The Digital Humanities and Islamic & Middle East Studies

Edited by
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Acknowledgments

Maxim Romanov
Toward Abstract Models for Islamic History

> "Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful."[1]
>
> George E. P. Box

1. Why Models?[2]

The advent of the digital humanities has brought the notion of 'big data' into the purview of humanistic inquiry. Humanists now have access to huge corpora that open research possibilities that were unthinkable a decade or two ago. However, working with corpora requires a rather different approach that is more characteristic of the sciences than the humanities. In particular, one has to be transparent and explicit with regard to how data are extracted and how they are analyzed. Text-mining techniques rely on explicit algorithms for data extraction and analysis because this helps keep track of errors, correct them, and, ultimately, improve results.[3] Analytical procedures for studying extracted data rest on explicit algorithms for the same reason. As a way of constructing algorithms, modeling is part and parcel of developing complex computational procedures.

Working with big data also requires another kind of modeling. Opting for the breadth of data, we have to give up the richness of details. Close reading—to which humanists are most accustomed—becomes impossible.[4] Working with

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1 George E. P. Box, *Response Surfaces, Mixtures, and Ridge Analyses* (2nd ed.; Hoboken, N.J: John Wiley, 2007), 63.

2 All data, graphs and cartograms used in the article were produced by the author. The data were extracted from the electronic text of a medieval Arabic biographical collection available online in open access. Graphs and cartograms are based on the extracted data and produced with R, a free software environment for statistical computing and graphics.

3 For more details, see chapter one in Maxim G. Romanov, "Computational Reading of Arabic Biographical Collections with Special Reference to Preaching (661–1300 CE)" (Ph.D. diss., University of Michigan, 2013).

4 While most humanists remain skeptical with regard to working with big data, the number of studies that show that close reading alone is not enough keeps on growing. They emphasize that case studies based on close reading do not allow for extrapolations, and that humanists are prone to putting too much effort into studying objects that are unique and for this reason are least likely to represent larger trends. The most vivid examples can be found in the field of literary history; see, e. g., Franco Moretti, *Graphs, Maps, Trees: Abstract Models for Literary History* (London: Verso, 2007); Franco Moretti, *Distant Reading* (1st ed.; London: Verso, 2013); Matthew

big data one cannot maintain the nuanced complexity of details that is the hallmark of close reading. Instead of relying on complex textual evidence and reading between the lines, one has to work with relatively simple textual markers—essentially, words or simple phrases—that are treated as indicators of large trends. Yet it is through such analysis that we can look into long-term and large-scale processes that are beyond the scope of close reading.

The literary historian Franco Moretti dubbed such an approach "distant reading," explaining "distance" not as an obstacle, but *a specific form of knowledge.*[5] By emphasizing fewer elements and their interconnections, we can begin to distinguish shapes, relations, and structures. Most importantly, we can trace small changes over long periods of time. Modeling is an important part of this approach. With models, we simplify reality down to a limited number of factors[6] through the analysis of which we can hope to gain insights into complex historical processes.[7] This simplification is the reason why, as the statistician George E.P. Box put it, "all models are false." However, models are valuable and powerful tools that improve our understanding of the world. Unlike theories, models are experimental and driven by data. Good models offer invaluable glimpses into the subjects of our inquiry.[8] With them, we can explore, explain, and project. Through them, we catch a glimpse of a bigger picture. That is why some models are useful.

L. Jockers, *Macroanalysis: Digital Methods and Literary History*, (1st ed.; Chicago: University of Illinois Press, 2013).

5 See Moretti, *Graphs, Maps, Trees*, 4.

6 For example, Ian Morris uses the size of the largest urban center as an indicator of the social development of the region to which it belongs; see Morris, *The Measure of Civilization: How Social Development Decides the Fate of Nations* (Princeton, NJ: Princeton University Press, 2013). Richard Bulliet uses onomastic data as the indicator of conversion; see Bulliet, *Conversion to Islam in the Medieval Period: An Essay in Quantitative History* (Cambridge, MA: Harvard University Press, 1979).

7 For valuable examples of modeling 'big data', see Moretti, *Graphs, Maps, Trees*; Ian Morris, *Why the West Rules–for Now: The Patterns of History, and What They Reveal about the Future* (New York: Farrar, Straus and Giroux, 2010). See also http://orbis.stanford.edu/ for a geographical model of the Roman world, developed by Walter Scheidel and Elijah Meeks. In the field of Islamic studies, see *Bulliet, Conversion to Islam in the Medieval Period.*

8 Bulliet's model of conversion is a great example of this. The very fact that this study is still criticized more than three decades after its publication shows that a solid model cannot be discarded through a critique of where it fails, if otherwise it still remains plausible and coherent. For the most recent critique, see David J. Wasserstein, "Where Have All the Converts Gone? Difficulties in the Study of Conversion to Islam in Al-Andalus," *Al-Qanṭara* 33 no. 2 (February 11, 2013): 325–42, DOI:10.3989/alqantara.2011.005.

What follows is an attempt to model Islamic élites based on the data from al-Dhahabī's (d. 748 AH/1348 CE) *Taʾrīkh al-islām*[9] in order to explore major social transformations that the Muslim community underwent in the course of almost seven centuries of its history. The main types of data used in the model are dates, toponyms,[10] linguistic formulae (or wording patterns), synsets (lists of words that point to a specific concept or entity),[11] and, most importantly, "descriptive names" (sing. *nisba*).

A detailed discussion of the main assumptions underlying these types of data as well as a discussion of more general issues relevant to the study of Arabic biographical collections can be found elsewhere.[12] It is most important, however, to say a few words here about our assumptions regarding "descriptive names," which are considered by some scholars to be the most valuable kind of data that literary sources offer to the social historian of the Islamic world, while others dispute this as highly problematic. The major problem with *nisba*s is that it is not always clear what they stand for. For example, if an individual is described in a biographical collection as a *ṣaffār*, does this actually mean that he was involved in "coppersmithing"? When our subject is just one particular individual, it is not so difficult to establish the more or less exact meaning of this descriptive name by cross-examining biographies of this individual in other biographical collections. This is particularly easy now, when dozens of electronic texts of biographical collections are just few mouse-clicks away.

However, such an approach becomes problematic when this rather time-consuming procedure has to be repeated for dozens of individuals. The approach becomes particularly difficult if our goal is to study some biographical collection in its entirety, since Arabic biographical collections often contain thousands of biographies, and most biographies offer multiple descriptive names for the same individual. After a certain threshold, it becomes utterly impossible to apply this approach. Our source, *Taʾrīkh al-islām*, is well beyond this threshold. In the analysis that follows, we will deal with the dataset of almost 70,000 *nisba*s

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9 An electronic text of this source has been used in this study. The text is based on and collated with al-Dhahabī, *Taʾrīkh al-islām wa-wafayāt al-mashāhīr wa-al-aʿlām* (ed. ʿUmar Tadmurī; 2nd ed.; 52 vols.; Bayrūt: Dār al-Kitāb al-ʿArabī, 1990).

10 Both toponyms proper and toponymic *nisba*s linked with relevant toponyms. Toponymic data is crucial for our understanding of the social geography of the classical Islamic world. For my modeling of the geography of the Islamic world based on the data from *Taʾrīkh al-islām*, see Romanov, "Computational Reading," 35–37, 41–42, 87–113.

11 As hierarchically organized word lists, synsets are here used for the grouping of toponymic and onomastics data into categories of higher level.

12 Romanov, "Computational Reading," 28–51.

(with about 700 unique ones) that represent about 26,000 individuals over the period of 41–700 AH/661–1301 CE. Working with such a dataset one cannot possibly know the exact meaning of each and every *nisba*. At the same time, we do not have any solid foundation to argue that descriptive names are to be treated in a particular manner or to be discarded altogether. Yet such a dataset is too valuable a tool to ignore simply because we are not entirely sure what all these data mean. This is where modeling offers an optimal solution: we must begin with assumptions and be transparent about them. Thus, in what follows, descriptive names will be treated according to their most common acceptations, if only because this is the most logical starting point.[13]

2. The Source: al-Dhahabī's *Ta'rīkh al-Islām*

The *Ta'rīkh al-islām* is the largest Arabic biographical collection, including over 30,000 biographies and covering almost seven centuries of Islamic history. The current dataset includes information on slightly over 29,000 individuals (the first three volumes of *Ta'rīkh al-islām* are structured differently from the rest of the collection and cannot be studied with the same computational method). Figure 6.1 shows a graph of the chronological distribution of the biographies in this data set. Biographies are grouped into 20 lunar year periods (quantities of biographies for each period are shown along the x-axis). The graph is transformed into a curve that smooths out the noise of data, emphasizing larger trends (see the line labeled *Smoothed Biographical Curve*). Finally, the main curve is the *Adjusted Biographical Curve*, which is shifted 30 years back in time to reflect "the years of floruit" of the biographees from *Ta'rīkh al-islām*.

The curve can be split into several periods, each beginning at a point that marks a noticeable diversion of the curve. The number of biographies grows quite rapidly until c. 160 AH/778 CE, when it begins to slow. During c. 270–470 AH/884–1078 CE there is a steady decline. After c. 470 AH/1078 CE the curve starts recovering, reaching its highest point around c. 570 AH/1175 CE, after which it keeps growing but slows its pace by the end of the period—with the second peak being somewhere after 700 AH/1301 CE. For convenience, many of the graphs that follow will include the scaled-down cumulative curve and color-coded periods.

**13** For a detailed discussion, see ibid., 43–46.
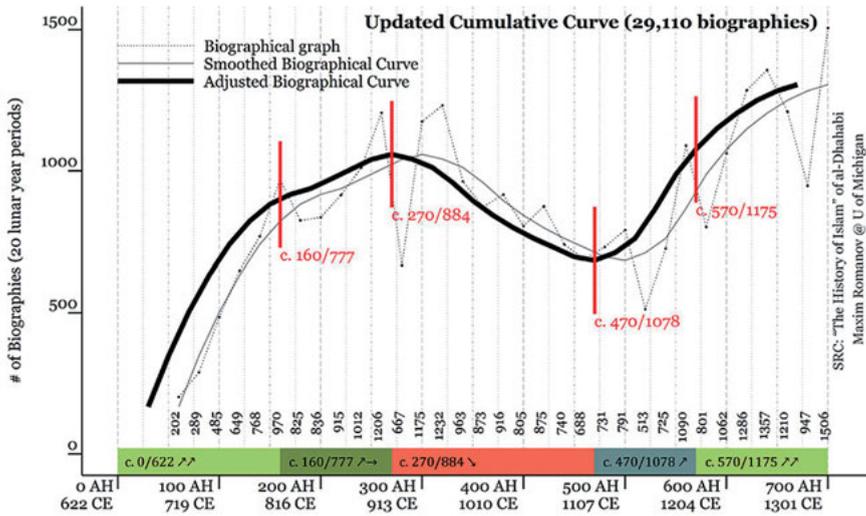
Figure 6.1. Cumulative Biographical Curve. The row of numbers shows the quantities of biographies per 20 lunar year periods, beginning with 41–60 AH/662–681 CE and up to 680–700 AH/1282–1301 CE.

3. Modeling Society

The individuals whose lives are described in biographical collections were not ordinary people. In most cases, they were noteworthy members of their communities, and almost every biographical note contains some information on a sphere of life to which its protagonist contributed—and "descriptive names," at least at this point, are the most manageable indicator of their place in society.

Major studies that use "descriptive names" for analytical purposes split them into categories. Cohen's classic study concentrates primarily on "secular occupations" during the first four centuries of Islamic history. [14] He offered a major division of occupational *nisba*s (textiles, foods, ornaments/perfumes, paper/books, leather/metals/wood/clay, miscellaneous trades, general merchants, bankers/middlemen) and supplied an extensive appendix with explanations for about 400 *nisba*s and relevant linguistic formulae. Unfortunately, the *nisba*s

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14 See, Hayyim J. Cohen, "The Economic Background and the Secular Occupations of Muslim Jurisprudents and Traditionists in the Classical Period of Islam: (Until the Middle of the Eleventh Century)," *Journal of the Economic and Social History of the Orient* 13 (1970): 16–61.

in Cohen's appendix are not explicitly categorized and—since any categorization involves pushing the boundaries, especially in instances that stubbornly resist classification—the exact scheme remains somewhat unclear.

Petry's scheme is built on biographical data from Mamlūk Egypt (656–923 AH/1258–1517 CE). Petry divided his subjects into six major, often overlapping occupational groups: executive and military professions, bureaucratic (secretarial-financial) professions, legal professions, artisan and commercial professions, scholarly and educational professions, and religious functionaries. Although an explicit classification is not given in the "Glossary of Occupational Terms," numerous tables provide enough information to form a rather clear idea about the specifics of each category in Petry's classification scheme.[15]

Shatzmiller approached this issue from the much wider perspective of labor in general. Her scheme covers a much wider variety of occupational names and splits the entire society into three major sectors—extractive, manufacturing, services—with each sector having its overlapping subcategories. Shatzmiller offers an explicit categorization of each and every descriptive name.[16]

As is the case with any scheme, all three examples are designed to serve specific purposes. Although immensely helpful, none of them are suitable for the purposes of broader analysis: unlike the above-mentioned schemes, the scheme needed here must take into account *all* meaningful descriptors, not only those that can be classified as "occupations." In other words, it must consider anything that would allow discerning all potentially identifiable groups, so that their evolution could be traced. Some of these descriptors do not pose significant problems, while others are so complex that even presenting them as ideal types might be highly problematic.

The list of "descriptive names" from *Ta'rīkh al-islām* is based on frequencies, and for the moment I will consider only *nisba*s that are used to qualify at least ten individuals (slightly over 700 unique *nisba*s, with their total running up to almost 70,000 instances). My list of descriptive names overlaps only partially with those of Cohen, Petry, and Shatzmiller. Figure 6.2 shows how the categories of "descriptive names" from *Ta'rīkh al-islām* are interconnected from the individual's perspective.

The innermost layer of categories includes **trib**al, **topo**nymic, **ethn**ic and **phys**ical descriptions. These are descriptors over which individuals have the least control—in the sense that no one chooses into which **trib**e to be born,

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15 Carl F. Petry, *The Civilian Elite of Cairo in the Later Middle Ages* (Princeton, NJ: Princeton University Press, 1981). For the "Glossary, " see pp. 390–402.

16 Maya Shatzmiller, *Labour in the Medieval Islamic World* (Leiden: E.J. Brill, 1994). For extensive lists of names/occupations, see pp. 101–168, 410–424.
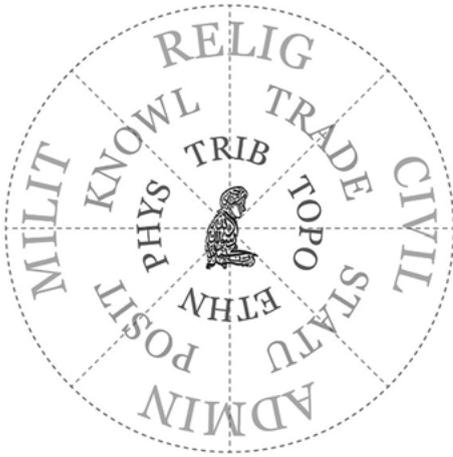
Figure 6.2. Interconnectedness of Descriptive Names from the Individual's Perspective. Shifting circles and dashed lines denote the intricate interconnectedness of the three layers of name categories.

where to be born, what **ethn**ic group to belong to, and what **phys**ical peculiarities to have or suffer from. To a certain degree, these descriptions are also acquirable—in the early period, being a Muslim meant being affiliated with an Arab **trib**e; individuals were constantly moving around the Islamic world, changing their **topo**nymic affiliations; **phys**ical peculiarities could have resulted from life experience. However, these are only probable—and thus secondary—cases that would usually be piled up on top of primary, 'by-birth' descriptions. The first three categories—**trib**al, **topo**nymic, **ethn**ic—also tend to overlap.
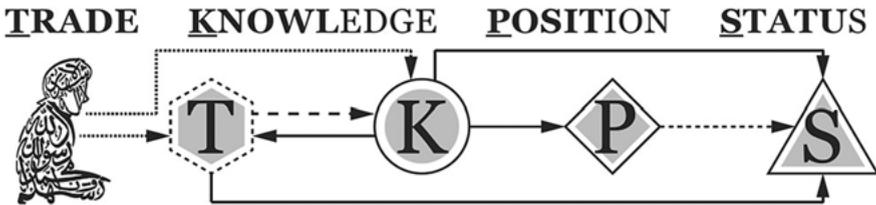

Figure 6.3. Hierarchical Connections of the Middle Layer.

The middle layer groups "descriptive names" in terms of acquirable qualities —**trade**, **knowl**edge, **posit**ion and **statu**s. These are not categories that rest on the same level, and their connections are better represented in a hierarchical manner (Figure 6.3). The main gateways to élites were **trade**s (or "secular occu-

pations") and **knowl**edge[s]. However, practicing some **trade** alone was almost never enough: biographical collections rarely—if ever—include individuals who were involved exclusively in some specific "secular occupation." In order to climb up the social ladder, a practitioner of any **trade** had to start converting his economic capital into social capital—this was most commonly done through acquiring religious **knowl**edge. **Knowl**edge—as specialized training in a specific area that would set an individual apart from the masses—opened ways for acquiring **posit**ions and **statu**s[es]; it could also allow one to practice **trade** on a new level, thus improving the individual's **statu**s.

The outermost layer represents the major sectors to which a person could belong in pre-modern Islamic society: **relig**ious, **admin**istrative, **milit**ary, and '**civil**ian'. The term civilian is problematic and is used here essentially as a negative blanket category that encompasses everything that does not clearly belong to the first three sectors. Descriptive names often cross boundaries among these categories, and most individuals do not clearly belong to one specific sector, but rather balance among them.
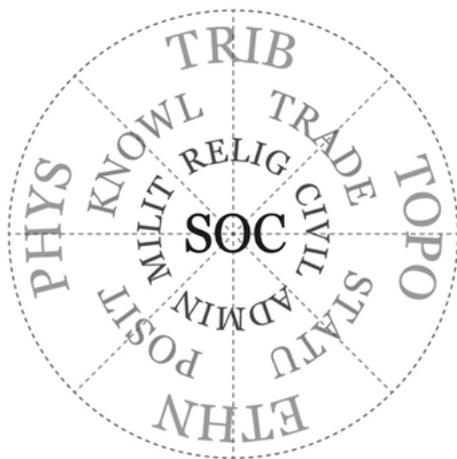
Figure 6.4. Interconnectedness of Descriptive Names from the Social Perspective.
Shifting circles and dashed lines denote the intricate interconnectedness of the three layers of name categories.

For our purposes, it will be more efficient to invert this scheme so that "descriptive names" are presented from the social perspective (Figure 6.4). Now, each category contributes to the composition of Islamic society, and every "descriptive name" can be seen as a social role. These roles are likely to receive a centripetal charge from individuals who attempt to expand their influence on so-

ciety at large; how close they get to the center—i.e., how much social influence they can exercise—would depend on the success of particular individuals and/or historical circumstances that might be favorable to particular groups. Social influence here is understood broadly as a pressure that forces someone to do something that s/he otherwise would not have done; at this point, I do not make a distinction between physical threats and social pressures. Clearly, the sword of an *amīr* ("military commander") and the word of a *shaykh* ("religious authority") are different in their nature, but both may have equally serious societal consequences.
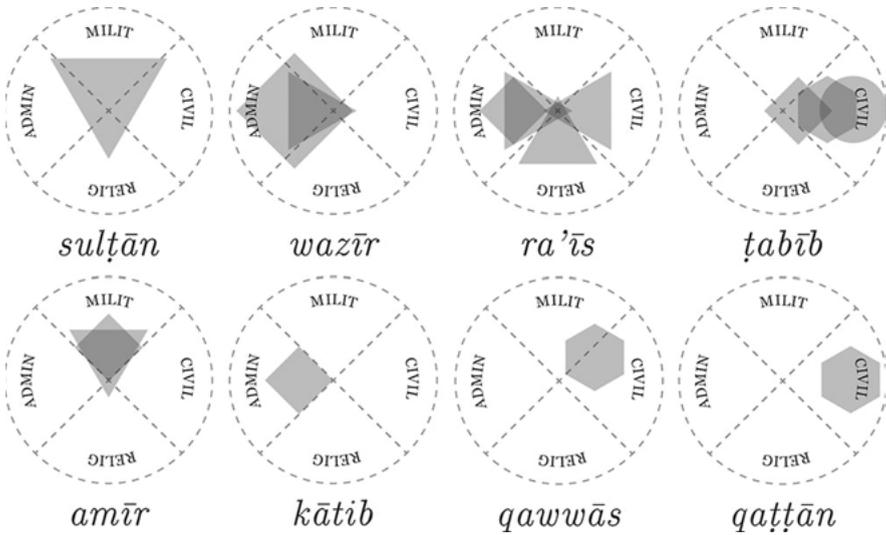
Figure 6.5. *Nisba* Classification Examples (a).

Figures 6.5 and 6.6 should provide a visual clue as to how these overlapping categories are used in the classification scheme. In Figure 6.5 : *amīr* ("governor, commander") and *sulṭān* ("sultan") both belong to the **milit**ary sector of society. *Amīr* can be seen primarily as a **posit**ion—in the sense that there is somebody above who granted this **posit**ion to a given individual; arguably, this **posit**ion provides one with a relatively high **statu**s. *Sulṭān* is the apex of the **milit**ary hierarchy and thus is primarily seen as **statu**s with significant influence over all other sectors. *Kātib* ("scribe") and *wazīr* ("vizier, prime minister") belong to the **admin**istrative sector, where the former is a **posit**ion with potential for social

influence, while the latter is the apex of the **admin**istrative hierarchy, which gives one significant resources to influence society at large—hence, it is also **status**.[17] Somewhat equivalent to *amīr, raʾīs* ("chief, director") is a denomination of high **status** in either the **civil**ian, the **relig**ious, or the **admin**istrative sector (also **posit**ion in the latter). *Ṭabīb* ("physician") stands for special training—**knowl**edge—within the **civil**ian sector, which is also likely to fall into the categories of **trade** and **posit**ion, especially after hospitals (sing. *[bī]māristān*) become a constant element in the Muslim cityscape.[18] *Qaṭṭān* ("producer or seller of cotton") and *qawwās* ("bow-maker") are both secular occupations—**trade**s—and thus belong to the **civil**ian sector, although the latter—if bows are produced for war-making purposes—may cross into the **milit**ary one.
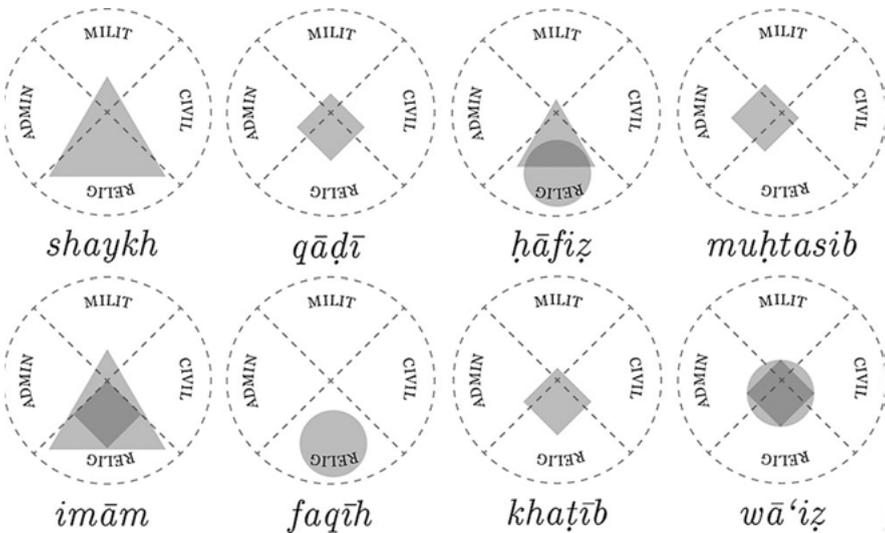
Figure 6.6. *Nisba* Classification Examples (b).

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18 There are 322 physicians in the *ʿUyūn al-anbāʾ fī ṭabaqāt al-aṭibbāʾ* of Ibn Abī Uṣaybiʿa (d. 668 AH/1270 CE), and quite a few physicians are Jews and Christians, judging by their names. al-Dhahabī's count of physicians is about 200, which can be considered a very thorough coverage, since Ibn Abī Uṣaybiʿa's book is devoted exclusively to the physicians (and, as often happens, tends to overstretch the definition of the group), while al-Dhahabī's book is a general history.

In Figure 6.6: *shaykh* (literally "elder") and *imām* ("leader") are the markers of the highest **relig**ious **status**, although in the later period *imām* also refers to a **relig**ious **posit**ion of "prayer leader" that was only marginally influential in social terms. *Faqīh* refers to the **knowl**edge of Islamic law, whereas social influence is exerted primarily through other roles, such as *qāḍī* ("judge"), which is always a **posit**ion—or *muftī* ("jurisconsult"), which turns into a **posit**ion in the later period (not graphed). *Ḥāfiẓ* denotes **knowl**edge of prophetic tradition and high achievement (**status**) within this area of **relig**ious expertise. *Muḥtasib* ("market inspector") is an **admin**istrative **posit**ion with strong **relig**ious underpinnings. Last on the list are *khaṭīb* ("Friday preacher") and *wāʿiẓ* ("public preacher"). Both belong to the **relig**ious sector, but while the former is always a **posit**ion, the latter refers to a specific field of religious **knowl**edge that tends to become a **posit**ion only during the later period.

Individuals in the Islamic biographical dictionaries usually wear many turbans and are qualified with more than one "descriptive name." Using the same method, each individual can be represented as a unique constellation of **trade**s, **knowl**edge[s], **posit**ions, and **status**[es] that are fitted into the diagram of the four major sectors. Pushing this approach even further, we may try to evaluate how the composition of Islamic élites—and, possibly, society at large—changed over time, although conventional graphs may be more efficient for this task.

4. Looking into Major Sectors

Introducing the categories of sectors—**milit**ary, **admin**istrative, **relig**ious, and **civil**ian—I hope to use them as markers of change within the composition of Islamic élites. Society would remain healthier when more social groups were represented in the élites, since a more diverse population would be participating in the [re]negotiation of the rules of the game. This is what the share and the diversity of the civilian sector—with a number of trades, crafts, and knowledge[s]—is meant to represent.

Figure 6.**7** shows the cumulative curves of all four sectors. Although this is still a work in progress and the algorithms for determining the administrative and military sectors still need adjustment, the curves do agree with the major trends that we expect to be confirmed by quantitative analysis.

The religious sector keeps on growing throughout the period. Occasional fluctuations notwithstanding, it hits the 60 percent mark by the end of the period. One would expect this number to be higher, but a significant number of individuals participated in the transmission of knowledge without specializing in
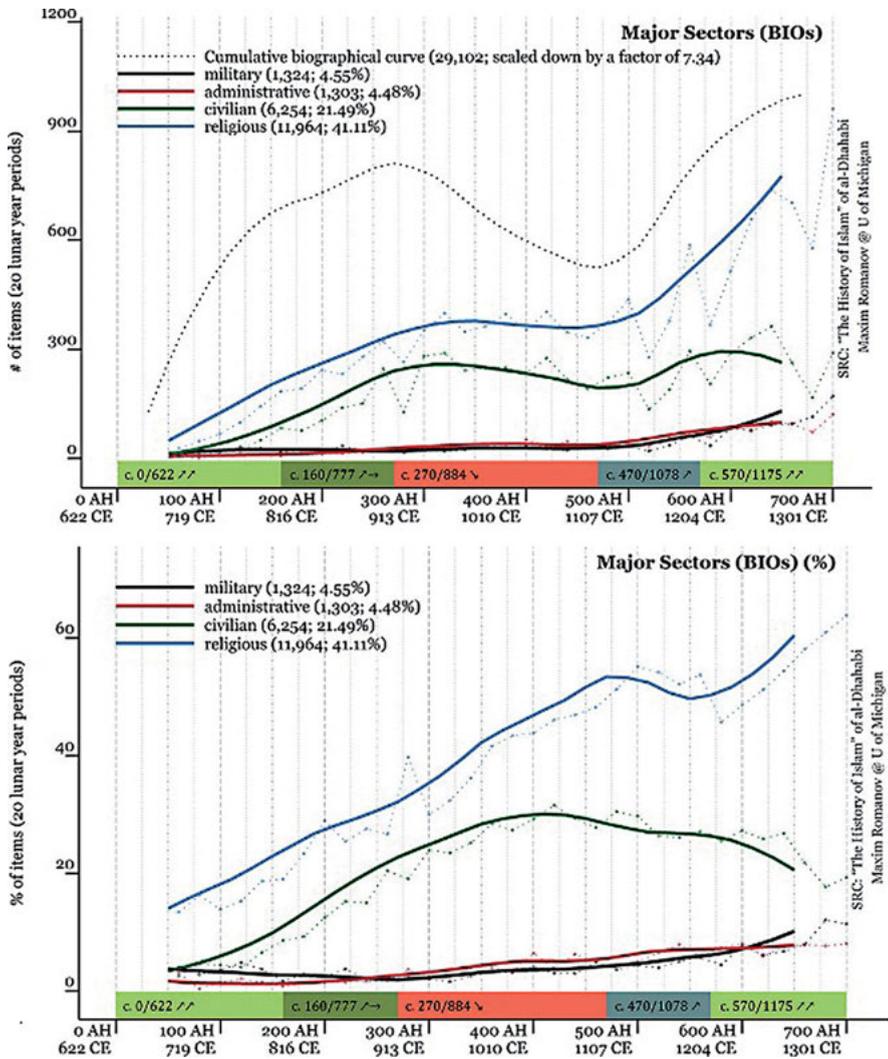
**Figure 6.7.** Major Sectors of Islamic Society (as represented in the *Taʾrīkh al-islām*)

specific fields of religious learning and thus did not earn relevant *nisba*s. This, of course, may result from irregularities in naming practices or the lack of verbal patterns in my synsets.[19]

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[19] For instance, the person is identified as a "jurist" if he is mentioned as a *faqīh* (or some other

The civilian sector is at its highest between 300–400 AH/913–1010 CE, when it reaches a 30 percent share. By the end of the period, it goes down to 20 percent. The number of individuals involved in trades and crafts is about 24–25 percent at its highest point around 400 AH/1010 CE and goes down to 13–14 percent by the end of the period.

The administrative and military sectors are not as significant in terms of numbers, but the representatives of these sectors are in better positions to make the most immediate and most striking impact on society at large. Both sectors keep growing, although while the growth of the administrative sector is constant, albeit rather slow, the growth of the military sector is quite remarkable, especially after 500 AH/1107 CE. Overall, the share of the military sector could have reached ten percent during the later periods, which is very significant considering that at some earlier periods, this sector is lacking altogether. The administrative sector may have hit the mark of about eight percent during the later periods.

5. Major Social Transformations

5.1 De-tribalization

De-tribalization is one of the most striking processes that the onomastic data allows us to discover. Islamic society starts as a tribal society, with up to 85 percent of individuals in the earliest periods qualified through tribal affiliations. As the Islamic community grows and spreads over the Middle East and North Africa, the number of individuals with tribal identities rapidly goes down (Figure 6.8), and by about 350 AH/962 CE only 20–25 percent of the individuals in the *Ta'rīkh al-islām* have tribal affiliations. From this point on—perhaps even earlier—tribal affiliations persevere in different capacities: some as dynastic (most prominently, the *nisba* al-Umawī that spikes again after 350 AH/962 CE in Andalusia), but in most cases as status markers.

Such *nisba*s as al-Anṣārī (Figure 6.9) and al-Qurashī (Figure 6.10) make quite a noticeable comeback. The numbers of al-Anṣārīs (this *nisba* is particularly frequent in Andalusia as well) begin to grow quite rapidly after 350 AH/962 CE, and the number of al-Qurashīs practically skyrockets right after 500 AH/1107 CE.

nominal descriptor pertaining to the field of Islamic law); however, at this point my approach does not take into account such instances as *tafaqqaha ʿalá fulān bn fulān*, "he studied [Islamic] jurisprudence under so-and-so." This more extensive approach will be implemented in the future.
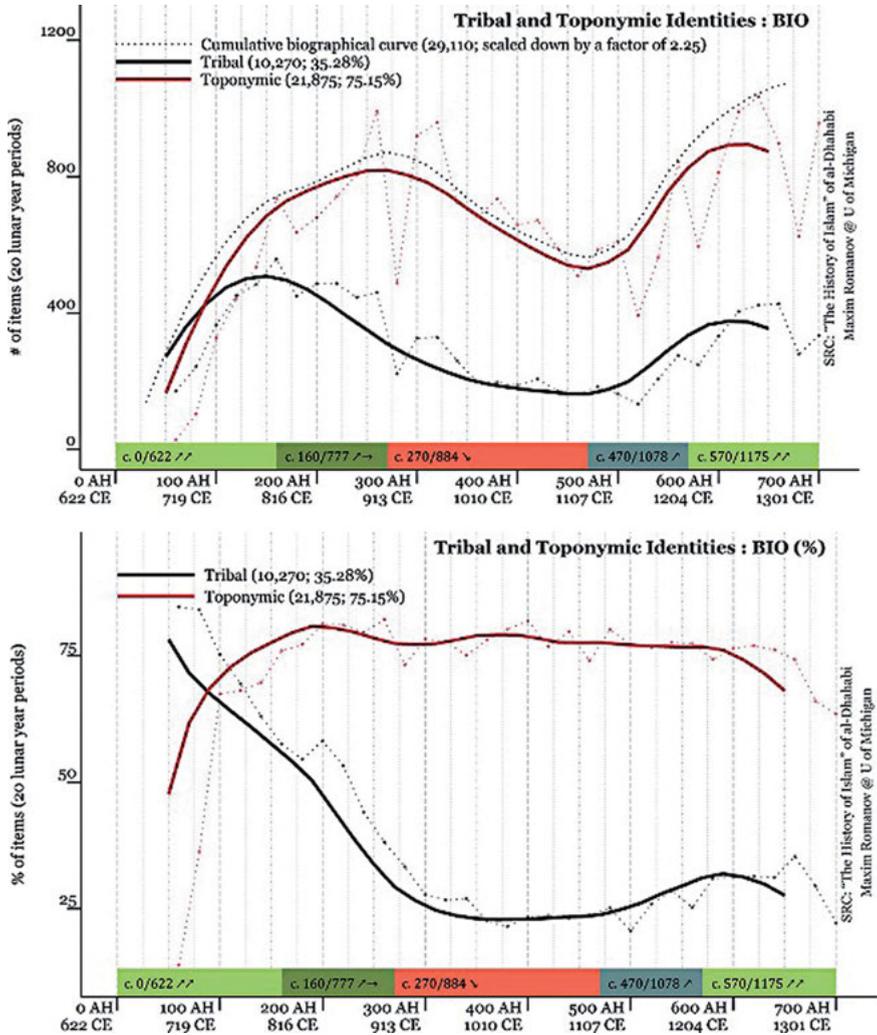
Figure 6.8. Individuals with Tribal and Toponymic *Nisba*s in the *Ta'rīkh al-islām*.

However, even though their absolute numbers are much higher in the later periods, their percentages never reach their early peaks: the highest peak of al-Anṣārīs in the earliest periods is 18.32 percent, while the highest one in the later periods is only 6.53 percent; with al-Qurashīs, these numbers are 8.42 percent and 3.31 percent, respectively. Some other tribal *nisba*s are re-claimed as well, but the overall number of individuals with names that associate them with Arab tribes remains rather low, only briefly going above the 30 percent mark.
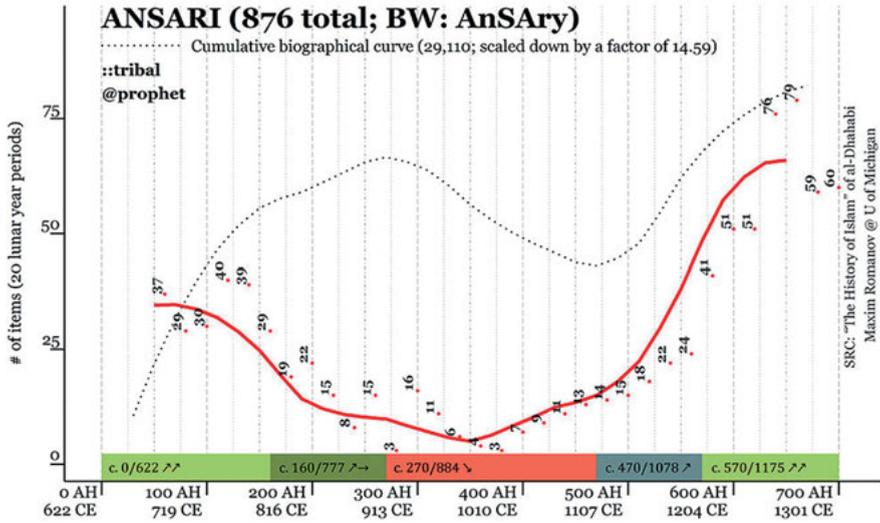
Figure 6.9. Individuals with *nisba* al-Anṣārī in the *Taʾrīkh al-islām*. Although al-Anṣār, "The Helpers [of the Prophet]," are not exactly a tribe, this group, being a product of the tribal society of Arabia, in many ways functioned as such.
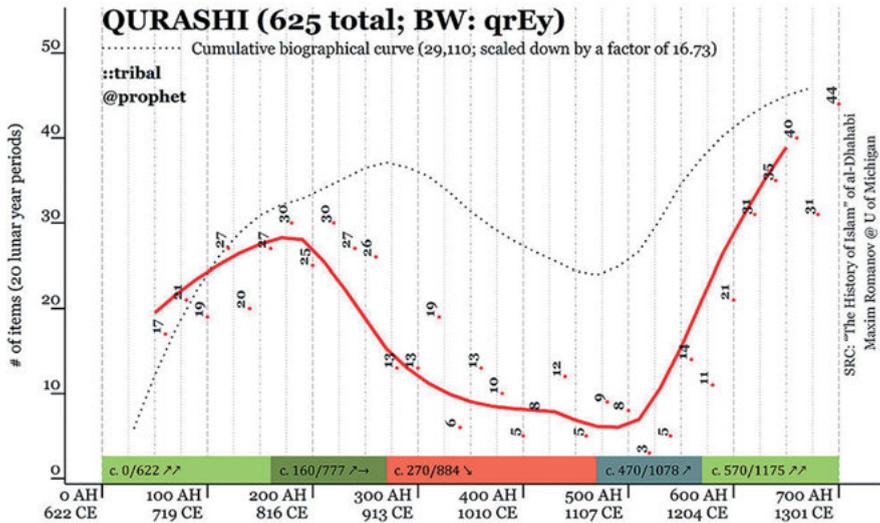
Figure 6.10. Individuals with *nisba* al-Qurashī in the *Taʾrīkh al-islām*.

Most tribal *nisba*s display rather distinctive orientations toward the East or the West of the Islamic world. 'Late bloomers' are most often oriented toward

the West (Figure 6.11). For example, such *nisba*s as al-Qaysī (208) and al-Lakhmī (183) feature most prominently in Andalusia (84 al-Qaysīs and 83 al-Lakhmīs); al-Tujībī (127)—in Andalusia (57) and Egypt (46); al-Makhzūmī (182)—in Egypt (33);[20] al-Saʿdī (191)—in Egypt (50) and Syria (25). But again, the percentages of 'late bloomers' never reach those of the earlier periods.
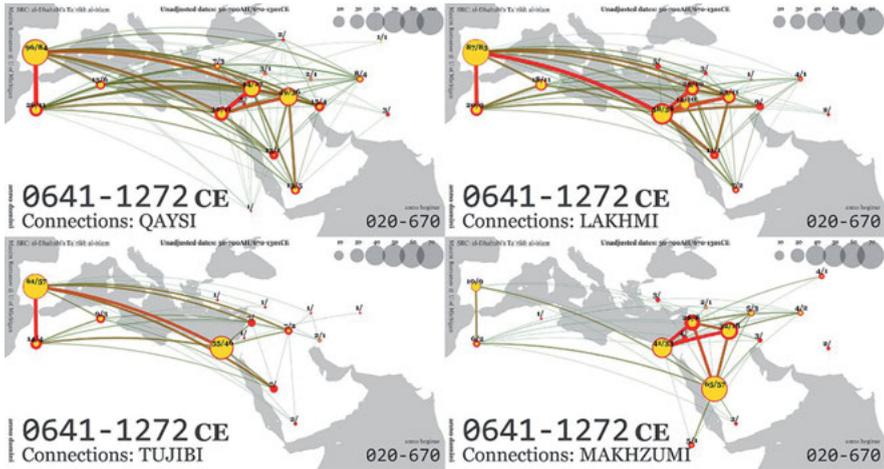
Figure 6.11. Western Orientation of Some Tribal 'Late bloomers'.
NB: Each map has its own scale.

The change in tribal identities can also be seen through the numbers of unique tribal *nisba*s per period (Figure 6.12). In general, they display a similar trend. At its highest, the number of unique tribal *nisba*s fluctuates at around 115 during the period 100–200 AH/719–816 CE. It drops to about 60 by 500 AH/1107 CE and then grows back to about 80—most likely through the re-appropriation of old tribal *nisba*s that are now used as status markers as well as through the introduction of Turkic and Kurdish tribal identities—but by the end of the main period, this number goes down to the 60–70 range.

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20 The first major peak of the *nisba* al-Makhzūmī is around 150 AH/768 CE, and geographically it peaks largely in the Central Arabian Cluster (65 al-Makhzūmīs).
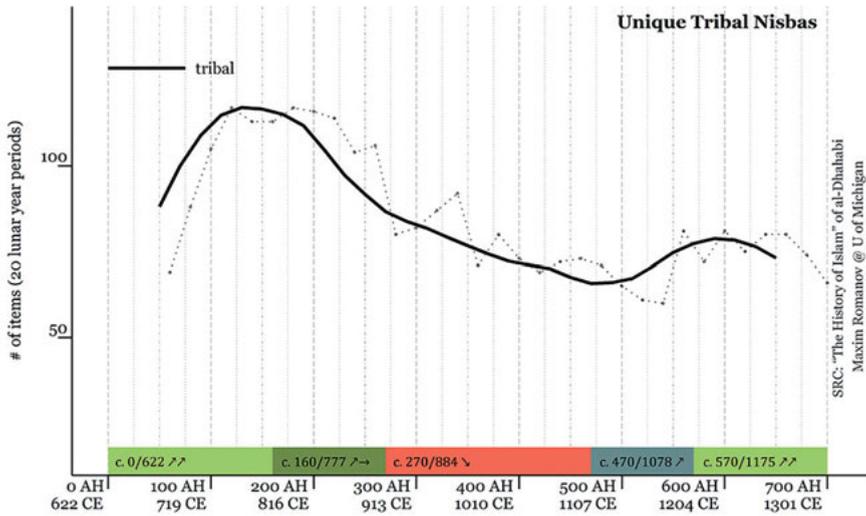
Figure 6.12. Unique tribal *nisba*s in the *Ta'rīkh al-islām*.

5.2 Militarization

Onomastic data from *Ta'rīkh al-islām* allows us to take a closer look at the process characterized by Hodgson as "perhaps the most distinctive feature of the Middle Islamic periods."[21] The absolute numbers on Figure 6.13 (left) show that the military sector of élites begins to grow rapidly after 500 AH/1107 CE—the numbers of *amīr*s included in the *Ta'rīkh al-islām* are staggering.[22] Geographically, this spike of militarization is clearly visible in Iraq, the Jazīra, and Egypt, but in Syria more than anywhere.

The relative numbers in Figure 6.13 (right) allow for a more detailed glimpse into how the military were treated by the learned class, who composed biographical collections that became the sources of al-Dhahabī's "History." And the percentages tell a somewhat different story. Interestingly, the turning points of the

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[21] Marshall G. S. Hodgson, *The Venture of Islam: Conscience and History in a World Civilization. Vol. 2. The Expansion of Islam in the Middle Periods* (Chicago: University of Chicago Press, 1974), 64.

[22] Unfortunately, at the moment my algorithms are not tuned well enough to trace all individuals who belonged to the military sector. The *nisba* "*al-amīr*" should serve well as an indicator: it is the most frequent "descriptive name" within the military sector, and it is the easiest to trace computationally.

military curve coincide with those of the cumulative biographical curve. The military curve, however, has three clearly visible sections or periods. The first section, the early period up until 270 AH/884 CE, shows the decline of the military in Islamic society. This process of de-militarization went on hand-in-hand with de-tribalization, during which the diversity of the Islamic community grew, the ethos changed, and swords and horses were exchanged for pens and donkeys. The year 270 AH/884 CE marks the first peak of the cumulative biographical curve: the highest percentage of the learned and the lowest percentage of the military in the *Taʾrīkh al-islām*.

During the middle period of 270–570 AH/884–1175 CE, when the cumulative biographical curve takes a dive and then, after 470 AH/1078 CE, begins to recover, the share of the military in *Taʾrīkh al-islām* grows slowly. This can be marked as the beginning of the (re)militarization of Islamic élites. Unlike in the early period, however, now the *amīr*s are not Arab[ian] warriors, but Turkic military commanders.

After 570 AH/1175 CE—when the cumulative curve recovers and continues growing further—the percentage of military commanders in the élites begins to grow as rapidly as their absolute numbers. This third period shows a successful integration of the military into the élites, and their numbers strongly suggest that religious scholars take even minor commanders seriously.

Military commanders do a lot to make a place for themselves in the dense social space of Islamic society: as their biographies show, they build *madrasa*s, hospitals (*[bī]māristān*), and establish other *waqf* institutions. More and more often, they participate in the transmission of knowledge, which scholars report.

The military—the *amīr*s themselves and members of their families[23]—are not the only ones building *madrasa*s, and, judging by the frequencies of their mentions, their establishments are not the most prominent. However, they compensate for this in numbers: there are significantly more endowments established by the military than by members of other groups.[24] Figure 6.14 shows the curves of

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23 Most prominently, women from their households. See, for example, R. Stephen Humphreys, "Women as Patrons of Religious Architecture in Ayyubid Damascus," *Muqarnas* 11 (January 1, 1994): 35–54, DOI:10.2307/1523208.

24 See, for example, al-Dhahabī, *Taʾrīkh al-islām*: v.28, 311–312; v.29, 68–76; v.37, 57–58; v.37, 185–186; v.38, 157–158; v.39, 370–387; v.41, 161–164; v.42, 407; v.44, 220; v.45, 119; v.45, 164; v.45, 311–313; v.45, 359; v.45, 402–406; v.46, 87–88; v.46, 289; v.46, 431–432; v.47, 165; v.47, 308; v.49, 192; v.50, 264; v.51, 196–197; v.51, 369–370; v.52, 368; v.52, 409–411. On military patronage, see also R. Stephen Humphreys, "Politics and Architectural Patronage in Ayyubid Damascus," in *The Islamic World from Classical to Modern Times: Essays in Honor of Bernard Lewis*, ed. Clifford Edmund Bosworth (Princeton, NJ: Darwin Press, 1989), 151–74.
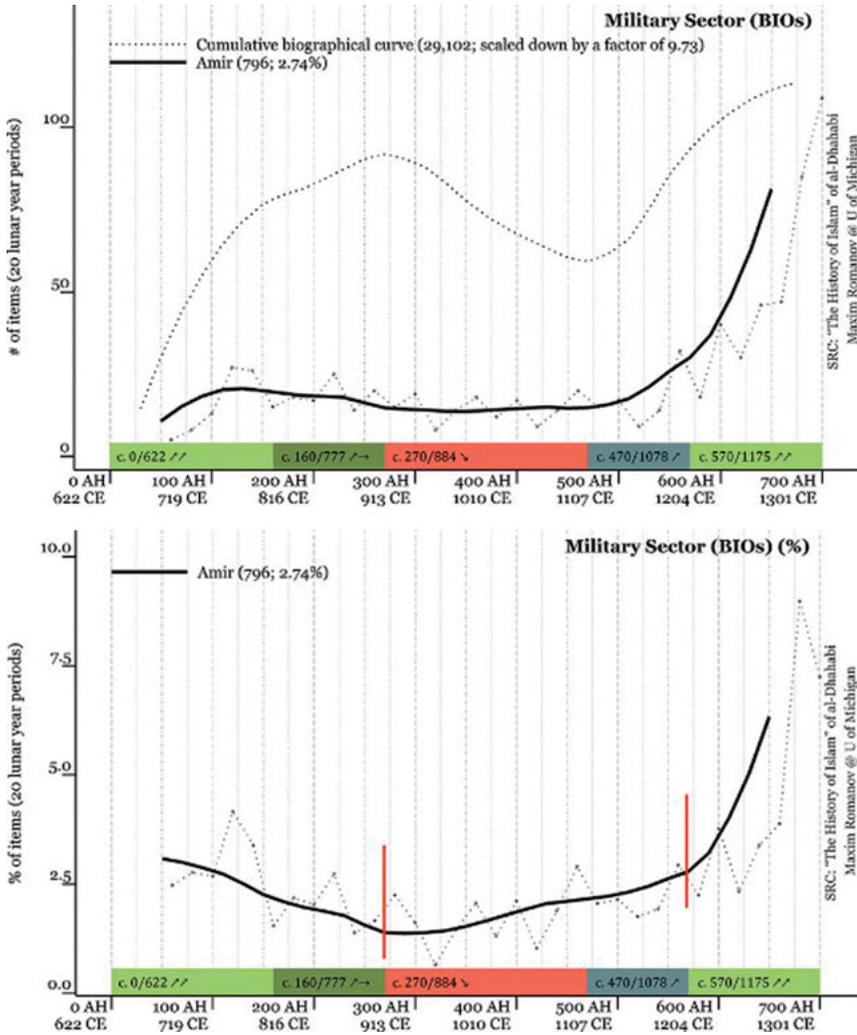
Figure 6.13. The Military Sector in the *Taʾrīkh al-islām*.

the most frequently mentioned *madrasa*s in the *Taʾrīkh al-islām*. The vizieral al-Niẓāmiyyas and the caliphal al-Mustanṣiriyya feature more prominently. However, the curves strongly suggest that their prime time is over, while 'military' *madrasa*s—al-Ẓāhiriyya, al-Amīniyya, al-Nāṣiriyya, al-Nūriyya, al-ʿĀdiliyya, al-Qaymariyya, and others—are on the rise.

The "Fulān al-dīn" honorifics, which in the earlier periods were reserved for religious scholars, become very common among the military, while the old pat-
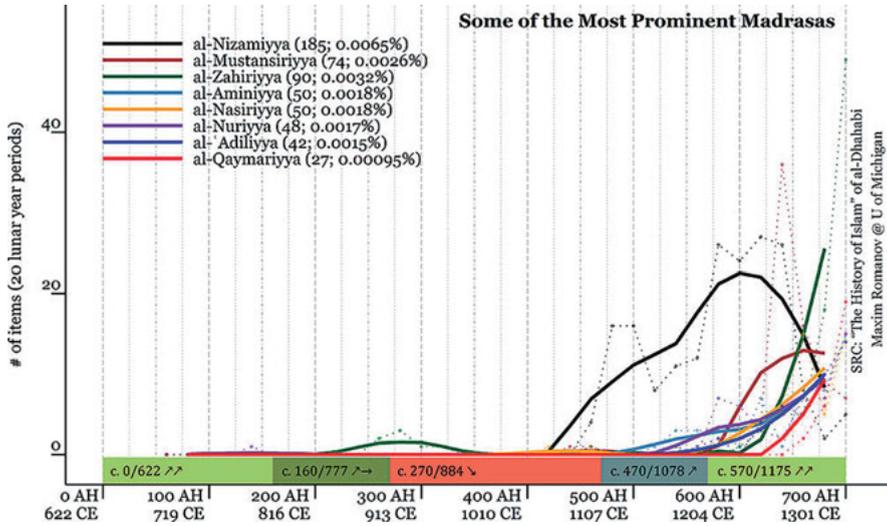
Figure 6.14. Mentions of Most Prominent Madrasas.

tern of "Fulān al-dawla" practically disappears (see Figure 6.15).[25] It is not entirely clear whether these names are given to the military by religious scholars or whether they are self-claimed (most likely both), but the fact that the military are listed under these honorifics in biographical collections implies that, at the very least, religious scholars endorsed them.

Frequencies of such words as *khalīfa/amīr al-muʾminīn*, *sulṭān*, and *amīr* in biographies show that the fourth/tenth century was a the period (Figure 6.16) when scholarly attention started shifting from caliphs to *sulṭāns* and *amīrs*, who were gaining more power and more social presence. This shift in frequencies also neatly marks the end of the period which Hodgson characterized as the High Caliphal Period (in his chronology, c. 692–945 CE)[26] and the beginning

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25 Somehow, the "Fulān al-dīn" names still have a strong steel aftertaste. The most common first components of the "Fulān al-dawla" pattern are: Sayf al-dawla, "Sword of the Dynasty;" Nāṣir..., "Helper...;" Naṣr, "Victory;" Muʿizz, "Strengthener;" ʿIzz, "Strength;" ʿAḍud, "Support;" Tāj, "Crown;" Bahāʾ, "Splendor;" Ḥusām, "Cutting Edge." The most first components of the "Fulān al-dīn" pattern are: Sayf al-dīn, "Sword of Religion;" ʿIzz..., "Strength...;" Jamāl..., "Beauty...;" Badr..., "Full Moon...;" Shams..., "Sun...;" Ṣalāḥ..., "Goodness...;" Ḥusām..., "Cutting Edge..., " Quṭb..., "Pole...;" ʿAlam..., "Banner...".

26 There is also a late peak that corresponds to the temporal restoration of the independence of the ʿAbbāsid caliphate during the second half of the sixth/twelfth century, but it is equally short-lived.

of the Earlier Middle Islamic Period (in his chronology, c. 945–1258 CE): the era of *sulṭān*s and *amīr*s.
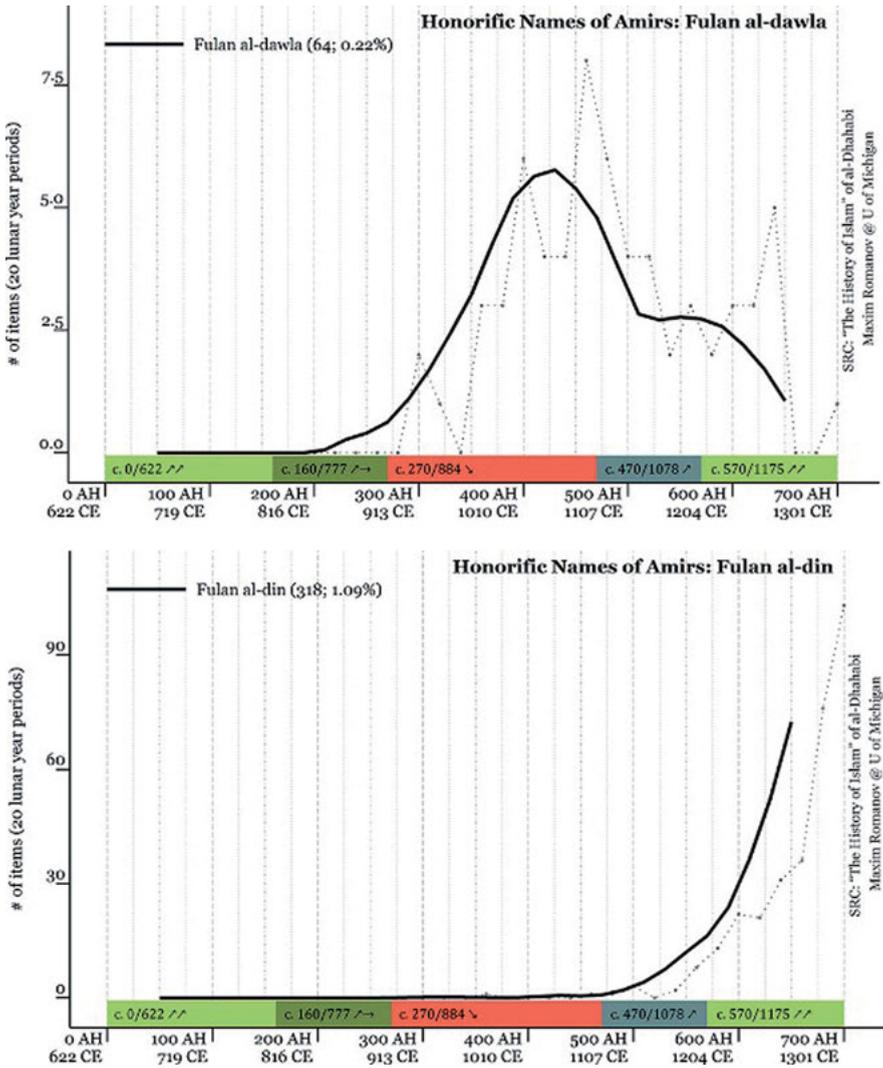

Figure 6.15. Patterns of Military Honorific Names: Fulān al-dawla, the most common pattern in the middle period, gets replaced by Fulān al-dīn pattern in the later period.
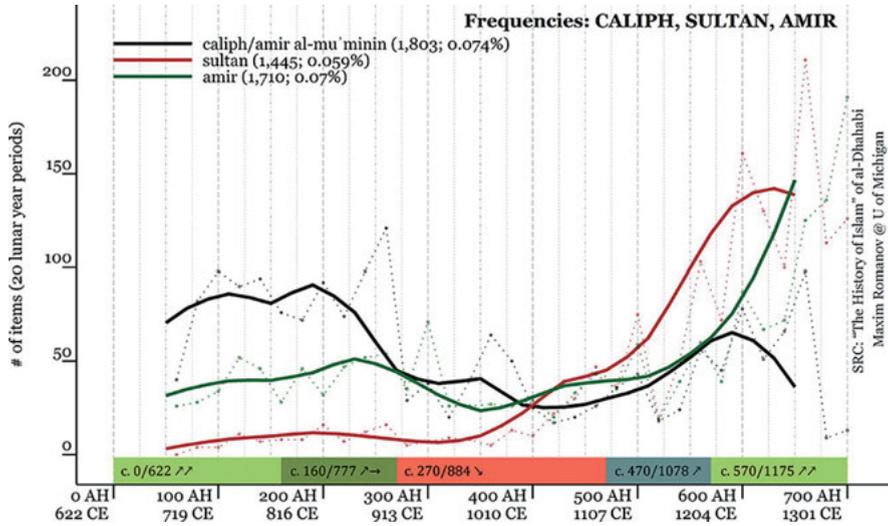
Figure 6.16. Frequencies of *khalīfa amīr al-muʾminīn, sulṭān, amīr.*

5.3 De-civilianization

As was noted above, the share of the civilian sector noticeably decreases after 400 AH/1010 CE. The diversity of crafts and trades within the civilian sector (Figure 6.17) reaches its highest point around 300 AH/913 CE, when 85 different trades and crafts are represented.[27] After 300 AH/913 CE the diversity goes down, getting to the 60s range by the end of the period.

Looking more closely into trades and crafts, it can be pointed out that several sectors are clearly distinguishable:[28] textiles (1, 495), foods (799), metalwork (331), "chemistry" (349),[29] clothes (306), finances (278), paper/books (253), brokerage (231), jewelry (218), and sundry services (170).

All sectors peak sometime between 300 AH/913 CE and 500 AH/1107 CE, but after that they show steady decline—even in those rare cases when absolute numbers remain quite significant, their percentages unmistakably go down.

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27 I should remind the reader that only *nisba*s that are used to describe at least ten individuals are considered in this analysis.

28 Largely following Shatzmiller's classification; see *Shatzmiller, Labour in the Medieval Islamic World*. These sectors often overlap.

29 Trades that involve dealing with any complex compounds: al-ʿAṭṭār, "druggist, perfumer;" al-Ṣaydalānī, "apothecary, druggist;" al-Ṣābūnī, "soap maker/seller," etc.
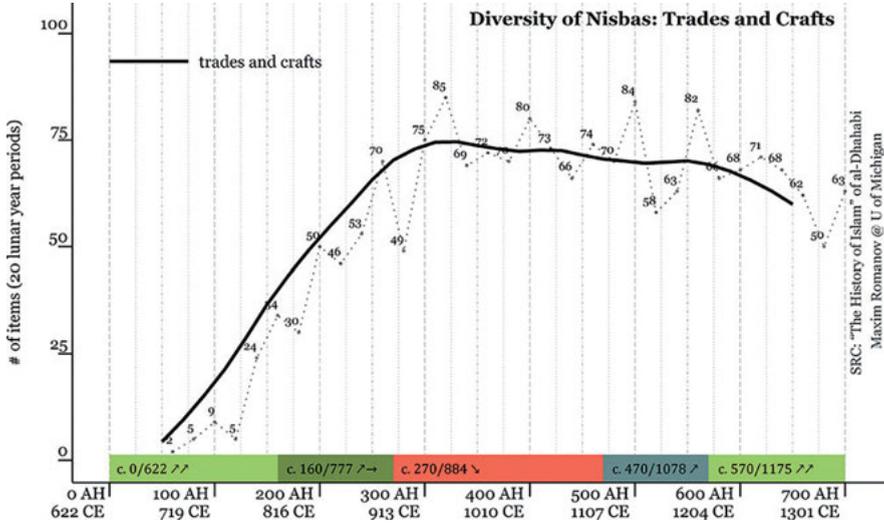
Figure 6.17. Diversity of Trades and Crafts: Numbers of unique *nisba*s referring to trades in crafts by 20 lunar year periods.

Practically all individual *nisba*s show the same trend. Merchants (sing. *tājir*, 294; Figure 6.19) constitute the only group that shows a different trend, and their numbers actually grow by the end of the period. This is, however, only because this is a blanket category that encompasses all the above listed 'industries' without emphasizing any specific one in particular. Figure 6.18 shows the cumulative trend of involvement of religious scholars in crafts and trades. The curve based on absolute numbers (*left*) shows that numbers of scholars—who were either directly involved in specific crafts and trades or came from families that made their fortune in those areas—remained rather high until 600 AH/1204 CE; relative numbers (*right*) show that the steady downward trend in this sector begins as early as 440 AH/1049 CE—about three decades before the cumulative biographical curve (470 AH/1078 CE) starts recovering.

By the end of the period, the emphasis on identities shifts, and while "secular occupations" are still not uncommon among the learned,[30] they are definitely no longer the main focus of biographers, who instead pay more attention to positions and family connections (see the section on professionalization below).

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30 The decline does not appear as staggering as, for example, Cohen's study argued; see Cohen, "The Economic Background and the Secular Occupations of Muslim Jurisprudents and Traditionists in the Classical Period of Islam: (Until the Middle of the Eleventh Century)."
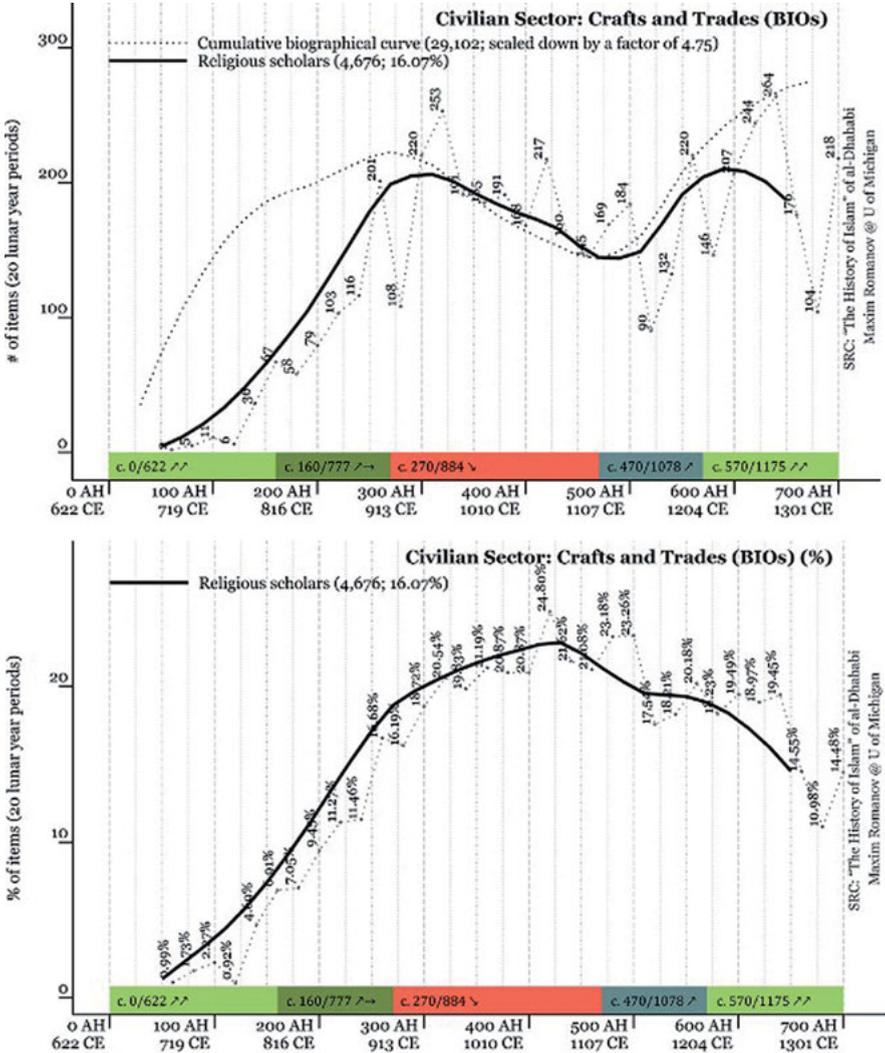
Figure 6.18. The Growth and Decline of Crafts and Trades.

The geographical distribution of these professions is most puzzling. Essentially, all 'industries' display the same pattern: the larger the region, the larger the presence of individuals involved in specific 'industries'. Iraq always comes first, followed by Iran (representation by sectors varies slightly, but northeastern Iran usually has highest numbers), then Syria and Egypt. Such a geographical distribution of 'industries' suggests that occupational *nisba*s were also used as

necessary specifiers to distinguish among individuals in large communities.[31] This issue might be resolved by adding local biographical collections to the corpus and experimenting with data grouping until some distinctive patterns can be discerned. Data from non-literary sources will be crucial for advancing this inquiry, which requires undivided attention.

Whether this decline of the civilian sector is a result of the actual withdrawal of the learned from trades and crafts or the loss of awareness of this part of their identity, the general effect on the development of the religious sector would still be the same: the loss of connections with the broader population. It is not that religious scholars stopped maintaining connections with the populace at large, but they gradually turned into a self-reproducing class whose members were primarily concerned about their own group interests.

5.4 Professionalization and Institutionalization

The professionalization and institutionalization of the learned class are another two processes that take place during the period covered in the *Taʾrīkh al-islām*. These processes have been discussed at length in academic literature,[32] although in most cases the emphasis is on institutionalization.[33]

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31 Very similar to what Bulliet argued regarding toponymic *nisba*s: "For example Karkh, a popular quarter of Baghdad, appears in the nisba al-Karkhī when representation from Iraq is high. When the proportion is smaller, the name of the major city itself is a common nisba. In the example given, a later resident of Karkh would appear as al-Baghdadī. Finally, when the proportion is very low, the nisba will frequently be derived from the entire province, that is, al-Baghdadī becomes al-ʿIrāqī." See Bulliet, *Conversion to Islam in the Medieval Period*, 12.

32 The most important studies are: George Makdisi, *The Rise of the Colleges: Institutions of Learning in Islam and the West* (Edinburgh: Edinburgh University Press, 1981); Jonathan P. Berkey, *The Transmission of Knowledge in Medieval Cairo: A Social History of Islamic Education* (Princeton, NJ: Princeton University Press, 1992); Michael Chamberlain, *Knowledge and Social Practice in Medieval Damascus, 1190–1350* (Cambridge/New York: Cambridge University Press, 1994). To a large extent, Berkey's and Chamberlain's studies are responses to Makdisi's "over-institutionalization."

33 It seems that Gilbert is the only one to use this term in her study of the learned of Medieval Damascus; see Joan E. Gilbert, "Institutionalization of Muslim Scholarship and Professionalization of the ʿUlamā' in Medieval Damascus," *Studia Islamica* 52 (January 1, 1980): 105–34, DOI:10.2307/1595364. However, in her study this term appears to blend into institutionalization, and both become practically indistinguishable. Other scholars mention professionalization almost exclusively with reference to Gilbert's work. See, for example, Chamberlain, *Knowledge and Social Practice in Medieval Damascus, 1190–1350*, 70; Daphna Ephrat, *A Learned Society*
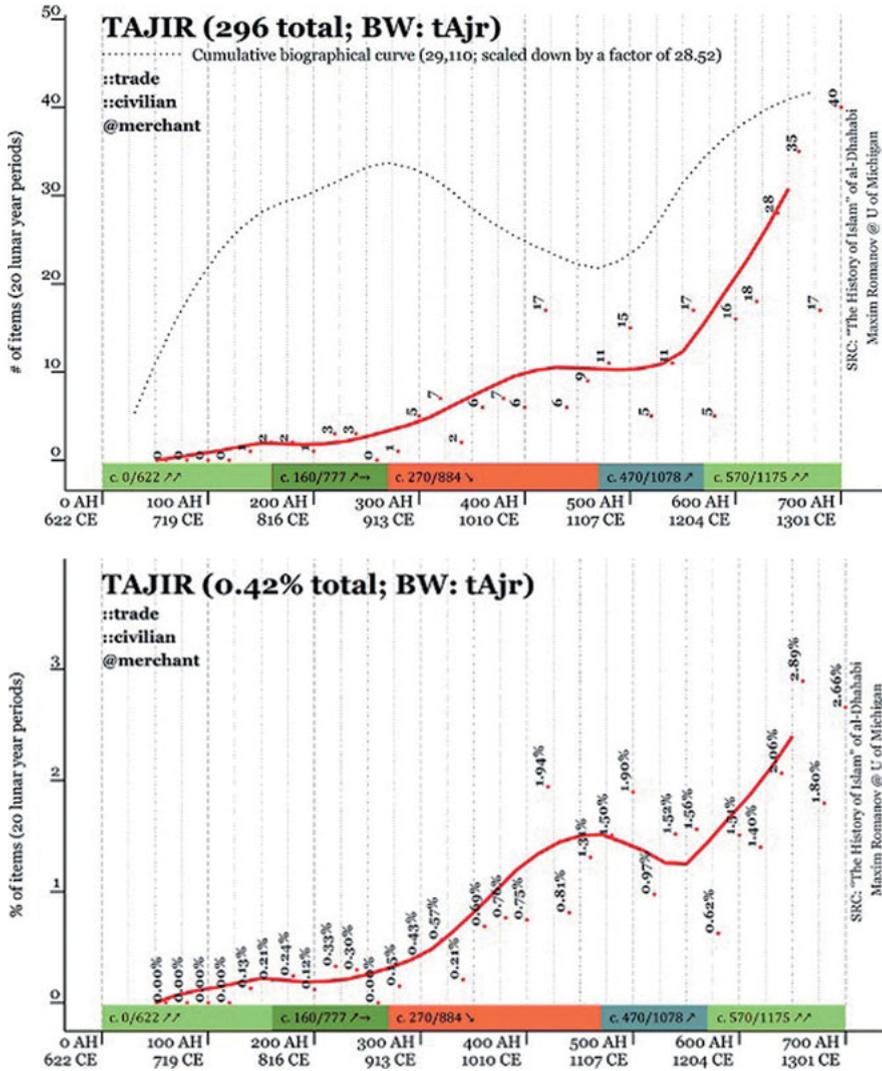
Figure 6.19. The Growth of Merchants.

Here 'professionalization' is understood as the growth of complexity of religious learning that leads to its branching into specific disciplines, mastering

which would eventually require full-time commitment. Professionalization implies the development of a community of specialists who maintain qualifying standards and ensure demarcation from the non-qualified; ideally, mechanisms of monetary and status compensation for professional services should also develop during this process.
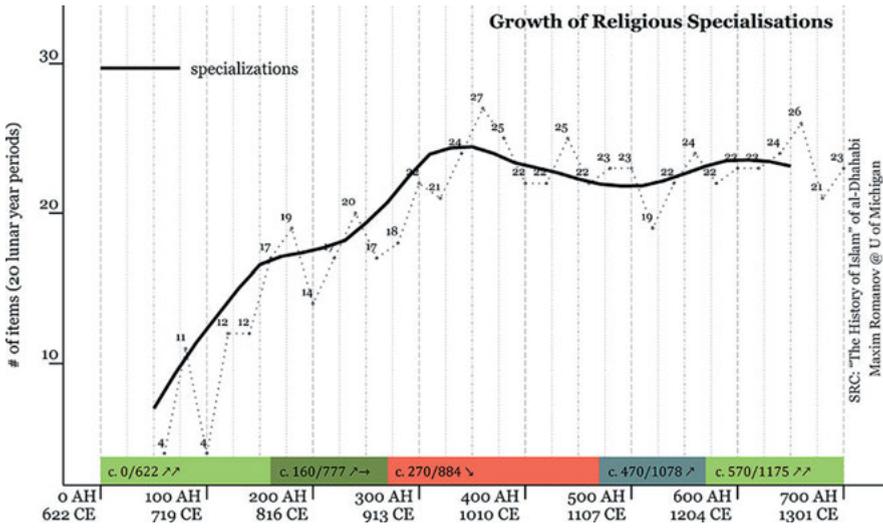

Figure 6.20. Growth of Religious Specializations: Numbers of unique *nisba*s referring to religious specializations by 20 lunar year periods.

If we agree on recognizing the process of the branching of the religious learning into specific disciplines as an indicator of professionalization, we may look at the growth of religious specializations as indicated through "descriptive names." Figure 6.20 shows that the process of branching reaches its highest point during 300–350 AH/913–962 CE, after which the number of specializations remains on the same level and fluctuates only slightly.

Although completely devoid of both buzzwords, Melchert's study is perhaps the most valuable insight into the process of professionalization.[34] In his book on the formation of the Sunnī legal schools (*madhhab*), Melchert offered three major criteria: the recognition of the chief scholar (*raʾīs*), commentaries (*taʿliqa*) on the summaries of legal teachings (*mukhtaṣar*) as a proof of one's qualification, and a

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34 Christopher Melchert, *The Formation of the Sunni Schools of Law, 9th-10th Centuries C.E.* (Leiden/New York: Brill, 1997).

more or less regulated process of transmission of legal knowledge, through which the achievement of required qualification is ensured. Chronologically, Melchert placed this process for the Shāfiʿīs, Ḥanbalīs, and Ḥanafīs in Baghdad of the late ninth—early tenth centuries.[35] Keeping in mind this coincidence of Melchert's close reading of legal *ṭabaqāt* and my distant reading of *Taʾrīkh al-islām*, we may—at least tentatively—consider 300 AH/913 CE to be a turning point in the process of professionalization.

Data from the *Taʾrīkh al-islām* shows that the professionalization of religious knowledge (around 300 AH/913 CE) is not directly related to scholars' abandoning their gainful occupations in the civilian sectors, as this process will start only around 430 AH/1039 CE. However, professionalization failed to bring about one very important thing, namely more paid positions for the learned. This must have forced men of learning into difficult positions where they had to maintain a delicate but uncomfortable balance between keeping up with higher standards of religious learning and earning a living. The financial difficulties that professionalization imposed on the life of a scholar may have become quite a discouraging factor for the young who were considering career paths. Keeping in mind that the decline of the main curve begins c. 270 AH/884 CE—i.e., roughly around the time when the number of religious specializations reaches its highest point—it is tempting to consider that professionalization has something to do with this decline. After all, a full-time commitment to study religious sciences leaves one no time to earn a living through gainful occupations in the civilian sector. Charging money for teaching religious subjects was considered illicit, and there are hardly any indications that the number of positions for religious specialists grew to compensate for this unfortunate development. To succeed in such conditions, one had to be either extremely resolute or come from a wealthy family in order to afford the career of a scholar. And since both of these situations are in limited availability in any society, this could explain the decline in numbers of biographies.

The introduction and spread of *waqf* institutions is considered a turning point in the institutionalization of the learned. The salaried positions of these institutions offered a solution to the complication of professionalization. Frequencies of references to *waqf* institutions in biographies (Figure 6.21) show that they —most importantly the *madrasas*—become a noteworthy detail of biographies

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35 Melchert explains the failure of the Mālikīs by their being too closely linked to the caliphal patronage, and when the caliphs were eclipsed, so were the Mālikīs. See ibid., 176.
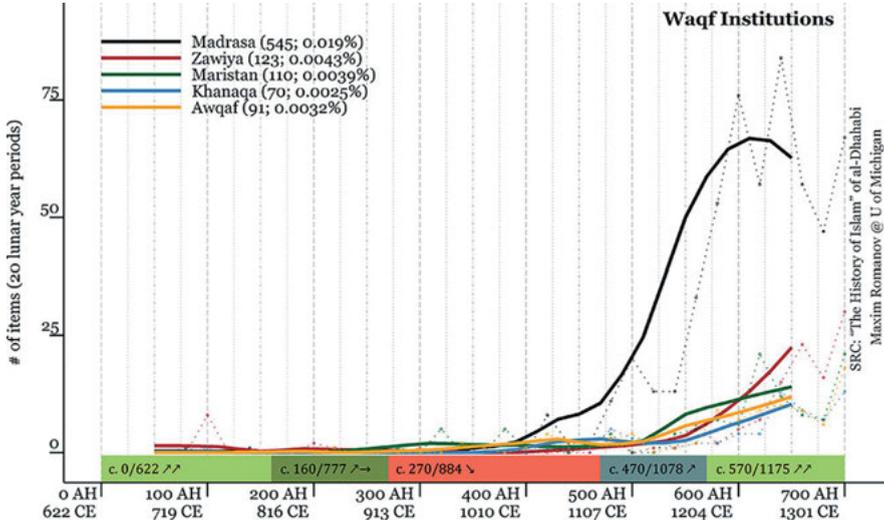
Figure 6.21. References to *Waqf* Institutions in Biographies.

soon after 400 AH/1010 CE, about 100 lunar years after the turning point in professionalization, and a very important one after 500 AH/1107 CE.[36]

However, by offering salaried positions, the *waqf* institutions also reconfigured the structure of the learned class, which in the long run had a very negative effect. In his study of medieval Damascus,[37] Chamberlain convincingly argued that salaried positions (*manāṣib*) became one of the major objects of contention among the learned, who were now concerned about winning and holding as many of these positions as possible. One of their strategies was to ensure that the positions stayed within a family—household—which led to the formation of dynasties of religious scholars and, in the long run, the transformation of the religious class into a rather closed social stratum, to which the word 'clergy' became more and more applicable as time went on.

As the data from the *Ta'rīkh al-islām* indicate (Figure 6.22), the role of family connections unmistakably increases after 400 AH/1010 CE. The tribal nature of early Islamic society explains the high frequency of references to close relatives in the early periods. However, references to parents are most frequent—largely to

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36 The decline of the frequency of the word *madrasa* should not be interpreted as a decline of this institution, but rather as a change in the form of reference in general: most *madrasa*s are referred to by their "al-Fulāniyya" names (see Figure 6.14 above).

37 *Chamberlain, Knowledge and Social Practice in Medieval Damascus, 1190–1350.*
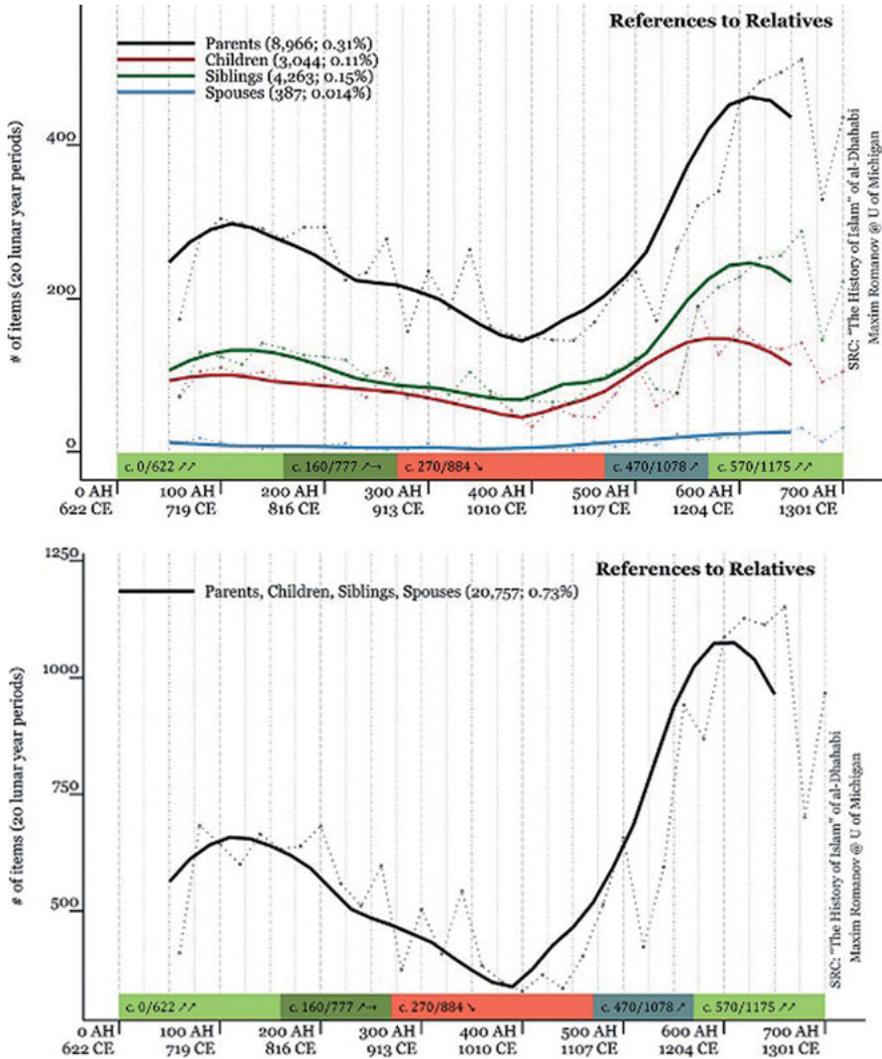
**Figure 6.22.** References to Relatives. The graph on the left shows the major categories of relatives, while the one on the right shows the same data combined into one graph.

fathers,[38] which is understandable, considering the importance of lineage through the male line within tribal society. But again, the curve of references

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38 The most common references are the forms of *abū* ("father"). Since this word is also the es-

goes down steadily between 120 AH/739 CE and 380/991 CE, mirroring the curve of tribal identities that also goes down, while the number of biographies keeps on growing.

After 380 AH/991 CE, references to family members practically skyrocket and even increase in pace slightly around 500 AH/1107 CE. Unlike in the early period, references to most members of the immediate family become very common: parents (the word "parent" [*wālid[a]*] becomes particularly common), siblings (brothers and sisters—*akhū*, *ukht*), children (sons and daughters—*ibnu-hu*, *bintu-hu*, etc.), and, to a lesser extent, spouses (husbands and wives—*zawj[a]*). The same trend can be seen in the references to uncles, aunts, grandparents, and grandchildren. These shifts—not just the growth of frequencies, but also the growth of varieties of familial references—may be interpreted as a shift of scholarly attention from the lineage to the household.

If we accept these rates of frequencies as an indicator of the formation of households, then it appears that scholarly households begin growing earlier than *waqf* institutions. The growth of scholarly families thus may have been caused by professionalization and then boosted by institutionalization.

6. Concluding Remarks

Many of these social transformations have been discussed in the academic literature, and one may say that the present analysis shows only what "we already know," to use the most common dismissal of the digital humanities.[39] However, the exploratory model presented here offers a methodologically different *data-driven* perspective on the Islamic élites over the course of almost seven hundred years. With this model, we were able to identify and trace a number of major processes that took place over this long period: how Islamic society, which started as tribal entity, stopped being such by the beginning of the tenth century CE; how the role of the military commanders increased from the twelfth century on; how the diversity of social backgrounds of religious scholars gradually declined, and they turned into a rather isolated group. One should also keep in mind that our field is making its first steps into the digital realm, and this piece is a show-

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sential part of *kunya*, an extremely common patronymic element of the Arab/Muslim name, only its forms with pronominal suffixes—such as *abū-hu* ("his father")—are considered. The same principle is applied to other ambiguous family terms.

39 My digital study of preaching tells a story that disagrees with the previous scholarship on this topic. See chapter three in *Romanov, Computational Reading of Arabic Biographical Collections*.

case and an invitation to work with explicitly described models that can be discussed, compared, modified, and applied to new sources. With models, we can stop futile discussions about the meaning and reliability of certain data and start exploring Islamic history experimentally. By developing and testing multiple complex models, we can eventually arrive at a better understanding of both our sources and the processes they describe. With models, we can compare multiple sources and evaluate entire genres. Right now, when scholars of Islam are entering the domain of digital humanities, there is a dire need for transparency in our methods—and modeling appears to be the most optimal option—especially if we venture to study the entire digital corpus of classical Arabic sources, which at the moment may have already exceeded 800 million words.

Bibliography

al-Dhahabī. *Taʾrīkh al-islām wa-wafayāt al-mashāhīr wa-al-aʿlām*. Edited by ʿUmar Tadmurī. 2nd edition. 52 vols. Bayrūt: Dār al-Kitāb al-ʿArabī, 1990.

Berkey, Jonathan P. *The Transmission of Knowledge in Medieval Cairo: A Social History of Islamic Education*. Princeton, NJ: Princeton University Press, 1992.

Bulliet, Richard W. *Conversion to Islam in the Medieval Period: An Essay in Quantitative History*. Cambridge, MA: Harvard University Press, 1979.

Chamberlain, Michael. *Knowledge and Social Practice in Medieval Damascus, 1190–1350*. Cambridge/New York: Cambridge University Press, 1994.

Cohen, Hayyim J. "The Economic Background and the Secular Occupations of Muslim Jurisprudents and Traditionists in the Classical Period of Islam: (Until the Middle of the Eleventh Century)." *Journal of the Economic and Social History of the Orient* 13 (1970): 16–61.

Ephrat, Daphna. *A Learned Society in a Period of Transition: The Sunni ʿUlamaʾ of Eleventh Century Baghdad*. Albany: State University of New York Press, 2000.

Gilbert, Joan E. "Institutionalization of Muslim Scholarship and Professionalization of the ʿUlamāʾ in Medieval Damascus." *Studia Islamica* 52 (January 1, 1980): 105–34. DOI:10.2307/1595364.

Hodgson, Marshall G. S. *The Venture of Islam: Conscience and History in a World Civilization. Vol. 2. The Expansion of Islam in the Middle Periods*. 3 vols. Chicago: University of Chicago Press, 1974.

Humphreys, R. Stephen. "Politics and Architectural Patronage in Ayyubid Damascus." In *The Islamic World from Classical to Modern Times: Essays in Honor of Bernard Lewis*, ed. Clifford Edmund Bosworth, 151–74. Princeton, NJ: Darwin Press, 1989.

——. "Women as Patrons of Religious Architecture in Ayyubid Damascus." *Muqarnas* 11 (January 1, 1994): 35–54.

Jockers, Matthew L. *Macroanalysis: Digital Methods and Literary History*. 1st edition. Chicago: University of Illinois Press, 2013.

Makdisi, George. *The Rise of the Colleges: Institutions of Learning in Islam and the West*. Edinburgh: Edinburgh University Press, 1981.

Melchert, Christopher. *The Formation of the Sunni Schools of Law, 9th-10th Centuries C.E.* Leiden/New York: Brill, 1997.

Moretti, Franco. *Distant Reading*. 1st edition. London: Verso, 2013.

——. *Graphs, Maps, Trees: Abstract Models for Literary History.* London: Verso, 2007.

Morris, Ian. *The Measure of Civilization: How Social Development Decides the Fate of Nations.* Princeton, NJ: Princeton University Press, 2013.

——. *Why the West Rules–for Now: The Patterns of History, and What They Reveal about the Future.* New York: Farrar, Straus and Giroux, 2010.

Petry, Carl F. *The Civilian Elite of Cairo in the Later Middle Ages.* Princeton, NJ: Princeton University Press, 1981.

Romanov, Maxim G. "Computational Reading of Arabic Biographical Collections with Special Reference to Preaching (661–1300 CE)." Ph.D. dissertation, University of Michigan, 2013.

Shatzmiller, Maya. *Labour in the Medieval Islamic World.* Leiden: E.J. Brill, 1994.

Wasserstein, David J. "Where Have All the Converts Gone? Difficulties in the Study of Conversion to Islam in Al-Andalus." *Al-Qanṭara* 33 no. 2 (February 11, 2013): 325–42.