciphers."

34. De Leeuw, "Cryptology," 331–332.

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The Amateur Use of Codes and Ciphers in Early Modern Venice

As scattered archival information suggests, the use of encryption in the written communication of businessmen such as merchants, bankers, and their agents was not uncommon in the medieval and early modern period. Tomaso Spinelli, for example, the famed Florentine banker and patron of Renaissance architecture, used a cipher to communicate business instructions to his brother,[35] as did Venetian merchant Andrea Barbarigo with his business agent Andrea Dolcetto.[36] Undeniably, the codes and ciphers used by these individuals were quite rudimentary in nature, yet they are indicative of the need to protect information that was vital to their business affairs. Cryptographic manuals published in that period assert the significance of cryptography for merchants, reinforcing the idea that encryption was a significant mercantile custom. *Opus novum*, one of the earliest cryptographic treatises to be published (1526), was, according to its author, a book for merchants and anyone else who sought ancient and contemporary encryption techniques.[37] In it, Jacopo Silvestri proposed methods that could be easily deployed by merchants and any men or women who wished to keep their letters, books, and accounts secret.[38]

Merchants' use of codes and ciphers was not only intended to protect trade secrets but also to undergird their diplomatic activities. Starting in the medieval period, it was customary for Italian merchants to be directly or indirectly involved in diplomatic and political affairs.[39] Genoa's idiosyncrasy, for example, as a major commercial center with no territorial expansion, meant that diplomatic negotiations were conducted by mercantile and economic agents, while official legates were solicited only for the most formal of occasions.[40] Early diplomatic studies attributed Italian merchants' involvement with diplomacy to their dexterity in the art of negotiation.[41] Nevertheless, the robust research tradition in Italian commercial networks has overlooked the

35. Jacks and Caferro, *Spinelli of Florence*.
36. Lane, *Andrea Barbarigo*.
37. Silvestri, *Opus novum*, 1526.
38. Ibid., fol. 13 r.
39. On the enmeshment of the commercial and diplomatic activities of Italian merchants in the late medieval period, see Lazzarini, "I circuiti mercantili." On Italy and the Iberian Peninsula, see the essays in Tanzini and Tognetti, *Il governo dell'economia*. On the informative nature of merchants' written communication, see Trivellato, "Merchants' Letters."
40. Shaw, "Genoa."
41. See the classic work of Von Reumont, *Della diplomazia*.

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diplomatic role of merchants.[42] Thus, further research is needed to shed more light on mercantile diplomatic activities in the medieval and early modern periods. Even so, Italian merchants' undisputed diplomatic interventions were so prominent that, as Isabella Lazzarini aptly put it, "If there was a lack of ambassadors, there was no lack of merchants."[43]

In the case of Venice, a major commercial entrepôt with territorial expansion over several areas of Northern Italy, the Adriatic, and the islands of the Levant, this contention holds great merit. Venice's territorial expansion necessitated the formal organization of the state's diplomatic representation by means of resident ambassadors.[44] Still, there were times when ambassadors, or the lack of them, called for the diplomatic support of merchants.[45] The political tribulations of the late quattrocento, for example, especially in terms of the tumultuous Ottoman–Venetian relations, meant that Venice had to rely on its large merchant community in Constantinople for both diplomatic representation and intelligence gathering.[46] In the late 1490s, in particular, Venice was left without a formal envoy in the Ottoman capital, as the Venetian ambassador had been expelled from the city, having been discovered to spy for the Spanish.[47] At that point in time, the young merchant and future doge of Venice, Andrea Gritti, took the reins of both commercial and diplomatic negotiations. In 1497 he convinced the sultan to overturn the embargo on grain export that the Ottomans had imposed on Italian merchants in Constantinople.[48] In 1503 he also successfully negotiated the final details of a peace treaty between Venice and the Ottoman Empire.[49] His missives to the motherland were overflowing with intelligence on the size and moves of the Ottoman fleet. To divert suspicion, he coded his dispatches in commercial jargon and presented them as business communication. Once he sent a letter informing the authorities that new products were arriving in Venice from sea and land, meaning that the Ottomans were preparing to attack with their navy and army.[50]

42. See, for example, Sapori, *Studi di storia economica*; Melis, *I mercanti italiani*.

43. Lazzarini, *Communication and Conflict*, 40.

44. On Venetian ambassadors, see Queller, *Office of Ambassador*.

45. See, for example, Luzzatto, *Studi di storia economica*; Lane, *I mercanti di Venezia*.

46. On Venice's merchant community in Constantinople, see Dursteler, *Venetians in Constantinople*.

47. Davis, "Shipping and Spying."

48. Sanudo, *I diarii*, vol. I, 508.

49. Lane, *Venice*, 270.

50. Davis, "Shipping and Spying," 101–102.

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The technique of substituting specific words with inconspicuous code-words was a widely popular method of encoding called *in parabula* (in parable) or the Cicero method.[51] According to an unpublished cryptologic treatise that the Council of Ten adopted as a training manual for their professional cryptologists, the specific use of mercantile jargon that appeared innocuous to the unsuspected reader had been in use for centuries.[52] The Venetians, who were adept at camouflaging information of political nature with commercial jargon, simply termed this approach *lettere mercantili* (mercantile letters). So extensive was the use of this cryptographic method among Venetian merchants that the renowned papal cipher secretary Matteo Argenti went as far as to attribute its development and diffusion to the Venetians who,[53] as seasoned travelers and dealers in both merchandise and news, had developed a flair for inventiveness in secret communication.

Eventually the Cicero method became widely used not only in Venice but also in other parts of Europe, including England and France.[54] Writing from France, a fervent user of the Cicero method was the famed Dalmatian printer and publisher Bonino di Boninis. Between 1494 and 1554, during the Italian Wars, Di Boninis acted as a spy for the Venetian authorities and worked in close collaboration with the Venetian ambassador in France.[55] While stationed there, he sent several encoded missives in the style of mercantile letters to Venice reporting on French affairs. One letter informed the authorities of "prices and dispatches of books" from France, which, in reality, meant news from that country.[56]

Di Boninis's case suggests that a rather simple encoding technique that was primarily used by the merchant class had started to spill over to other layers of Venetian society, including foreigners who were either Venetian subjects or others living or trading within the Venetian state. The authorities took advantage of these people's expertise and, on several occasions, gave them clandestine missions, as in the well-documented case of the Sephardic Jewish merchant Hayyim Saruk, from Thessaloniki.[57] In 1571, during an ongoing war between Venice

51. On the history of the in parabula method, see Couto, "Spying in the Ottoman Empire," 292–294; Strasser, *Lingua universalis*, 23–25.

52. *Inquisitori di Stato*, busta 1269, fols. 25 v.–26 r., ASV.

53. Meister, *Die Geheimschrift*, 92.

54. On instances of the Cicero method in English letters, see Daybell, *Material Letter*, 152–158.

55. See, for example, *Capi del Consiglio dei Dieci* (hereafter CCX), *Dispacci Ambasciatori*, busta 9 (February 2, 1501), ASV; ibid., (April 30, 1501). On Bonino di Boninis as an informer of the Venetians, see Dalla Santa, "Il tipografo."

56. Preto, *I servizi segreti*, 269.

57. On Saruk, see Arbel, *Trading Nations*, especially Chapters 6 and 7.

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and the Ottoman Empire, the Venetian authorities appointed Saruk to travel to Constantinople to spy on "the affairs, designs and military equipment of the Turks."[58] For this purpose, he was asked to create a book of code-words, in which he coded the Ottomans as "drugs," people as "money," and, quite sardonically, the pope as a "rabbi."[59] His compensation for this year-long mission was 500 ducats.[60] This is a staggering sum when considering that more than half a century later, a professional cryptanalyst's starting yearly salary, which had remained stagnant for nearly a century, was roughly 50 ducats.[61]

Although from different cultural and social backgrounds, Gritti, a genuine Venetian nobleman and merchant, and Di Boninis and Saruk, two well-to-do foreigners who conducted their business affairs in the Republic, were proficient in the use of merchant-style codes. The Cicero method, however, was not reserved only for the noble and the prosperous. By the sixteenth century it had diffused to the lowest echelons of Venetian society, which comprised the mass of skilled and unskilled manual laborers.[62] It seems that in a city where pretty much everyone had a service to sell, modes of covert communication were used by members of all strata of Venetian society, especially as part of espionage services rendered to the Venetian government in exchange for benefits.[63] Criminals and convicts were a consistent pool from which the Venetian authorities drew information gatherers and amateur spies, primarily on account of their audacious personalities,[64] their intent to have their punishment revoked, or even simply because the government could coerce them into action.

One striking example of a banished felon turned secret agent is Giovanni Antonio Barata. In the early 1570s, at the outbreak of war with the Ottomans, the Venetian Republic was desperate for information on military developments in the Ottoman capital. Barata agreed to have his banishment revoked in exchange for traveling to Constantinople to spy on the Turks. Importantly, he was ordered to report back to Venice by means of mercantile letters. For this reason, he created and presented to the authorities a code-book of terms commonly

58. CX, *Deliberazioni Secrete*, filza 15 (November 23, 1571, and December 30, 1571), ASV.

59. Ibid.

60. Ibid.; CX, *Deliberazioni Secrete*, Reg. 9, c. 189 v. (November 23, 1571), ASV.

61. CX, *Deliberazioni Secrete*, Reg. 19, c. 18 r.–v. (July 14, 1636), ASV.

62. On the Venetian laboring classes, see Romano, *Patricians and Popolani*.

63. See, for example, Iordanou, "What News on the Rialto?"

64. Preto, *I servizi segreti*, 247. On amateur agents and "diplomacy from below" in the early modern period, see articles in Van Gelder and Krstić, "Cross-confessional Diplomacy."

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used by merchants.[65] Conscious of his hazardous mission, the Venetian authorities took care of his wife and young children while he was on duty, relocating them from Milan to the Venetian city of Bergamo, and providing them with a monthly stipend that turned into a permanent yearly pension for his widow when, nearly one year later, Barata was captured and decapitated in Constantinople.[66]

As noted, the users of the Cicero method came from different cultural and socioeconomic backgrounds. From Andrea Barbarigo and Andrea Gritti in the fifteenth century, to Hayyim Saruk and Antonio Barata in the sixteenth century, it seems that, by the late 1500s, simple modes of encryption, through the substitution of specific words with inconspicuous code-words or symbols, had been diffused to all layers of Venetian society and used by people from all walks of life. This diffusion is manifest in an array of contemporaneous publications, ranging from cheap-printed pamphlets and writing manuals to mathematically grounded cryptologic treatises.[67] In 1546, for instance, the charlatan Leonardo Furlano published a pamphlet on writing in cipher. His intended "readership," according to his work's title, comprised every faithful Christian, including any illiterate individual who could have the work recited at home or in the workshop.[68]

It is important to emphasize here that the use of merchant-style codes was a basic and rather amateur mode of encryption. The choice of commercial jargon, especially in a commercial state like Venice, does not seem to be fortuitous. Although the absence of surviving records does not allow for an accurate reconstruction of the amateur use of cryptology,[69] the documented deployment of such codes primarily by merchants, the undisputed mention of code-writing as an important mercantile tool in contemporaneous cryptologic and writing manuals, and even the use of the term lettere mercantili by the Venetian authorities suggest that in an amateur fashion, cryptology had become a mercantile custom in Venice.

65. CCX, *Lettere Secrete*, filza 17 (February 7, 1571), ASV; CX, *Deliberazioni Secrete*, Reg. 9, cc.126 v.–127 r. (January 26, 1571), ASV.

66. CX, *Deliberazioni Secrete*, Reg. 9, c. 198r. (December1571), ASV.

67. For examples of contemporaneous writing manuals that referred to ciphers and were published in Venice, see Furlano, *Opera noua*; Capaccio, *Il secretario*. For such publications published in other parts of Italy, see, for instance, Fedeli Piccolomini, *Della nuoua inuentione*; Palatino, *Libro nuovo*. I am grateful to Alex Bamji and Rosa Salzberg for sharing their relevant knowledge on this subject with me.

68. Salzberg, "Word on the Street," 341.

69. The use of codes and ciphers by merchants and tradesmen is, to this day, largely unexplored. For Venice specifically, this can be attributed to the limited number of surviving merchants' letters in the Venetian state archives. See Mackenney, "Letters from the Venetian Archive."

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Nevertheless, aside from amateur encoding by means of commercial jargon, sixteenth-century Venetians were idiosyncratic in their development of a full-fledged, state-controlled and -regulated professional cryptology department, housed in the Doge's Palace, and dedicated to the cryptography and cryptanalysis of sophisticated substitution ciphers. To this day, no systematic attempt has been made to investigate this process of professionalization of Venetian cryptology. Exploring it against the context in which it evolved is a long overdue task that might enable historians to reconsider the distinctive course that professional cryptology took in sixteenth-century Venice. Before proceeding to this exploration, a brief discussion of the historical development of professionalization is in order.

Professionalization in the Early Modern Era

Professionalization has been defined as the social process of organization of a trade or occupation based on "cognitive specialization."[70] This is distinct from professionalism, a disciplinary device that "allows for control at a distance through the construction of 'appropriate' work identities and conducts."[71] In its fully developed form, professionalization has been analyzed and discussed by scholars as an outcome of the industrial and urban demands of the nineteenth and twentieth centuries.[72] The lack of institutional frameworks—aside from the church or the university—within which professions developed in the early modern era can account for sociologists' attenuation of that period when discussing professionalization.[73] As an emergent and dynamic phenomenon, though, professionalization—just like work organization and management—was developing long before linguistic terms were coined to describe it, born out of the wider sociopolitical, intellectual, even religious contexts of the early modern period.[74]

In both qualitative and quantitative studies, sociologists and historians have produced a list of the key characteristics of a profession. These include a sense of commitment; an appeal to expertise; reliance on both theoretical knowledge and practical skills; a professional ethic; internal control and discipline; professional training and development; organization of work; and, stemming from the latter,

70. Larson, *Rise of Professionalism*, 3.

71. Fournier, "Appeal to 'Professionalism,'" 281.

72. Carr-Sanders, *Professions*; Larson, *Rise of Professionalism*; O'Day, *Professions in Early Modern England*, 7.

73. Biow, *Doctors*, *Ambassadors, Secretaries*, 11.

74. O'Day, *Professions in Early Modern England*, 14. See also Malatesta, "Italian Professions."

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a certain degree of autonomy in the workplace and a perceived esprit de corps.[75] Particular emphasis among these characteristics has been cast on the "rise of a system of formal education" that "recognized and superseded apprenticeship."[76] It is important to emphasize here that while several of these traits can be traced back to some early modern professions, they stem, primarily, from nineteenth-century professions, especially in the Anglosphere,[77] and are not entirely representative of professional traits in the preindustrial era.[78]

Studies on early modern professions have focused on two distinct categories: histories of individual professions—primarily the "learned" professions, such as the clergy and lawyers—and histories of societies, again with a focus on the learned professions.[79] Especially in the sixteenth and seventeenth centuries, the word "profession" was associated with a declaration of service—what someone professed to offer—rather a distinct form of work organization. However, as certain occupations gradually claimed knowledge, expertise, and monopoly, a tacit or more explicit discourse on what exactly was professed developed.[80] Sociologist Megali Larson identified two primary characteristics of early modern professions: the inextricable link to social stratification and a "liberal education" based on a combination of classical schooling and practical skills.[81]

More specifically, cognitive specialization was almost exclusively reserved for the literate elites on whom specialists relied for their professional existence.[82] In this respect, the learned professions entailed establishment and social standing.[83] This trait was evident in the rise of the medical profession,[84] but also professions that rendered services to the state and the church and were predominantly performed by an educated "elite," as opposed to the mass of laborers. As I show, the Venetian cipher secretaries were themselves an "elite" of servile functionaries, emanating from the social class of the *cittadini* (citizens), the "secondary elite" in the Venetian social hierarchy,[85] placed immediately under the patriciate. The distinct characteristic

75. O'Day, *Professions in Early Modern England*, 4.
76. Larson, *Rise of Professionalism*, 4.
77. O'Day, *Professions in Early Modern England*, 4.
78. Biow, *Doctors*, *Ambassadors, Secretaries,* xii.
79. See O'Day, *Professions in Early Modern England*, 9–11, and bibliography therein.
80. Ibid., 13.
81. Larson, *Rise of Professionalism*, 4.
82. Carr-Sanders, *Professions*.
83. O'Day, *Professions in Early Modern England*.
84. See Freidson, *Profession of Medicine*.
85. Chambers and Pullan, *Venice*, 261. On Venetian citizens, see Grubb, "Elite Citizens"; Bellavitis, *Identitè, marriage, mobilitè sociale*.

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of those educated elites was service and commitment to the state (or the church).[86] This was their raison d'être that complemented their need to make a living.[87]

The Professionalization of Cryptology in Sixteenth-Century Venice

Compared to the composite yet disparate independent espionage networks that most European rulers relied on for intelligence, Venice had created a centrally organized secret service. This service was housed in the Doge's Palace, the headquarters of Venice's political, diplomatic, and intelligence activities, and was overseen by the Council of Ten, the exclusive committee responsible for state security.[88] As part of its covert operations, the Venetian secret service created a full-blown cryptology department that was responsible for the production of ciphers for the secret communication of Venetian authorities with overseas formal representatives, as well as the successful cryptanalysis of the ciphers produced by the chanceries of foreign rulers.

The seed for the gradual professionalization of the Venetian cryptologic service was sown by a single yet significant event: the appointment of Giovanni Soro as Venice's official cipher secretary in 1505.[89] Knowledge of Soro is fragmented and primarily derives from the daily accounts of Marino Sanudo, the astute observer and chronicler of Venice in that period. According to Sanudo, Soro enjoyed a fine reputation as one of Italy's most accomplished cryptanalysts. His remarkable ability to break multilingual ciphers was so great that he enjoyed an unblemished reputation as an extraordinary professional code-maker and code-breaker.[90] So widely known was he that even the pope would frequently send him intercepted letters, in the conviction that only he could crack the codes in which they were written. Soro nearly always obliged.[91] It was most probably due to his numerous accomplishments that Alvise Borghi, his assistant and successor,

86. O'Day called this underlying philosophy "Social Humanism"; *Professions in Early Modern England*, 5.

87. Ibid.

88. On the central organization of Venice's intelligence service, see Iordanou, "What News on the Rialto?" For an overview of early modern Venice's intelligence operations, see Preto, *I servizi segreti*.

89. On Soro, see Kahn, *Codebreakers*, 109.

90. See, for instance, Sanudo, *I Diarii*, vol. 10, 231; ibid., vol. 11, 393. On Venetian diarists and their use of correspondence, see Neerfeld, "*Historia per forma di diaria*"; Infelise, "Merchants' Letters."

91. Sanudo, *I diarii*, vol. 10, 832; ibid., vol. 38, 125; Brown and Hinds, *Calendar of State Papers*, lxxi.

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called him "*padre di questa rarissima virtù*" (father of this rarest of virtues).[92]

Soro served the Venetian Republic for nearly forty years, until his death in 1543.[93] During his career, he broke innumerable enemy ciphers for the Venetians, the Florentines, and the papal court, among others.[94] In 1539 he produced and presented to the Ten a cryptology instruction manual with sections in Italian, Spanish, and French that was deemed by Borghi to be more angelic than human in quality.[95] The Venetian authorities acknowledged his excellence by abundantly compensating him for his services, granting him several pay raises and other benefits throughout his career.[96] A year before he died, in 1542, the government assigned him two assistants.[97] From then on, the Ten kept a minimum of three permanent cipher secretaries on the payroll.

The professionalization of cryptology in sixteenth-century Venice was an emergent, dynamic, and gradual process that began with the formal appointment of Soro's assistants. Thereafter, a line of eminent cryptologists found themselves in the employ of the Council of Ten, working in the *secreto* (secret)—the Venetian Black Chamber—on the top floor of Venice's Ducal Palace. Their work was conducted under strict laws of secrecy, the breach of which was subject to legal sanctions, including the death penalty.[98] When he died, Soro was succeeded by four cipher secretaries: Alvise Borghi, Giambattista de Ludovici, an engineer named Giovanni, and Zuan Francesco Marin,[99] who was already working as a state secretary when he was chosen to join the team of cifristi in 1544.[100]

Marin was the most distinguished of the four recruits. His ascent commenced when he succeeded in cracking an extremely complex Spanish code.[101] During his career, he gradually rose from the ranks of *secretario straordinario* (extraordinary secretary), the entry-level position in a Venetian bureaucrat's career, to a secretary of the Council of Ten.[102] This was the second-highest ranking position in the

92. CX, *Deliberazioni Secrete*, filza 7, n.d. (attributed to the year 1548), ASV.

93. Pasini, "Delle scritture," 302.

94. While it is not clear why Soro was allowed to serve other courts, it is probable that the Venetian authorities did not discourage him for diplomatic reasons.

95. Preto, *I servizi segreti*, 277.

96. Sanudo, *I diarii*, vol. 11, 232. See also Preto, *I servizi segreti*, 141.

97. Kahn, *Codebreakers*, 109.

98. See, for instance, CX, *Deliberazioni Secrete*, Reg. 11, c.158 r.–v. (May 23, 1578), ASV.

99. Brown and Hinds, lxxi.

100. Manoscritti Italiani (Mss. It.) Classe (cl.) VII 1667 (8459), *Tabele nominative e chronologiche dei Segretari della Cancelleria Ducale*, folio (fol.) 6 r, Biblioteca Nazionale Marciana (BNM).

101. Brown and Hinds, lxxi.

102. Mss. It. cl. VII 1667 (8459), fol. 6 r., BNM

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hierarchy of the Venetian Ducal Chancery, after the post of *cancellier grande* (great chancellor). The latter was the most important office open to members of the cittadini class, who could never aspire to prohibitively high posts reserved for patricians, such as the position of the doge.[103] Marin occupied the post of cifrista for nearly thirty years, during which time he made a name for himself as one of Venice's most distinguished cryptanalysts, breaking countless ciphers in different languages and helping to forestall several state threats.[104]

Professional Training and Development

In the early 1570s, Venice suffered a heavy blow by losing Cyprus, one of its most prized strongholds in the Mediterranean, to the Ottomans, following earlier heavy losses of its territories in the Peloponnese.[105] Moreover, between 1575 and 1577, a devastating plague killed one-quarter to one-third of its population.[106] Most probably for contingency purposes, the Ten deemed it necessary to train and develop their professional cryptologists. By that point, the Venetian cryptology service that had been in operation for nearly three decades had reached a state of maturation that allowed it to display distinct professionalization traits, such as specialist skills formation through systematic training. The Ten named Marin the new recruits' trainer because of his natural aptitude to cryptology and his tireless study of the subject.[107] Marin, therefore, became the first known formal trainer in the Venetian school of professional cryptology, an in-house training and development regime for novice professional cryptologists. His appointment as the school's official instructor categorically refutes contemporary scholarly contentions that no systematic "in-house" training and development for state cryptologists existed prior to the eighteenth century.[108] Moreover, it broadens and deepens current debates in business history that portray systemized training and professional skills formation as a nineteenth-century phenomenon.[109]

As they were practically the custodians of the state's most private secrets, the Venetian cipher secretaries underwent a rigorous program of training and development. This started with an entrance examination

103. On the *cancellier grande*, see Trebbi, "La cancelleria veneta."

104. CX, *Deliberazioni Secrete*, Reg. 11, c. 90v. (March 21,1576), ASV.

105. Knapton, "Tra dominante e dominio," 222–223.

106. On the 1575–1577 plague in Venice, see Preto, *Peste e società*. On a reevaluation of the impact of the plague on the Venetian society and economy, see Iordanou, "Pestilence, Poverty, and Provision."

107. CX, *Deliberazioni Secrete*, Reg. 11, cc. 77 v.–78 r. (January 25, 1576), ASV.

108. Strasser, *Lingua Universalis*, 66, 249.

109. Larson, *Rise of Professionalism*; Thelen, "Skill Formation."

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to determine their aptitude to codebreaking. After passing the examination, the cipher secretaries would receive instruction in Latin and other languages that were vital for the cryptologist's trade, as well as rhetoric, grammar, and calligraphy. Importantly, they were expected to study the works of the forefathers of cryptology, including those of Alberti, Trithemius, and Giambattista Della Porta.[110] Their probationary period ended when they passed a final, rigorous examination, in which they were expected to break a complex cipher without a key.[111] This achievement was compensated with a salary increase from 4 to a maximum of 10 ducats monthly.[112] The Ten emphasized that training was vital, as the end goal was not simply the ability to encipher, decipher, and break unknown codes but also the cultivation of deep theoretical and practical knowledge of the science of cryptology.[113]

Marin did not live long enough to complete his job of training the next generation of Venetian cryptologists. He died in 1578, leaving the authorities at a loss as to how they could fill this intellectual and professional vacuum, since most of his trainees were too inexperienced to take up his role.[114] Given the lack of a suitable replacement, the Ten decreed that what Marin was able to teach *con la sua voce* (orally) while still in life, he could do *con la sua scrittura* (through his writings) posthumously. For this reason, the Heads of the Ten ordered that Marin's voluminous writings be consigned to the state, indexed, and deposited in a separate chest within their office, hermetically sealed with a key to be kept by the Ten. The documents would be made available for consultation to the novice cipher secretaries, who were instructed to pay particular attention to the scriptures relating to breaking ciphers. The cifristi were granted permission to make copies of them in order to study them at their leisure at home. Failure to keep these copies confidential entailed severe sanctions, including the death penalty. For this reason, they were to maintain an inventory of their copies and to store it in a designated repository, where all relevant state ciphers were kept.[115]

This autodidactic mode of training and professional development was deemed sufficient for Marin's team of cryptologists. However, twenty years later, when a fresh intake of recruits entered the Venetian cryptology department, a new instructor was sought. Extant documents do not reveal why it took two decades to find a new trainer.

110. Preto, *I servizi segreti*, 271.

111. CX, *Deliberazioni Secrete*, Reg. 11, cc. 77 v.–78 v. (January 25, 1576), ASV.

112. Ibid., Reg. 14, c. 127 r.–v. (August 31, 1605), ASV; ibid., Reg. 15, cc. 16 v.–17 r. (October 24, 1607), ASV.

113. Ibid., Reg. 19, c. 18 r.–v. (July 14, 1636), ASV.

114. Ibid., Reg. 11, c. 158 r.–v. (May 23, 1578), ASV.

115. Ibid.

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As the trainer was appointed concurrently with the intake of new recruits, I hypothesize that Marin's initial and posthumous training regime was deemed sufficient for his cohort of trainees but inadequate for the new entrants. It is clear that the trainer was internally recruited and that it took two decades to develop as an instructor.

This new instructor was the Venetian cryptologist Girolamo Franceschi, who had initially been recruited as a prodigy because of an innovative cipher that he had invented, which was deemed impossible to crack without a key.[116] In 1596, twenty years into his service, he was appointed the trainer of the next generation of Venetian cryptologists. Among his nominated trainees was Piero Amadi, a state secretary who had displayed a natural adeptness at ciphers.[117] Piero was the son of Agostino Amadi, a Venetian citizen who in 1588 wrote a detailed cryptology manual titled *Delle Ziffre* (*On Ciphers*) which still remains in the Venetian State Archives and is emblematic of the intellectual superiority of Venetian cryptologists.[118] In it, Amadi presented myriad ways for the production of ciphers in any language imaginable, including Greek, Arabic, Latin, and even the language of the devil, for which he provided practical examples.[119] He also detailed numerous deciphering techniques and several recipes for the production of invisible ink. After Amadi's death, his wife consigned the manuscript to the Ten, who were so impressed with its level of erudition that they adopted it as a training manual for their cryptologists, "so that our young secretaries, who wish to be employed in such a noble profession in our service, can be instructed and trained."[120] The delicate and critical nature of the book's content is most probably the reason why it never found its way into print.

In compensation for this work, the Ten offered Amadi's two sons two opportunities: a monthly pension of 10 ducats for life to recompense for the poverty in which the family had been reduced after their father's death;[121] and employment in the Venetian chancery after they reached the age of fifteen, when a vacancy for each son would become available. It was also decided that they would not sit for the customary entrance examination for Senate secretaries. Instead, they would take the specialist entrance examination for aspiring cipher secretaries, in the hope that at least one of them had inherited their father's natural aptitude to ciphers.[122]

116. Ibid., c. 87 r. (February 29, 1576), ASV.
117. Ibid., Reg. 14, c. 7 r.–v. (September 9, 1596), ASV.
118. *Inquisitori di Stato*, busta 1269, ASV.
119. Ibid., c. 35 v., ASV.
120. CX, *Deliberazioni Secrete*, Reg. 13, cc. 48 r.–49 r. (March 10, 1588), ASV.
121. Ibid., c. 49 r.–v. (March 16, 1588), ASV.
122. Ibid, cc. 48 r.–49 r. (March 10, 1588), ASV.

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The selection and recruitment of new cifristi suggests intergenerational nepotism, that is, reserving specific state secretary positions for the members of the family of already instated bureaucrats. This was an ordinary approach to recruitment by the Council of Ten and the great chancellor, who oversaw hiring and internal promotions in the Venetian chancery.[123]

Recruitment and Promotion: Intergenerational Nepotism and Professional Isolationism

Just like several other services of state bureaucracy in Venice, the profession of the cifrista was a family business, passed from father to son, grandson, or nephew. The case of Zuan Francesco Marin was emblematic of this hereditary practice. When in the late 1570s the Ten selected him to train the next generation of state cryptologists, they also offered him the opportunity to name two of the three new recruits. In response, Marin nominated his youngest son, Ferigo, and his nephew, Alvise.[124] The Ten hoped that Marin's descendants might have inherited his *natural inclinatone* (natural inclination) and insatiable appetite for the study of cryptology.

More specifically, the Ten knew that Ferigo had learned the trade almost by osmosis, having displayed glimpses of his father's talent early on. Thus, they decided that he was the ideal candidate for the post of the trainee cifrista. Accordingly, he was fast-tracked to the formal entry-level position of an extraordinary secretary without even having to sit for the customary entrance examination.[125] He was to serve in this capacity until the age of twenty, when he would be promoted to the next level in the Venetian civil service hierarchy: *secretario ordinario* (ordinary secretary). Five years after that, granted that he passed the formal examination of breaking an unknown cipher without a key, he would ascend to the respectable position of a secretary of the Senate or of the Collegio.[126]

Meanwhile, Alvise Marin had to wait a year even to be appointed.[127] The Ten would frequently headhunt recommended individuals, but there had to be an opening, usually following the death of an employee. Hence, Alvise had to wait for a chancery vacancy.[128] Once they made it into the system, the progression of both men, as indeed most novice recruits in the chancery, was steady but gradual. At the age of twenty,

123. De Vivo, "Coeur de l'Etat."
124. CX, *Deliberazioni Secrete*, Reg. 11, cc. 77 v.–78 r. (January 25, 1576), ASV.
125. Ibid.
126. Ibid.
127. Ibid., c. 117 v. (January 8, 1577), ASV.
128. Ibid., cc. 117 v.–118 r. (January 8, 1577), ASV.

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Ferigo did assume the role of secretario ordinario, which was left vacant after the death of his brother, also named Alvise.[129] Several years after their appointment, and having long completed their formal induction to the post of cipher secretary, both men assumed high level civil service posts. Ferigo was secretary of the Senate and Alvise was an ordinary secretary.[130]

Zuan Francesco Marin, his son Ferigo, and his nephew Alvise were not the only members of the Marin family to have secured positions in the Venetian chancery. As revealed by family trees and organizational charts of Venetian secretaries stored in the archives of St. Mark's Library, in Venice, the Marin family had an established foothold in the Venetian chancery for generations. This intergenerational employment started with the recruitment of Marin's father, Alvise Marin de Zuane, as a *secretario extraordinario* (extraordinary secretary) in 1497.[131] Alvise's brother also served the Venetian chancery as a state secretary from 1498 to 1515.[132] Alvise's sons, in turn, secured jobs in the Venetian state bureaucracy, and while Ferigo only managed to reach the first rank of secretario extraordinario in 1544,[133] his eldest son, Zuan Francesco Marin, as discussed in this section, enjoyed a long and successful career as an eminent cryptologist, eventually assuming the highest-ranking state secretary position: secretary of the Council of Ten.[134] Zuan Francesco Marin managed to secure state service positions for his three sons, Alvise, Zuane, and, as we have seen, Ferigo, whom he trained as a cifrista. Due to his success, Ferigo was also allowed to induct his own two sons, Zuan Francesco and Antonio, into the Venetian chancery as state secretaries.[135] Overall, many generations of descendants of the Marin family occupied the posts of state secretary or cipher secretary.[136]

This intergenerational nepotism was not uncommon in the Venetian chancery,[137] and it was particularly pronounced in Venice's cryptologic service, which was characterized by professional isolationism.

129. Ibid., c. 142 r.–v. (September 23, 1577), ASV. See also Mss. It. cl. VII 1667 (8459), fol. 8 r.–v, BNM.

130. CX, *Deliberazioni Secrete*, Reg. 13, cc. 61 v.–62 r. (August 22, 1589), ASV; ibid., c. 81 r.–v. (November 29, 1590); ibid., c. 82 r.–v. (January 23, 1591), ASV.

131. Mss. It. cl. VII 1667 (8459), fol. 4 v., BNM.

132. Ibid.

133. Ibid., fol. 6 v.

134. Ibid., fol. 6 r.

135. Ibid, fols. 4 v.–10 r. See also Gürkan, "Espionage the 16th-Century Mediterranean," 179–180.

136. Mss. It. cl. VII 1667 (8459), fols. 10 r.–12 v.; Preto, *I servizi segreti*, 276.

137. The bibliography on the secretaries of the Venetian chancery is vast. See, among others, Trebbi, "La cancelleria"; Trebbi, "Il segretario veneziano"; Zannini, *Burorocrazia*; Galtarossa, *Mandarini veneziani*.

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Scholars have postulated several reasons to account for this tendency. The historian Filippo de Vivo offered two plausible explanations. The first is purely financial. At a time when the Republic's finances were depleted by continuous wars and the secretaries' salaries could not always be paid in full, the safeguarding of secretarial posts for family members was a means of compensation and staff retention.[138] The second reason is sociopolitical. Nearly all state secretaries in Venice were recruited from the social class of the citizens, who did not have political rights. To compensate for this, but more importantly to secure their loyalty, the government reserved exclusive privileges, including civil service posts for them.[139] In a similar vein, Emrah Safa Gürkan argued that the Ten saw it as incumbent upon themselves to provide for the family of deceased civil servants, hoping that their descendants would have inherited their skills and talents.[140] Intergenerational nepotism, then, was linked to loyalty, skills, and knowledge transfer.

While these soundly argued contentions are plausible and merit serious consideration, another explanation for this recruitment pattern is possible, if the significance of secrecy for such a specialist domain and secrecy's instrumentality in professional identity construction is considered. Historically, secrecy has been considered among the primary functional responsibilities of secretaries. It is not accidental that well into the eighteenth century *secret*aries were believed to be, by definition, keepers of secrets.[141] Several scholars, erstwhile and contemporary, have taken for granted the secrecy secretaries were bound by. Francesco Sansovino, for instance, the versatile scholar and eulogist of Renaissance Venice, described secretaries as those who "have eyes and mind, but not a tongue outside of counsel."[142] Historian Douglas Biow called them "deferential, tight-lipped servants."[143] Few scholars, however, have endeavored to explain why and how secrecy was linked to secretaries' development of professional identity.

To explore this consideration further, some established social theorizations of secrecy must be brought into the discussion. Secrecy, as a process, enables the creation of the boundary between two separate entities: *those in the know* and the *ignorant others*. The exclusivity of being in the know as compared with the ignorant others can boost the sense of distinctive inclusiveness in a group and, by extension,

138. De Vivo, "Coeur de l'Etat," 720–722.

139. De Vivo, *Information*, 51n31.

140. Gürkan, "Espionage the 16th-Century Mediterranean," 180.

141. See Biow, *Doctors, Ambassadors, Secretaries*, especially Chapter 6 for relevant bibliography.

142. Sansovino, *L'avvocato e il segretario*, 152.

143. Biow, *Doctors, Ambassadors, Secretaries*, 22.

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cement one's identification with it.[144] Additionally, the social aspect of secrecy that requires and promotes the conscious awareness of the group, due to the intention of concealment and boundary construction, can enhance the process of group identity creation. The sense of belonging that ensues, the feeling of specialness in being a lifelong member of a privileged inner circle—"the priesthood of those 'in the club,'" as intelligence scholar Michael Herman described it[145]—can potentially augment the need to protect and perpetuate secrecy to maintain the group. Secrecy, therefore, creates a dynamic relationship between its agents and becomes both the condition and the consequence of the formation of group identity.[146] By singling out these professionals as the custodians of state secrets and reinforcing the distinctive significance of their work with exclusive benefits, the government can be seen as engineering the social construction of a professional identity that was premised on secrecy.[147] In essence, by reserving specific privileges such as civil service posts for these secretaries and their families in exchange for their secrecy, the authorities managed to maintain their loyalty and continuous service; indeed, there is no known case of betrayal of secrecy on the part of any Venetian cipher secretary who was privy to what nowadays would be termed classified information. This is indicative of an emergent professional ethos. In this respect, secrecy created an on-going relationship between state secretaries and the authorities and became both the condition and the consequence of professional identity formation and, by extension, loyalty.[148]

State Control and Regulation

By the time Ferigo Marin and Girolamo Franceschi took the reins of the Venetian cryptology department, the discipline's professionalization had reached maturation as a stand-alone professional service. In the late 1590s, the Ten even elected a committee of five delegates—all noblemen with hereditary rights to statecraft—who would be responsible for overseeing and making strategic decisions on the state's cipher policies.[149] This included selecting the most effective cipher to be used by the Venetian authorities and their diplomats.[150]

144. See Simmel, "Sociology of Secrecy," 497.
145. Herman, *Intelligence Power*, 330.
146. Costas and Grey, "Bringing Secrecy into the Open"; Costas and Grey, *Secrecy at Work*.
147. Simmel, "Sociology of Secrecy."
148. Costas and Grey, "Bringing Secrecy into the Open"; Costas and Grey, *Secrecy at Work*.
149. CX, Reg. 14, c. 8 r. (September 16, 1596), ASV.
150. See, for example, ibid., Reg. 13, cc. 92 v.–93 r. (March 16, 1592), ASV.

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The role of the five-member committee was particularly relevant when disagreements arose, especially with regard to the quality of ciphers produced in-house, in which case they were asked to settle disputes and restore order.[151]

On the eve of the seventeenth century, the regulation of the Venetian cryptology service became even more stringent. In 1605, for example, it came to the Ten's attention that several of the older cipher keys were missing; worse, they were in the wrong hands, including those of former diplomats and envoys who neglected to return them to the chancery. Accordingly, both Ferigo Marin and Piero Amadi were summoned to a formal audience with the Heads of the Ten, at which they were ordered to set aside all cipher keys already in use and produce new ones to be distributed to all state envoys. The Ten also decreed that older keys no longer in use were to be burned from time to time. Importantly, Marin and Amadi were instructed to create two books—one for the Venetian strongholds in the Mediterranean and one for the Venetian colonies in the Italian mainland—in which they would register all ciphers and their keys, taking a note of the date and person to whom they had been consigned and the expected return date. Copies of these volumes were to be stored in secret locations. The cifristi were also required to work with their doors hermetically closed; failure to follow this rule resulted in the forfeiture of one year's salary.[152]

In the meantime, as Ferigo Marin's health was deteriorating rapidly and none of the other secretaries had produced sons who were inherently gifted in the art of cryptology, the cancellier grande was ordered to recruit two more cipher secretaries under the pupillage and mentorship of Franceschi and Amadi. In November 1605, Giambattista Lionello and Ottavio Medici were hired, and their salary was 4 ducats per month. After two years of apprenticeship, they both passed the exam of breaking a cipher without a key, and their salary increased to 10 ducats per month.[153] Thus, the Venetian cryptology service continued to train and develop Venice's professional cryptologists, routinely hiring through nepotism those with the ability to carry on the *scientia di cavar le cifre* (the science of breaking codes).[154]

It is important to emphasize here that by trying to restore the picture of early modern Venice's professional cryptology service, I do not suggest Venice's superiority as compared with other early modern

151. For an example, see ibid., Reg. 14, c. 8 r. (September 16, 1596), ASV.

152. Ibid., cc. 126 r.–127 r. (August 31, 1605).

153. Ibid., c. 127 r.–v. (August 31, 1605), ASV; ibid., Reg. 15, cc. 16v.–17 r. (October 24, 1607), ASV.

154. Pasini, "Delle scritture," 309; Preto, *I servizi segreti,* 225.

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states.[155] While Venice's precocity in the systematic development of ciphers is generally acknowledged in the literature,[156] my primary intention has not been to shed light on the deft operation of ciphers by professionals. Instead, I wish to examine the development of a stand-alone profession of cryptology as it emerged and evolved in the Doge's Palace, the Venetian state's political nucleus. Future scholarship might expose and analyze the professionalization of cryptology in other early modern Italian and European states, where codes and ciphers were produced and broken by professional cifristi.[157]

Final Reflections on Professionalization

The sixteenth century saw a gradual proliferation of professions primarily due to the urbanization of Italian city-states that increased the demand for professional expertise.[158] Nevertheless, the term *professione*, as used in the early modern period is, to this day, a challenging one to define.[159] According to Baldassare Castiglione's *Il libro del Cortegiano* (1528), it meant, among other things, "intellectual labor within a culturally defined discipline, such as priesthood or the law," as well as "the product of any practice that required master–pupil training."[160] In short, it was a "polysemic" term, used to denote professing one's faith, ideas, or doctrines; or an intellectual or manual occupation.[161] By the time Tommaso Garzoni (1549–1589) published his famous treatise on "all professions of the world,"[162] a distinct "professional mentalité" was giving rise to a whole host of claims on professional identity and expertise.[163]

In relation to the professional cifrista, one could argue that the role was nothing more than a subdivision of the established profession of

155. Dejanira Couto mentions the existence of at least another trainer of cifristi in the sixteenth century, which indicates the professionalization of cryptology in other Italian states, but she does not substantiate her claim with any archival or historiographical references. Couto, "Spying in the Ottoman Empire," 289.

156. See, for example, Villain-Gandossi, "Les dépêches chiffrées; Kahn, *Codebreakers*; Preto, *I servizi segreti*; Couto, "Spying in the Ottoman Empire."

157. An excellent new volume that addresses the use and dissemination of cryptography in early modern Europe has recently been edited by Rous and Muslow, *Geheime Post*.

158. Biow, *Importance of Being an Individual*, 39.

159. Abbott, *System of Professions*, 318.

160. Biow, *Doctors, Ambassadors, Secretaries*, 7.

161. Malatesta, "Italian Professions"; Biow, *Doctors, Ambassadors, Secretaries*, 5–6.

162. Garzoni's *La piazza universale* was first published in Venice in 1586.

163. McClure "*Artes* and the *Ars moriendi* in Late Renaissance Venice," 95, 121.

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the secretary,[164] which included not only the routine tasks of writing, copying, and cataloguing documents but also the "learned rhetorical expertise" of performing such tasks.[165] However, according to Andrew Abbott's structural and relational theory of professions, a specific body of work delegated by a profession to a subordinate group can generate a new profession. This can happen as the newly delegated body of work embraces novel technical and intellectual developments in order to generate new knowledge.[166] This is particularly applicable to the profession of the cifrista, whose expert knowledge and deftness of ciphers, contingent on specialist education and training, extended beyond the customary intellectual errands of the professional secretary.

This proposition merits further exploration. In the late 1540s, in his fervent petition to the Venetian government for a promotion to the profession of cifrista, state secretary Alvise Borghi claimed that, while in other domains of intellectual activity the Ancients by far surpassed contemporaries, the art of cryptology was an exception to this rule. This was because, while several ingenious minds could invent secret ways of writing, the complexity of professional cryptology meant that employment by princes was accessible to only a few genuine professionals.[167] For the Council of Ten, what separated the amateurs from the professionals was specialist skills sharpened through continuous professional training, which was the prerequisite for employment when they sought individuals to enter the service as professional cifristi. Talent and aptitude to cryptology were taken as a given. That was the case for Ferigo Marin, who was expected to study under his father and continue to increase his skills, even after his second promotion to ordinary secretary.[168] This was also the case for Piero Amadi, who was taught by Girolamo Franceschi,[169] and for Giambattista Lionello and Ottavio Medici, who were trained by both Franceschi and Amadi.[170] In other words, a common educational process, combined with a shared professional identity and emerging professional ethos and

164. In his list of established professions, Tommaso Garzoni discusses cifranti (those who can write in code or cipher) within the broader category of professional writers and scribes. Instead, cifristi are better suited to Garzoni's description of "Consiglieri, e Secretarii." See Garzoni, *La piazza universale*, 182, 174.

165. Biow, *Doctors, Ambassadors, Secretaries*, 4.

166. Abbott, *System of Professions*.

167. CX, *Deliberazioni Secrete*, filza 7, n.d. (attributed by the archivist to the year 1548), ASV.

168. CX, *Deliberazioni Secrete*, Reg. 11, c. 45 v. (25 Jan 1576), ASV; ibid., Reg. 13, cc. 61 v.–62 r. (August 22, 1589), ASV.

169. Ibid., Reg. 14, c. 7 r.–v (July 9 1596), ASV.

170. Ibid., Reg. 15, cc. 16 v.–17 r. (October 24, 1607), ASV.

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philosophy, led to the development of the profession of cryptology in sixteenth-century Venice.[171]

While these distinct traits of a sixteenth-century profession are redolent of several of the criteria that contemporary sociologists have postulated as key determinants for "modern" professions, in my analysis I have intentionally refrained from examining the profession of the cifrista against every single one of these criteria. This is because the principles determining professions and professionalization in the early modern period are "distinctly at odds with modern sociological criteria."[172] Undeniably, some of these principles—such as appeal to expertise, work organization, and internal discipline—are emergent in the early modern period. In the historical reconstruction of early modern professions, however, researchers should not ignore the significance of "a communal, self-authenticating discourse that both periodically defined and policed … notion[s] of a particular profession as a meaningful form of work."[173] In absence of documented self-narratives of cifristi about their sense of professional identity and expertise, Borghi's description of the profession of the cifrista, echoing the very institution that marshalled it into existence, the Council of Ten, offers such a discourse.

Conclusion

Resembling the closed caste oligarchical structure of the Venetian government, Venice's professional cryptology service blossomed within an interdependent system of intergenerational nepotism and professional isolationism. These attributes served to promote specialist skills formation and familial specialization, with the purpose of safeguarding secrecy, the construction of a distinct professional identity, and even a new professional ethos and philosophy. Moreover, Venice's professional cryptology department flourished alongside a wider diffusion of an amateur use of ciphers by a variety of members of the Venetian society. As I asked at the start of this article: Was there a link between the two?

It is unquestionable that the professional use of ciphers in Venice proliferated in the wider landscape of the systemization of diplomatic activities in the late medieval and early modern periods.[174] From this

171. On education, ethos, and professional philosophy as key characteristics of early modern professions, see O'Day, *Professions in Early Modern England*.

172. Biow, *Doctors, Ambassadors, Secretaries*, xii.

173. Ibid., 12.

174. Lazzarini, *Communication and Conflict*; Lazzarini, "Renaissance Diplomacy"; Senatore, "*Uno Mundo de Carta*."

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perspective, there seems to be no direct link between the amateur use of codes and ciphers, especially as used by merchants in merchant-style codes, and the professional use of cryptology by "professionals of oral and written communication" who were involved in public administration.[175] A closer look at the users of Venice's cryptology service, however, might tell a different story.

Trade and industry, the cornerstones of the Venetian economy throughout the centuries, had traditionally been premised on secrecy and efficient intelligence.[176] Accordingly, Venetian merchants were expected to be competent in secret communication, even through simple means of encryption. The idiosyncrasy of Venetian merchants hinged on the fact that the very individuals who came up with such basic techniques of concealing information to protect commercial interests, such as Andrea Barbarigo, came from the Venetian patriciate, the highest order in the Venetian social hierarchy that comprised the Venetian ruling class. Venetian patricians thus had their feet firmly planted in two overlapping worlds: those of trade and politics. It is possible, therefore, that the patricians who prompted the professionalization of cryptology within the Doge's Palace were the ones who had been schooled in a tradition of concealing trade secrets through simple "mercantile letters."

While to date histography has not furnished firm evidence for this hypothesis to ripen into certainty, this peculiarity of the Venetian ruling class, which accounts for the enmeshment of trade, politics, and diplomacy in early modern Venice, suggests that the professionalization of cryptology in Venice might have been influenced by this mercantile custom. It is not accidental that this professionalization intensified from the 1540s to the 1570s, when the Venetians were fighting—both through warfare and diplomacy—to protect some of their most prized commercial strongholds in the Levant, including parts of the Morea and the island of Cyprus.[177] In this respect, while I do not argue that the Venetian *homo oeconomicus*, to use Frederic Lane's term,[178] directly interfered with the professionalization of cryptology in Venice, mercantile customs, in combination with sixteenth-century political and economic value judgements, may have influenced its gradual proliferation. Accordingly, scholars could pursue two future research avenues: the direct or indirect role of early modern merchants in the diplomatic or political dealings of governments,[179]

175. Lazzarini, *Communication and Conflict*, 115, 202.

176. See, for example, Juárez Valero, *Venecia y el secreto del vidrio*.

177. See Arbel, "Venice's Maritime Empire."

178. Lane, *Andrea Barbarigo*, 5.

179. For postindustrial societies, see Chernow, *House of Morgan*; Hart, "Red, White, and 'Big Blue'"; Sawyer, "Manufacturing Germans."

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and the hitherto neglected professional development of clandestine practices as a distinct function of a state bureaucracy to protect its economic (as well as political) interests.

With these thoughts in mind, one final question remains. What can the historical reconstruction and exploration of the professional cryptology service of early modern Venice confer to the historical study of management, organization, and business practices? First, the study of the systematic proliferation of the amateur use of ciphers by traders and merchants, both for commercial and diplomatic purposes, offers significant insights into an aspect of medieval and early modern commercial activity that still remains largely unexplored and, thus, awaits scholarly attention.[180] Second, this case study demonstrates that traditional professional practices that are associated with business and management, such as specialist skills training, professional identity formation, and regulation, assumed their form in unforeseen places, from Middle Ages and Renaissance marketplaces, to early modern state monopolies of overseas trade, and to burgeoning state bureaucracies. Viewed from this perspective, the remit of case studies that the medieval and early modern periods can confer to the disciplines of business and organizational history could potentially broaden to include managerial and business practices within state administration, in addition to more conventional studies on, for instance, early modern accounting.[181] In short, casting a scholarly gaze to the early modern era will allow historians to uncover a slender yet significant aspect of business and organizational history that traces its origins to unlikely places, such as churches, monasteries, agricultural estates, and, of course, governments.[182]

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180. Lazzarini, *Communication and Conflict*, 39–41.

181. See, for example, Lane, "Venture Accounting"; Goldthwaite, "Practice Culture of Accounting."

182. For examples, see Ruef and Harness, "Agrarian Origins"; Kieser, "From Asceticism to Administration of Wealth"; Ezzamel, "Work Organization."

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