

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/20022> holds various files of this Leiden University dissertation.

Author: Chahine, Nadine

Title: Reading Arabic : legibility studies for the Arabic script

Date: 2012-10-25

The Anatomy of the Arabic Script

What do Arabic letterforms look like? What is constant and what is changing? The development of Arabic letterforms has been varied and rich, with many different styles and an abundance of regional variation. These styles form the basis for the collective visual memory of Arabs today. Some styles have gone out of use and as such are less familiar to contemporary readers. Others form the backbone of the text styles that Arabs are reading in today.

What kind of letterforms do Arabs see in public communication today? There are handwritten shop signs, invitations, street banners, and such forms of short occasional texts. These are usually penned by skilled calligraphers. Everything else is Arabic letters in their typographic form, either printed or on screen. This chapter will focus on the handwritten forms used in long texts and their transition into typographic ones. The aim is to examine the anatomy of Arabic letterforms and to dissect them into their essential parts. Why? Type designer Suzana Licko has said: people read best what they read most. The role of familiarity is crucial, and so we need to study and analyze what the readers are used to in reading.

The Aesthetics of Arabic Texts: Manuscript Traditions

This section focuses on three calligraphic styles that were used primarily for long texts. These are the Early Kufi, Naskh, and Nasta'liq. The rich variety of Arabic calligraphy encompasses many different styles, many more than what will be covered in the following paragraphs. These three styles were selected, as will be expanded on in the following paragraphs, because of the role they played in manuscripts, and for having later served as a major point of reference for typographic design.

Early Kufi: The Early Manuscripts, Simplicity, and Contemporary Design Inspiration

The Qurans of the first three centuries of Islam look decidedly different from what one can see today. The format was usually horizontal, the text was written in brown ink and certainly not on paper, and most relevant here: The style of calligraphy

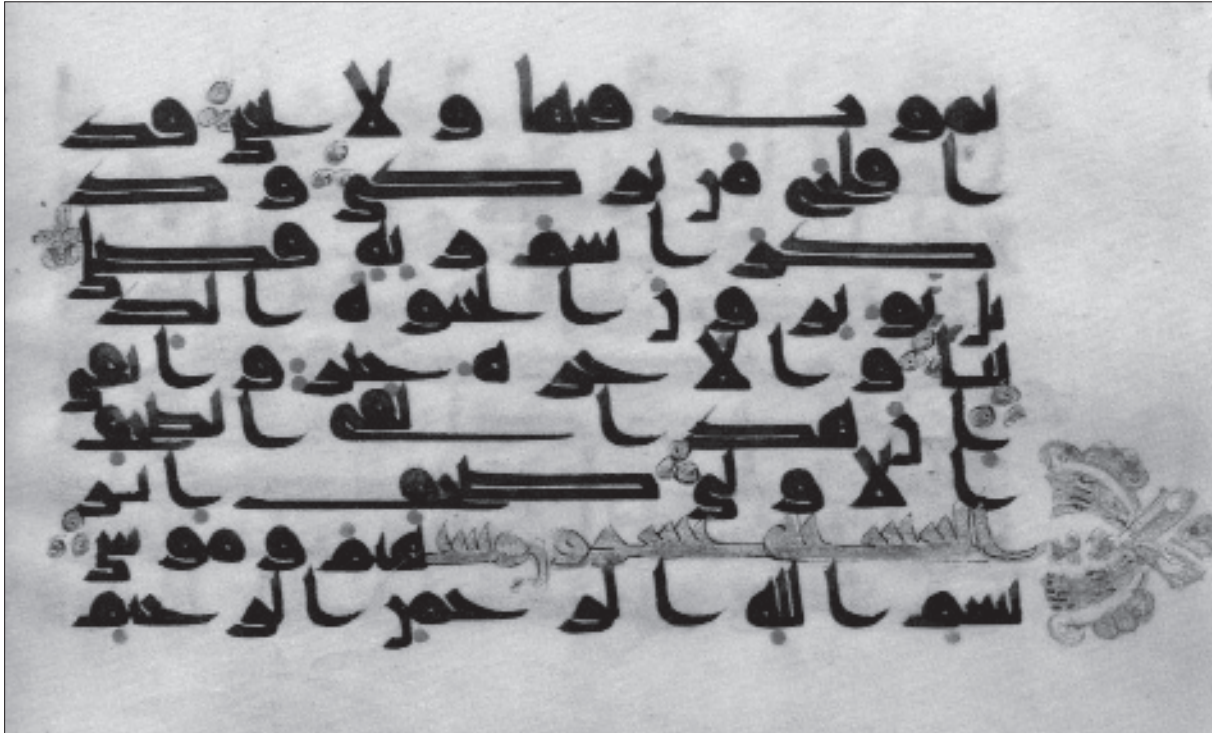


Fig. 2.1 Early Kufi on parchment at the end of 9th century or first half of 10th. Nasser D. Khalili Collection: KFQ82.



Fig. 2.2 The Blue Quran at 9th Century AD. The parchment is dyed in blue, and the text is in gold. Nasser D. Khalili Collection: KFQ53.

was unlike any of the famed Six Pens¹ as practiced by Ottoman calligraphers. To the uninitiated and newcomers to the field of Arabic calligraphy, the visual language of the Arabic script is often that of fluid undulating strokes that sway in a rhythmic and elegant manner. This is true, but only of certain styles. The early Qurans were written in styles that are elegant but not fluid, rhythmic but in a more restrained manner. They were bold, monumental, and very powerful in visual impact. These styles, and there is quite a variety in there, have been given many different names: In some cases referring to an area of origin (such as *Hijazī*), to a visual characteristic (as in *Ma'il*), to a period of time (the Abbassid styles), or as is most common, referring to the whole set of styles simply as Kufi (or Kufic). While the first two are used quite specifically, the rest are broad terms that encompass a variation of styles that share common broad characteristics. The Abbassid Styles, coined by Quranic paleography expert François Deroché, is not very accurate since these styles came into existence before the Abbassid period. The term Kufi is also problematic as it refers to the city of Kufa in southern Iraq, and these styles are not only connected with that city. However, this term has gone into mainstream usage, and so can be used with caution to refer to this group of styles, which are usually characterized by a strong horizontal base line, strictly vertical ascenders, and squarish construction. This term is also used to refer to later styles such as the Eastern Kufi and the Square Kufi so for the sake of clarity, this section will use the term Early Kufi to refer to the styles used to write the early manuscripts². This terminology is inspired by the name given to these styles in Arabic, *kūfi al-maṣāḥif al-'ula* or the kufi of the early manuscripts.

The key visual characteristics of the Early Kufi (Fig. 2.1 and 2.2) are as follows:

The letters are stacked side by side in a linear horizontal fashion. The ascenders are strictly vertical strokes and the Alif ends in a curved outstroke to the right. Words as a visual entity are not an integral unit. Rather the smallest unit is that of the continuous connected stroke and this is evident in the fact that words can be broken along 2 lines, and that the space between these units is equal to the space between words. The letters, or the baseline stroke connecting them, can be stretched horizontally and this gives a very distinct look to the page that ends up looking like an alternating rhythm of vertical and horizontal strokes. It is no surprise then that this style is part of what some authors call the squarish styles (Yacoub, 1986). Conspicuously absent are the dots as we know them today, and the colored dots one sometimes sees in these manuscripts are in fact standing in for the vocalization marks.

There are four reasons why the Early Kufi is relevant to this dissertation. First, it is the style in which the early Qurans were written, and so its link to long text is quite strong. Second, there is a key visual characteristic that is relevant here, and that is the simplicity of word formation. As will be discussed in chapter 7, there is a controversy within the field of Arabic type design that revolves around the question of what authentic Arabic is and a key element of that is the adherence to the manner in which letterforms connect to make words. In the more rounded styles, the word formation is a complex process as will be discussed later on, but that is not the case in the Early Kufi. There, the letters simply sit side by side to make words. The point here is this: The complexity of word formation, which is the chief variable being tested in the legibility experiment, is not a matter of being authentic to Arabic, but rather authentic to a specific calligraphic style of Arabic. Simplicity and complexity in word formation are equally part of Arabic calligraphic tradition, and when

1 The Six Pens are three sets of text and display pairs respectively: Naskh and Thuluth, Rayhan and Muhaqqaq, Riqā' and Tawqī'.

2 The term does not refer to either the Hijazi or Ma'il, which had different visual characteristics

going into legibility studies, it is important to note that both these approaches are grounded in the practical implementation of the script itself.

The third reason is a rather subjective one, and that is in this researcher's affinity for this style and the great avenues of inspiration that it has offered for contemporary type design. Though the use of the Early Kufi went out of style for many centuries, today it offers the widest doors for typographic exploration and that is mainly due to the fact that its inherent characteristics are very similar to current trends in type design: uniform stroke width, large proportion of body size to ascender height, and the simplicity of construction³. A look at these early manuscripts reveals a beauty of form and an elegance of design that is difficult to match. There is another lesson to be learned from these early manuscripts: simple can still be beautiful.

The fourth reason is one specifically related to legibility. The text in this style is un-dotted and often un-vocalized. Though the visual organization of letterforms is quite simple, the text is practically illegible to modern readers. The fact that the Arabic script needs the dots to differentiate letters is very clearly illustrated here. These early manuscripts offer a view of what Arabic is like when un-dotted, and quite easily reveal a basic shortcoming of the Arabic script.

Naskh: The Text Style Par Excellence

The second style to be discussed in this section is Naskh. The name derives from the Arabic verb to copy. It is a style meant for small text sizes and is one of the fastest to write, hence its popularity. The term, some write, "is used as a generic name for a variety of Arabic scripts used for many centuries, mostly for the copying of books and later for printing" (Gacek, 2006, p. 339). The following paragraphs are concerned with the various leading scribes connected with this style. However, of importance to this dissertation is the Naskh style as practiced during the Ottoman period for that was the period in which printing was introduced and the transition to typographic forms started.

Though the name Naskhi has also been used to denote the styles used in papyri in either the first, second, or third centuries of Islamic records to denote a rounded script that is in contrast to the squarish styles of contemporary manuscripts, some authors find this terminology to be undesirable due to its overly generalized description (Khan, 1993, p. 21).

The earliest known Quran written in Naskh⁴ is from Baghdad in 1000–01 (Khalili, 2008, p. 51) though this style was not only confined to the Quran but also had a much wider usage (James, 1992b, p. 15). This first manuscript was penned by the master calligrapher *Abul-Ḥasan 'Ali ibn Hilāl*, usually referred to as *Ibn al-Bawwāb*. His style of Naskh was characterized by angular qualities that proclaimed it to be part of the dry or "yabis" set of styles (Fig. 2.3).

The Naskh style, however, evolved into a rounder and more cursive form with the hand of the master calligrapher *Yāqūt al-Musta'simi* who lived in Baghdad in the thirteenth century. He is credited with bringing the Six Pens, or *al-Aqlām Assita*, to perfection. *Yāqūt* is attributed with a reform of Naskh via a new way of trimming the reed (James, 1992b, p. 58). By the 15th century his style of Naskh was the "universal

³ This is what clients ask for in the majority of typeface requests to Linotype GmbH where the researcher is the Arabic specialist.

⁴ Some authors believe that this was not actually Naskh (Gacek, 2006, p. 340) but this controversy is outside the scope of this paper.



Fig. 2.3 A sample of Ibn al-Bawwab's work from 1000-1 in Baghdad. The Chester Beatty Library: Is 1431, ff. 284b-285a.

model" for this style (James, 1992a, p. 14). In the *Yāqūt* tradition, Naskh is part of the curvi-linear "murattab" or dampened styles (Gacek, 2006, p. 340).

The Naskh style, as penned by *Shaykh (Ṣeyh) Ḥamdullah* (1429–1520), was based on the style of *Yāqūt al-Musta'simi* and became the standard Quranic text style during the Ottoman period (James, 1992a, p. 69). He was the calligraphy master of Prince Bayezid, son of Sultan Mehmed the Conqueror, and accompanied him to Istanbul when he came to power (James, 1992a, p. 69). When Bayezid ascended the throne, *Shaykh Ḥamdullah* became master calligrapher at the Ottoman Palace. It is said that the Sultan had great appreciation for his teacher and that he asked him to develop the styles of *Yāqūt* and provided him with the best specimens. These he studied in great detail and proceeded to sculpt a style of his own (Fig. 2.4) and thus earning the title *Qiblatu al-kuttāb* (the calligraphers' lodestar) (Derman, 2002). He continued to work for the Sultan in the late fifteenth and early sixteenth century, and his take on Naskh proved to be a reference model for future generations (Blair, 2006). So,



اعلموا ان فيكم هذا يوم عيد صدق

قال رسول الله صلى الله عليه وسلم: هذا يوم عيد صدق اعلموا ان فيكم هذا يوم عيد صدق اعلموا ان فيكم هذا يوم عيد صدق

قال ابوالمظفر محب على الاصل عزان

عن حكيم بن محمد قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون

ازواج اولاد استيعت صان اولاد

قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون

الطاعمة الشاكر ك الصاير الصابرة

قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون

ان عند المنكسرة قلوبهم لا

قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون

القلب كيف كن في هجت هواك

قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون

نفوق الشيخ على الاقران صان بهما الساطا

قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون

قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون قالوا فماذا قال قال رسول الله صلى الله عليه وسلم: لا يدخل الجنة من اهل البيت ولا المؤمنون





Fig. 2.4 (Opposite) Group of mounted muraqqa'at pages showing the work of leading Ottoman calligraphers such as Shaykh Hamdullah (bottom 2 panels) and Hafiz Osman (top left and middle right panels). Nasser D. Khalili Collection: CAL7.

Fig. 2.5 A sample of Nasta'liq calligraphy by Muhammad Husayn, Iran, 1787–8. Nasser D. Khalili Collection: CAL405.

what was it exactly that *Shaykh Ḥamdullah* did? This quote by Mohammed Zakariya (1998) sheds some light on his contribution:

“Studying the work of older masters, he sifted and tested to find the best letter shapes and invented a system of imaginary slanted horizon lines along which to arrange each letter, imparting motion, tension, and energy to the writing. He also refined the measurements of the letters and regularized the spacing between letters and words, giving the text a more open, regular feel”

Continuing in those footsteps, *Hafiz Osman* (1642-1698) further refined this style and reintroduced the Six Pens after they had fallen out of use in the 16th century (Khalili, 2008, p. 44). He was appointed as the calligraphy teacher to Sultan Mustapha II and the future sultan Ahmed III. Like *Shaykh Ḥamdullah*, he was greatly honored by the Sultans, to the extent that he was awarded a special sofa to sit on in the presence of the Sultan who would hold his inkwell while he was preparing the calligraphic exercises (Derman, 2002).

Hafiz Osman's contribution to Arabic calligraphy came through his study of *Shaykh Ḥamdullah's* style and the process of mixing it with his own individual flavor. (Fig. 2.4) His new style of Naskh, Thuluth, and Riqā' is still in use today, though later calligraphers have also left their mark (Derman, 2002, p. 86). These two calligraphers were two of the most important figures in Ottoman calligraphy (Khalili, 2008, p. 44).

Looking beyond the Ottoman traditions, the earliest known Mamluk Qurans (dated from the first 2 decades of the 14th century) were also set in Naskh though that was replaced by Muhaqqaq in the larger scale Qurans of the later period (James, 1992b, p. 150). Iranian Qurans in the 15th century also saw a dominance of Naskh as the main hand. Nastaliq, as will be covered next, was quickly developing in the region but it was mainly used for literary and diplomatic purposes (James, 1992a, p. 12).

All these variations and evolutions of this style or group of styles aside, the Naskh style is relevant to this dissertation for many reasons: It is the most commonly used style for the setting of long texts. It was used in both religious and secular settings. Finally, it is also the style after which the majority of Arabic typefaces are built. In fact, the thesis question regarding the complexity of word formation is very much confined, as a question, to the Naskh style given its predominance in both hand-written and printed texts.

The Naskh style is one used for small sizes and is usually neat and balanced between round and flat elements. It often has a forward tilt and the overall look is clear and legible, hence its popularity for long texts. And within that last sentence one encounters an apparent contradiction: The manuscript Naskh style is used for long texts because of its high legibility—and this is true—and yet the whole premise of this dissertation is the questioning of the legibility of this style. To clarify that one has to look at the visual characteristics of two other parties: the other popular calligraphic styles and the simplified typographic styles that the modern reader is accustomed to. The first group is characterized by calligraphic abundance and a busy representation that is visually compelling but with an often hectic rhythm. The second group is a flattened-out simplified version of the manuscript style. So, yes, the Naskh manuscript style is more legible than the other more hectic calligraphic styles, and the relative legibility to the simpler typographic variants is what this dissertation will try to investigate.

As to word formation and the structural characteristics of this style of calligraphy, and to avoid repetition, this will be covered in the Structural Analysis and the Different Interpretation of Typographic Naskh sections.

Nasta'liq: A companion style?

This is the ultimate Persian style, which came to life in Iran in the late 14th century as either a direct derivative of Naskh, or as a mix of Naskh and Ta'liq (Gacek, 2006a, p. 337). Both Ta'liq and Nasta'liq are of the hanging styles, so named because of their round and connected strokes that swash and hang in a diagonal and downward fashion. They have quite strong contrast in their thick and thin strokes. The rhythm alternates between strong compression to great expansion of strokes. The hanging scripts are well suited for Persian, which lacks the vertical accent achieved by the repetition of the Alif-Lam combination in Arabic and has a different proportion of round and vertical elements (Blair, 2006). Nasta'liq (Fig. 2.5) is characterized by words that descend on the baseline, long elongations where possible, and the final letter or word is often tucked up as a superscript (Gacek, 2006a, p. 337).

This style is interesting to this paper in a purely tangential way. It is not a style that is common for the setting of long Arabic texts. However, that is not the case for Persian or Urdu where newspapers in Pakistan today are still being read in this style. As will be discussed in the structural analysis, Nasta'liq to Naskh is similar in structure to the relation of Italic to Roman in the Latin typographic spectrum. The question of an italic Arabic comes up on a regular basis, and the legibility of this style is very much still an open question. So, its place in this dissertation is not to answer a question, but rather to pose one for the future. Is it possible to have an “italic” Arabic, and would such a combination be legible?

The Aesthetics of Arabic Texts: Typographic Traditions

The story of Arabic typography is intimately intertwined with the development of typesetting technology. Given the complexity of the Arabic script and its many differences from Latin in its structure and aesthetics, the typesetting technology developed for the setting Latin had to be adapted to support Arabic. At the heart of the struggle is the complexity of word formation, which so happens to be the chief variable to be investigated in this dissertation. This complexity and the challenges it poses run as unifying themes throughout the five centuries of printing Arabic.

To put it simply: to print the 26 Latin letters, a typesetter needs a total of 52 metal types for the uppercase and lowercase versions. To print the 28 or 31 Arabic letters in the Naskh style that is true to manuscript traditions, a typesetter would need hundreds if not thousands of different metal types. Not only is the problem one of time and logistics but it is also one of alignments. The organic forms of manuscript Naskh do not subscribe to linear horizontal stacking. So how was this problem resolved? There were three different solutions:

The Rule of Four Plus Extras: Traditional Naskh

There is a common element that unites the works of Granjon in the late 16th century (Fig. 2.6), seen to be the best of the early European attempts to print Arabic, the printing types used in Istanbul in the first Ottoman backed printing press set up by Ibrahim Müteferrika in the late 18th century (Fig. 2.7), with the printing types used

Fig. 2.6 The Four Gospels printed by the Medici Press in Rome in 1590–91 showing the largest of the 5 typefaces that Robert Granjon cut. This was cut in several sizes and employed a large number of ligatures that helped to recreate the flowing nature of Naskh. Most characters had four contextual forms, as well as the extra ligatures. Some characters even had swash alternates.

The overall design is very similar to that in use today except that it has a more extensive ligature set. The overall look and feel is calm but with intricate formulation; the words sit very nicely on the baseline. The word spacing is quite even, and the paragraph justification well executed. The Kashida was already used as a device to justify the line and the text reveals a large amount of ligatures. Detail: Line of text divided into its components. Niedersächsische Staats- und Universitätsbibliothek Göttingen: 8 BIBL 1, 4528.

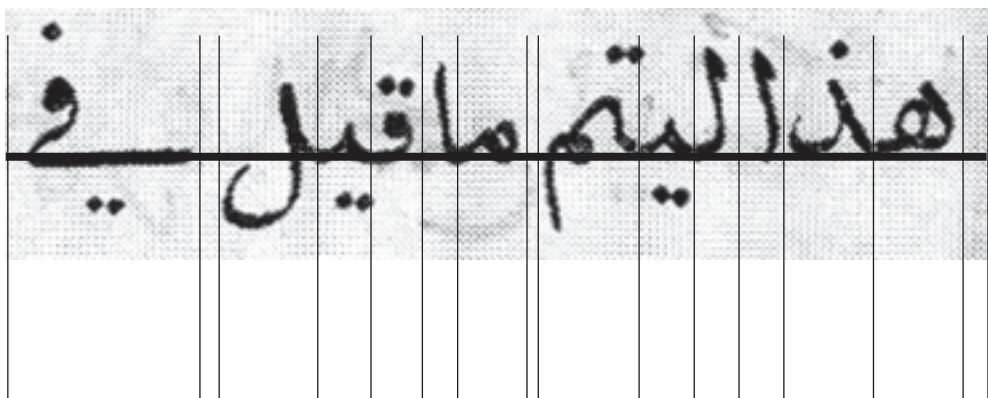
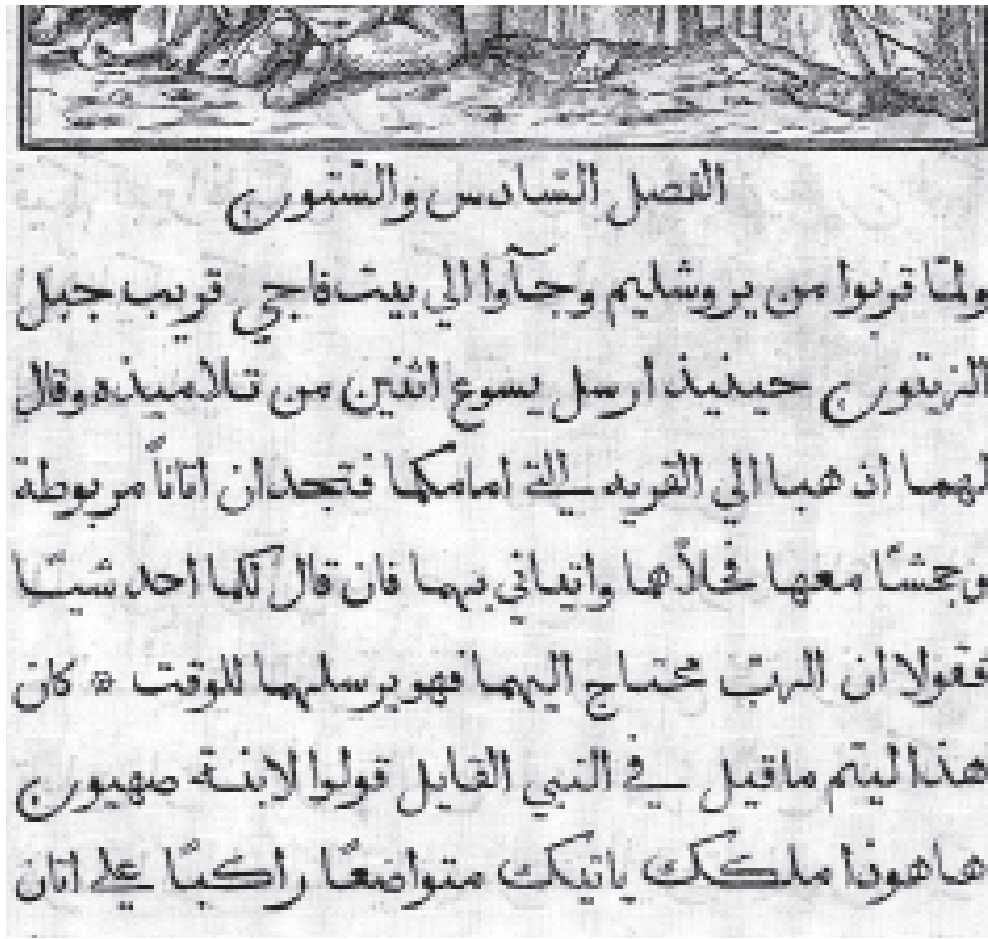




Fig. 2.7 Political treatise written and printed by Ibrahim Müteferrika in Istanbul in 1732. He was an Ottoman intellectual of Hungarian origin who was both printer and publisher and was the first to secure Ottoman approval for the founding of a local printing press (Nuhoglu, 2000, p. 86)

Some argue that his most important legacy is not in his work as a printer but in his skills in arguing for the adoption of printing and removing that debate from the “realms of theology to those of literacy, economics, and aesthetics” (Albin, 1990-1991, p. 115).

His typeface was a tightly spaced Naskh with a significant number of ligatures as well as changes in baseline alignment that are inspired by manuscript Naskh. The overall look is a bit hectic, though, as the characters are quite tightly packed, the baseline not so balanced, and the weight is somehow uneven. Though the books were non-religious in content, one can see manuscript influences in the elaborate ornamentation in chapter titles and in the use of gold for decoration. Detail: Line of text divided into its components. Bottom: A few complex ligatures with multiple alignments were also attempted. <http://muteferrika.mtak.hu/en/09.htm> (Retrieved on 01.06.2012).

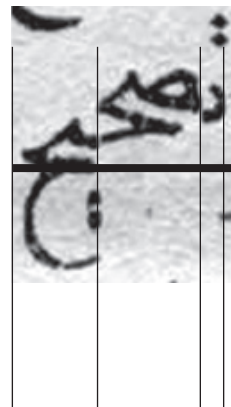
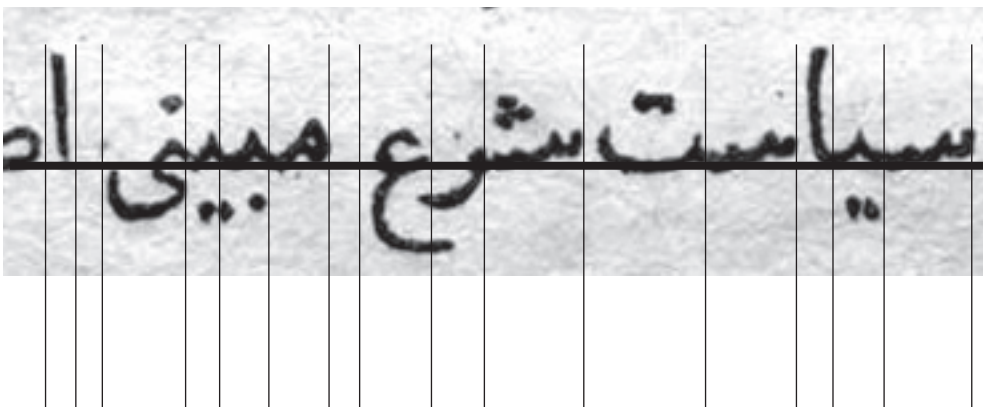
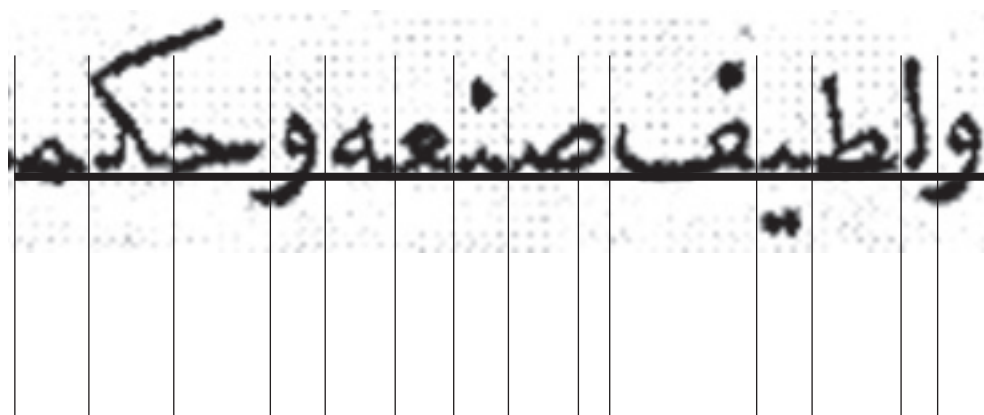


Fig. 2.8 The collection of stories Alf Layla wa layla printed at the Bulaq Press (also known as al-Matba'a al-Amiriya) in Egypt in 1835. The typeface is clear in its design and simple in its construction. The rhythm is very smooth and the overall look and feel is very pleasant. Detail: Line of text divided into its components. Staatsbibliothek zu Berlin: 4° Zu 4720.



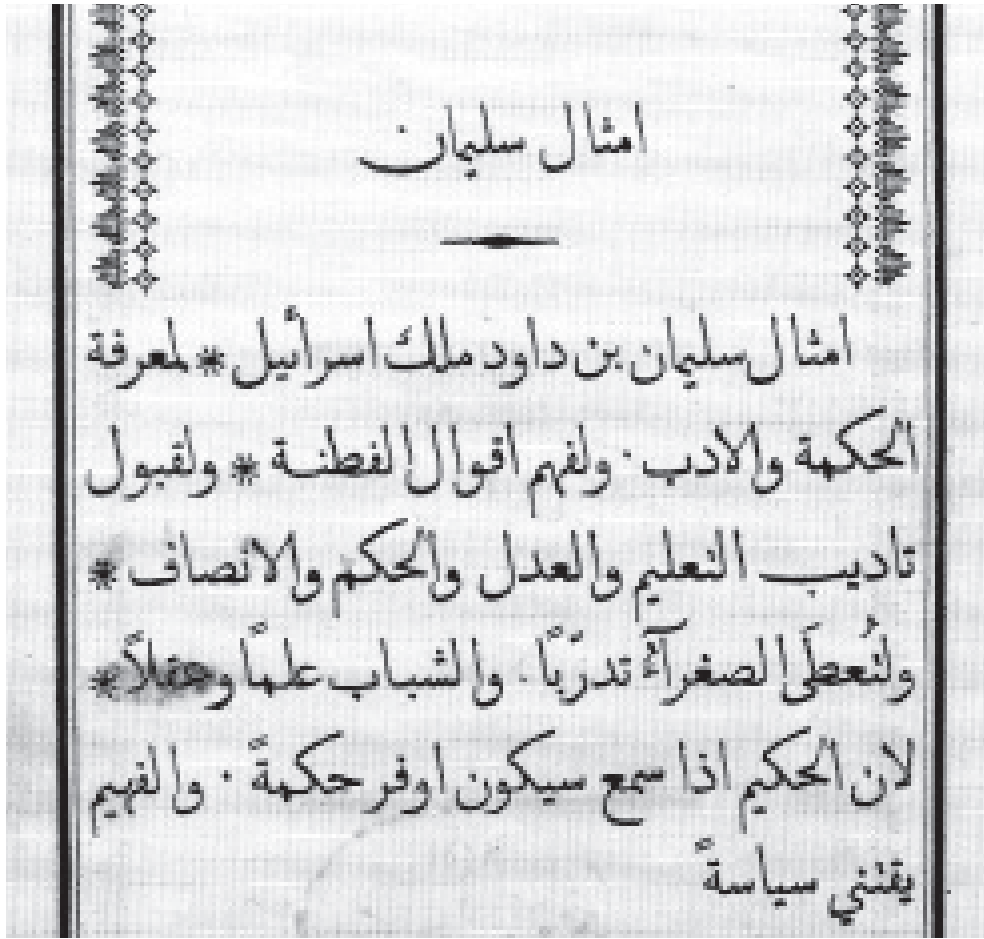


Fig. 2.9 In 1842, the American Press in Beirut started using a new typeface designed by Eli Smith, cut by Homan Hallok from Ismir and later cast in Leipzig. This was referred to as American Arabic and proved to be popular for decades afterwards. It has a slight forward tilt with long ascenders and descenders. The color of the text is light and with a rhythm that is more open and even than previously seen. The typeface also employs the stylistic and swash variants of several final forms (such as the Mim, Nun, and Beh). Detail: Line of text divided into its components. Bibliothek der Deutschen Morgenländischen Gesellschaft: Ib 1165.

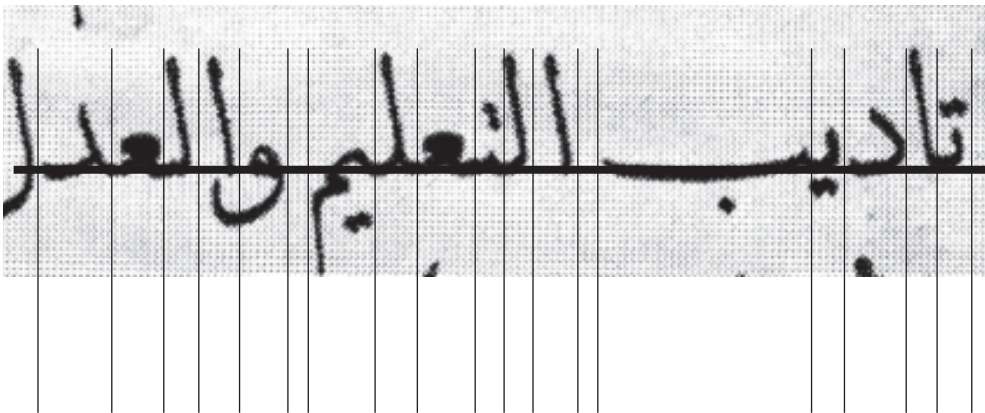


Fig. 2.10 Giridi Ahmed Rasim Efendi, *Hulasat ul-i'tibar*, printed by the Der-i Se'adet Mühendisyan Matba'asinda in 1869-70, p. 2-3. The work of Ohannis Mühendisoglu showed a high level of sophistication in character composition and overall rhythm and structure.

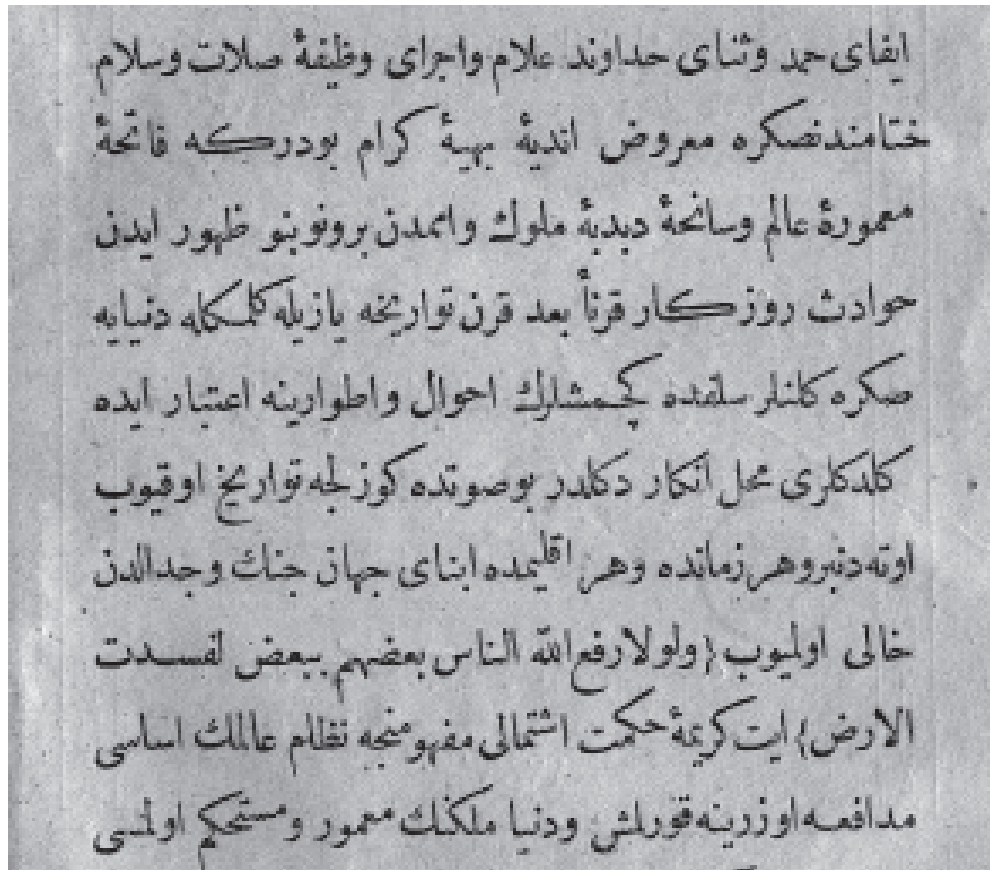
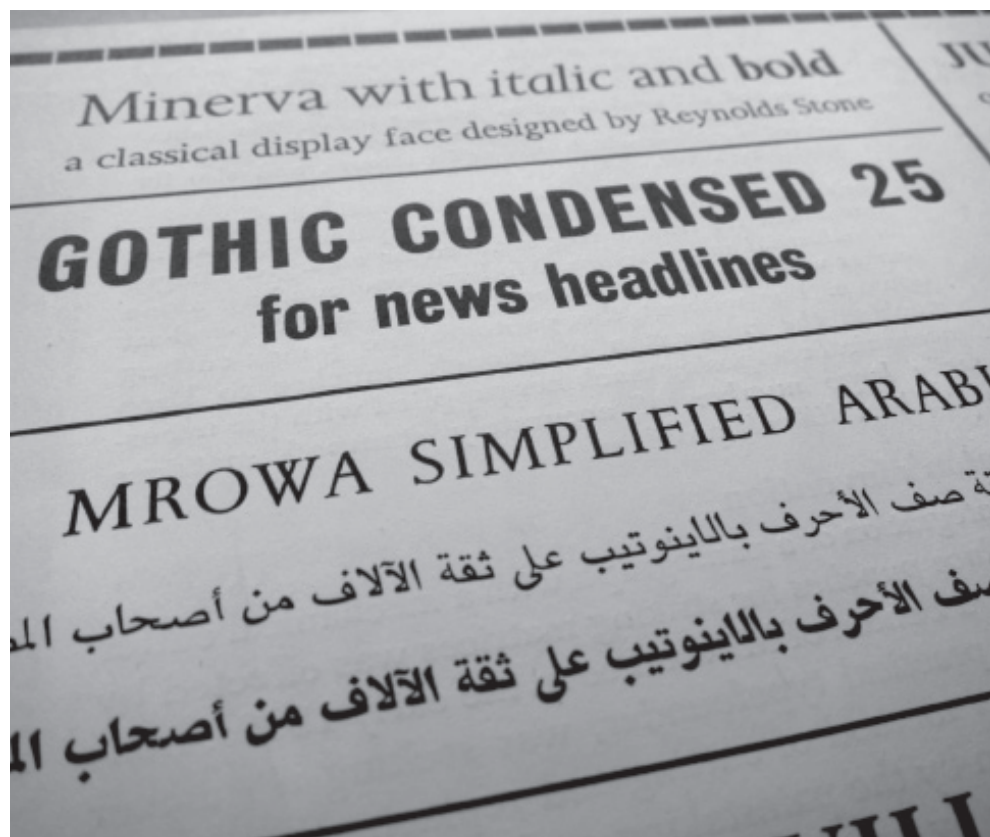


Fig. 2.11 Mrowa Simplified Arabic, published in 1954, was the predecessor of Linotype's Yakout. Linotype Matrix Issue 33.



at the Bulaq printing press in Egypt in 19th century (Fig. 2.8). That is the analytical view of the shape-shifting nature of Arabic letters. The logic is straightforward and hence attractive in its simplicity. The Arabic script is partially connected, therefore there are four different positions that a letter can be in: at the beginning of a word, at its middle, at its end, or on its own. These give rise to the initial, medial, final, or isolated forms that an Arabic letter can take. This logic seems all fine till one looks at the visual construction of the Naskh style, which has served as the model of most typographic design. The problem therein lies in the fact that letters do not sit side by side, they often climb on top of each other. To remedy that, punchcutters have resorted to adding ligatures that bring in that feel of fluidity that one sees in manuscripts. The more ligatures employed the more fluid the design.

This approach had varying degrees of success. Some designs showed great typographic texture such as the typeface designed by Eli Smith, cut by Homan Hallock from Izmir and later cast in Leipzig (Fig. 2.9). This was referred to as American Arabic and proved to be “popular and influential for the rest of the 19th century” (Glass & Roper, 2002, p. 191). One can see a stronger influence of calligraphic traditions and the design shows an extensive use of ligatures that bring more intricacy and complexity to the design (Fig. 2.10).

The main criticism of this approach is that it is still unable to fully replicate the kind of behavior that Arabic letterforms exhibit in the context of rounded styles such as Naskh. Still, this analytical view of looking at Arabic is very much the backbone of Arabic typography, and is the current definition by which Arabic letterforms are digitally encoded.

The Naskh typefaces designed within this view of Arabic are referred to in this dissertation as Traditional Naskh. The name derives from the fact that the majority of typefaces past and present employ this definition of Arabic.

The Rule of Continuous Pen Movement: Dynamic Naskh

There is another way to analyze manuscript Naskh and that is through pen movement rather than letter position. This approach looks at the fusion of strokes to make a continuous pen movement. The typeface is then composed of abstract shapes that, when dotted, transform into a group of letters. This approach was pioneered by Ohannis Mühendis-oglu in 1860. His approach to typeface design was fully based on “archigraphemes” (Milo, 2002) in the sense that the character set was made up of various stroke formations rather than contextual alternates of specific letters. Given the abundance of common basic shapes in Arabic, this approach makes sense when one is looking for a typographic flavor that follows the “script grammar” (Milo, 2010) of manuscript Naskh. The text is set via 1500 pieces of movable metal type to which dots and vocalization are then added (Milo, 2002). The design of the typeface is by far superior to anything that came before, and in a way to what came after. The strokes are well drawn, the rhythm is smooth though wider spaced than manuscript styles, and the design is in keeping with the aesthetics of manuscript Naskh (Fig. 2.10). Indeed, his inspiration was the calligraphic work of “Kazi Asker (Supreme Judge) Mustafa izzet Efendi (1801-1876), ranking among the viziers or ministers of the Ottoman State” and is thought to be the reference for later Naskh designs (Milo, 2002, p. 10).

The typefaces built and designed in this approach are labeled as Dynamic Naskh in this dissertation. These are the closest in adherence to the principles of word formation in manuscript Naskh. Their design, by extension, is the most fluid and dynamic in look and feel.

The Rule of Two: Simplified Naskh and The Quests for Speed

The strive to adhere to manuscript traditions changed in the 20th century to a strive for speed and efficiency. If the first four centuries of Arabic typography were about increasing complexity to achieve a closer impression of the calligraphic manuscripts, then the fifth century was one where the tables were turned and economy and speed took precedence. This was the century where Arabs questioned the value of the Arabic script and were plagued by doubts as to their ability to keep up with the developments in the west. This quest for speed and technical advancement is not surprising when one looks at the events that shaped the twentieth century. Other than the two world wars and a cold one that soon followed, the Arab world finally achieved independence after centuries of foreign rule. The Arab renaissance (*an-nahḍa* in Arabic) starting in the 19th century⁵, the increasing levels of literacy and self-awareness, the rise of Arab nationalism, and the move towards industrialization all served as a wake-up call: the train has long passed and Arabs must try their best to follow. The calls for script reform coming out of the Academy of Arabic Language in Cairo in the middle of the 20th century are testament to the national feelings of angst.

The typographic solution came in the simplification of the rule of four into the rule of two. The design would simplify the contextual shapes and merge initial with medial forms and final with isolated ones. Some letters could not be simplified but those were the exception and the character set was greatly reduced, thus allowing for faster typesetting of Arabic texts. This solution was first used in the Arabic typewriter and then fully exploited in Linotype's Simplified Arabic in 1954 (Fig. 2.11). This style became the de facto newspaper style and is very much part and parcel of the typographic spectrum as we know it today.

Breakthroughs

The technical limitations of setting Arabic have finally come to an end. The move to desktop publishing and the digital revolution were perhaps responsible for the fastest leap forward in terms of Arabic typographic design. The last couple of decades of the twentieth century witnessed a digital adaptation that was a continuous line of design development as that set by hot metal early on in the century. That would soon change with the development of the Opentype font format. This format allows a very large character set, and the possibility to program contextual behavior that brings in intelligent design to typographic practice. Contextual alternate designs of letterforms that would have taken prohibitive amount of time to set in metal type can now be used on-the-fly. This brings endless possibilities to typefaces that require a more complex design that is context sensitive, as most of the Arabic calligraphic styles are. In terms of design, this has opened many doors and the quality of available typefaces—mostly Kufi or Naskh—has improved tremendously in the last decade.

This technical advancement brings to the foreground the most basic question that Arabic typography has struggled with: which model of analysis should Arabic typefaces follow? How close should they be to manuscript traditions? These are the questions driving this dissertation forward. The typographic reality offers three different ways to approach Naskh typefaces. To fully grasp the details involved, a detailed look at the anatomy of Naskh styles follows.

⁵ An-Nahda is Arabic for “the awakening” and is a cultural and intellectual movement that started in Egypt towards the end of the 19th century and later spread to neighboring countries such as Lebanon and Syria.

Naskh Alignment Zones

The Latin script is characterized by having clearly defined vertical alignment zones. The characters walk across a horizontal baseline, and there are several possible heights for characters: the x-height, the cap-height, the ascenders, and the descenders. If one combines the baseline with the x-height, one can notice a horizontal band that runs through the middle of the script. This is not too different from Arabic, though this is not evident from the first glance.

When looking at Naskh in manuscripts⁶, one is struck by the seemingly unstructured and unbound undulating strokes. The letters appear to flow freely, seemingly in defiance of the baseline that the Kufi styles so faithfully adhere to. The Naskh world is one without a gravitational pull. In reality though, Naskh adheres to a strict set of proportions that govern its relationship of parts, as well as its vertical alignment zones. This becomes obvious once a band is drawn through its connecting strokes. Naskh is built around a flexible ribbon-like base stroke (Fig. 2.12) that rises and sways in a melodic and rhythmic fashion. Taking the ribbon as a start, the characters rise above or dip below in increments of rhombic dots. All in all, the system is 12 rhombic dots high with the base ribbon taking up approximately one dot. The system has 5 rhombic dots above the base ribbon and 6 below it. The relationship of the base ribbon to the baseline is also governed by the rhombic dots, and so the overall sense of movement within Naskh follows quite specific guidelines.

Most of the characters that are sitting above the base ribbon rise by either 1 or 2 dots. The initial Beh ب, Jim ج, Tah ط, Sad ص, initial Mim م, and middle Ayn ع are 1 rhombic dot higher than the base ribbon. The initial Feh ف, isolated Dal د and initial Heh ه are 2 dots higher, and the final Dal ذ is either 2 or 3 dots higher.

The ascenders are either 5 or 6 rhombic dots high. The isolated Alif ا is usually 5 rhombic dots high, and it goes one dot higher in case it has the Tarwees. The Lam ل, which is another frequent ascender, can be 6 rhombic dots high.

As for the descenders, they are 1, 2, 3, 4, or 6 rhombic dots deep. The middle and final Mim loop م is the most shallow of descenders. The Reh ر is either 2 or 3 rhombic dots deep, depending if it has a lower loop or not. The Waw و is always 2 dots deep. The final and isolated forms of the Jim ج and Ayn ع are the deepest descenders dipping 6 rhombic dots below the base ribbon.

The Different Interpretations of Typographic Naskh

As mentioned in previous sections, Naskh developed under the Ottoman hand to become the de facto text style. This resulted in the use of Naskh as the model for the first Arabic typefaces and thus started a long typographic tradition that continues until today. The various typographic interpretations of Naskh still in operation today can be placed in the three categories introduced earlier. Before taking a closer look at how they are formed, two important concepts need to be clarified:

⁶ For the study of alignment zones, it was best to refer to manuscript versions of Naskh since the typographic version had been flattened to fit onto a horizontal baseline. This affected the flow of characters into one another and changed the way text flows. It was more rewarding to study the letterforms in their original formation.



Fig. 2.12 The alignment zones in Naskh are governed by the rhombic dot system that is built around a flexible ribbon-like baseline. Manuscript by Mehmed Şefik Bey completed in 1847 in Istanbul. Sakip Sabanci Museum: SSM 190-0301-MSF.

Complexity of Word Formation

Word formation is the key variable across the different interpretations of Naskh. Its degrees of complexity are what set the three categories apart. A less accurate description would be “complexity of the style” and the reason for the longer version lies in the analysis of what it is exactly that is changing across the Simplified, Traditional, and Dynamic Naskh (Fig. 2.13). The key lies in the number of forms that are employed per letter and in the stacking order.

Stacking Order

Another key factor that comes to play is the stacking order. It is the order in which characters are assembled to make words. Latin characters sit at the same baseline and are visually consistent with their linguistic position, and as such, the stacking order is a non-entity. Since Arabic is a semi-connected script, most characters are attached to their neighbors. Characters are written in the same order as they are spelled in a word. However, the rounded styles allow complex ligatures to form where characters move around to create quite complex strings. For example, the Mim in the initial-Lam+middle-Mim combination is positioned to the bottom right of the Lam which is sharp contrast to the spelling order. Experienced readers are trained to recognize these ligatures and are able to read such sequences without error. Nevertheless, this brings the issue of stacking order to the front.

The three main categories of the typographic variants of Naskh are Simplified, Traditional and Dynamic Naskh. Dynamic Naskh also has a 4 tier stacking order: right-to-left, top-to-bottom, diagonal right-to-left, and diagonal left-to-right. This creates a quite dynamic front both on the x- and y-axis. By contrast, Simplified Naskh appears quite static and repetitive as it has only one stacking order which is the usual right-to-left. As to Traditional Naskh, it literally lies in the middle of the spectrum as the ligatures bring forth the various stacking orders, but their infrequency keeps the text from taking on a more elaborate formation.

Traditional Naskh

This category includes the number of interpretations of Naskh that follow these rules: The individual character structures and shapes follow those of manuscript Naskh but the stacking order is generally simpler. Each letter has four distinct letterforms based on the letter’s position in a word: initial, middle, final, and isolated. These characters are joined together via a small horizontal connection that serves as the base ribbon. The stacking order is horizontal from right to left, and can be manipulated into a more complex order via a set of extra ligatures. Typefaces of this category vary in the number of ligatures that they support. The character set, then, is enhanced with this varying number of ligatures that serve to emulate, to a small degree, the feel of manuscript Naskh.

This interpretation of Naskh was used in both hand setting and hot metal technologies. It is also the basis of the digital interpretation of almost all Arabic typefaces today as can be seen in the definition of the Arabic script by the Unicode Consortium. It is also the norm for the teaching of the Arabic script. This term “traditional” is not a typical term used to describe Arabic typefaces. The typeface style that it represents here is usually simply referred to as Naskh. For clarity purposes, the

Fig. 2.13 The 3 different levels of complexity evident in the typographic interpretations of Naskh. From left to right, then top to bottom: Simplified, Traditional, and Dynamic Naskh. Typefaces shown are Yakout, Lotus, and Decotype Naskh.



term Naskh will only be used to refer to the manuscript one. All other occurrences related to the typographic interpretations will have distinguishing adjectives.

As mentioned above, Traditional Naskh employs four representation forms per letter as well as a number of ligatures. The slightly curved baseline, as well as the extra ligatures, serves to create a typographic style that bears a bit of resemblance to the Naskh in manuscripts. Given various technical limitations, historically, and to the present day, Traditional Naskh does not carry the full flavor, fluidity, or complexity of its namesake. This typographic style is quite commonly used in book and magazine production. Though the OpenType font format has opened the door to more complex typographic representations, this category is dedicated to the run-of-the-mill standard typefaces available on the market at the time of research, as well as a significantly large portion of historical designs.

Simplified Naskh

As mentioned earlier, it is a typographic interpretation of Naskh developed by Linotype in the mid 1950s in which each letter has two representational forms instead of the usual four. This simplified the typesetting of Arabic and the subsequent style became the default face of newspapers in the Middle East. The style is also used in book production, though not as frequently. Due to the limited number

of forms per character, the design of the individual characters tends to gravitate towards the baseline, bringing with it a more static and rigid look and feel.

The story of Simplified Naskh is paradoxical in nature, a story that is simultaneously a success/failure story depending on the side one is looking at. Linotype had a solid head start in the automated typesetting of Arabic since 1911. In the forties and fifties, the Arab world was gripped by the calls to reform the script. The reasons cited were the inadequacy of the Arabic script to be as easy and economical to print as Latin. The Academy of Arabic Language in Cairo hosted a competition for script reformation and the proposals poured in. To cut a long story short, none of the proposals were accepted since the solutions would necessitate that all existing material would have to be reprinted or else future generations would lose the ability to read it. This proved to be too radical for the Academy to accept, but the challenge to simplify the typesetting of Arabic remained.

It seems too much of a coincidence that Simplified Naskh was developed within this timeframe. Indeed, in the thirty-second issue of the Linotype Matrix journal, the headline ran:

“Linotype are first in the world to produce a system of Simplified Arabic for the mechanical composition from one magazine” (Linotype and Machinery Limited, 1959).

The article discusses the rising levels of literacy, the large number of Arab speakers, and the unsuccessful attempts at script reform. Their new typeface dealt with the economical problems of having to work with a large character set by reducing that number by half, and thus made the typesetting of Arabic, just like Latin, possible from only one magazine.

A revealing article of the workings at Linotype can be seen in this text from an article in the Linotype Matrix in 1955:

“Even before the war the mood of national re-awakening in the East was having far-reaching effects, not the least of these being a growth of literacy and an ever-increasing demand for reading matter of every sort. Since the war this particular demand has grown very considerably, particularly in the Arab world” (Linotype and Machinery Limited, 1955).

The demand for faster production was a hard pressing reality. Unfortunately, when seen through the eyes of calligraphers, Simplified Naskh is almost an abomination, a clearly inferior aesthetic output than what they themselves are able to conjure. Simplified Naskh lacked the visual impact and elegance of manuscript Naskh. It was a prime example of design conceding to technology. On the other hand, Simplified Naskh really did deliver on its promise. It simplified Arabic typesetting and reduced costs and in the process helped to speed up newspaper production. Undeniably, its cultural contribution is immense. And here is the paradox. Which is greater in value? Is it the aesthetics of a script, or the ability to make it more readily available to the public? If the story of Simplified Naskh is any indicator, then it seems that practical requirements tend to win over aesthetic considerations.

This may seem disheartening, but the story of Arabic type design is that of a struggle. Thankfully, recent technical breakthroughs have almost abolished these problems. However, Simplified Naskh continues to be part of the Arabic typographic culture, and it is faster, and thus more economic, to design, and as such it remains a distinctive category within the interpretations of Naskh.

Fig. 2.14 Decotype Naskh is designed as a series of individual strokes that are often only parts of letters. These are dynamically put together to form letters and words.



Dynamic Naskh

This term also is not part of the repertoire of terms used to describe Arabic typefaces. It is used here to refer to typefaces that almost fully emulate the behavior of manuscript Naskh. Several various technical methods are available for the implementation of such complex typesetting. The character combinations are done dynamically (Fig. 2.14) and so a great number of the usual restrictions are eliminated. The style brings into effect the fully-fledged complexity and intricacy of word formation of the Naskh style. The first instance of Dynamic Naskh in metal type was by Ohannis Mühendis-oglu in 1860 (Milo, 2002). The first digital instance is Decotype's Naskh.

Dynamic Naskh differs from Simplified and Traditional Naskh by the following:

- . The analysis of text is done via letter strokes rather than full letter shapes.
- . Letters are able to take on more than the basic four forms, and these are sometimes used in the justification of text, or in the addition of swashes.
- . The addition of dots is added to dynamically formed strings, in contrast to the pre-prepared dot positioning of the previous two categories.
- . Dynamic Naskh is able to come very close to the actual rhythm and feel of the handwritten Naskh of manuscripts.
- . The stacking order is multi-directional. Due to its engineering, Dynamic Naskh is able to build the various stacking orders that are normally present in manuscript Naskh.
- . The relationship of the base ribbon to the baseline is more flexible and varied and this leads to multi-tiered alignment zones, as in manuscript Naskh.

- . Dynamic Naskh has several variant designs for its representational forms that are dependent on the preceding and following characters. This adds more diversity to the color of the text.

Perhaps the first digital and most prominent example of Dynamic Naskh is Decotype Naskh, accessible via the Tasmeem extension for InDesign. Its design follows in the tradition of Ottoman Naskh and brings into typography the script grammar of manuscript Naskh.

الخنساء

١ إني أرقْتُ فبتُ اللَّيْلَ سَاهِرَةً كأنما نُحِلَّتْ عَيْنِي بِعُومَارِ
 ٢ أرعى النُّجُومَ وَمَا كُفِّتُ رِعِيَّتَهَا وتأمرةً اتَّغَشَى فَضْلَ أَطْمَارِ
 ٣ وَقَدْ سَمِعْتُ وَلَمْ أَبْحَجْ بِهِ خَبْرًا مُحَدَّثًا جَاءَ يَنْمِي رَجْعَ أَخْبَارِ
 ٤ يَقُولُ صَخْرٌ مُقِيمٌ ثُمَّ فِي جَدَثٍ لدى الضَّرِيحِ صَكْرِيحٌ بَيْنَ أَجْمَارِ
 ٥ فَاذْهَبْ فَلَا يَبْعَدَنَّكَ اللَّهُ مِنْ رَجُلٍ تَرَالٍ ضَكِيمٍ وَطَلَابٍ بِأَوْتَارِ
 ٦ قَدْ كُنْتَ تَحُلُّ قَلْبًا غَيْرَ مُتَضَمِّ مُرَبِّكَ فِي نِصَابٍ غَيْرِ خَوَارِ
 ٧ مِثْلَ السِّنَانِ تُضِيءُ اللَّيْلَ صُورَتُهُ مُرُّ المَرِيرَةِ حُرٌّ وَأَبْنُ أَحْرَارِ
 ٨ فَسَوْفَ أَبْيِكَ مَا نَا حَتَّ مُطَوَّقَةٌ وَمَا أَضَاءَتْ نُجُومُ اللَّيْلِ السَّارِي
 ٩ وَلَنْ أَصَالِحَ قَوْمًا كُنْتَ حَرَبَهُمْ حَتَّى تَعُودَ بِيَاضًا جُوزَةَ التَّقَارِي

Fig. 2.15 Sample of Decotype Naskh as set in its promotional material showing full contextual capabilities. (Milo 2009).

Structural Comparison

Looking at the typographic spectrum of Arabic typography in the Arab world today⁷, one notices a predominance of Naskh for text and headlines and slightly offset by the variations of the Kufi styles used mainly in headlines. Looking more to the east in Iran and Pakistan, one is greeted with the fluid lines of Nasta'liq. Though these different styles of Arabic calligraphy look almost like different scripts altogether, they share a common foundation or so to speak. The structures vary in angularity, construction, and proportions while the angle of the tool provides different ways to dress the underlying structure.

To get a clearer view of the extent of typographic variation, three typefaces were abstracted into their basic structural forms (Fig. 2.16). The selected typefaces were Linotype's Lotus for Naskh, Ahmed for the Kufi styles, and Qalmi for Nasta'liq. These are by no means fully representative of their genre or anywhere near being exhaustive, especially in the case of Ahmed since the Kufi styles vary quite widely. Still, they offer an initial view into how these styles are built. In the case of Naskh and especially so in Nasta'liq, the letters can have several different structures. These are usually minor variations on a basic formation, though there are some exceptions to that. In this exercise, only one was chosen and this was done for the sake of simplicity. Otherwise, it becomes too complex to bear comparison. It is also interesting to note that proportions may vary among different typefaces and within different renderings of calligraphic styles. Thus, the proportions rendered in these examples are not fully definitive and are subject to a certain degree of stylistic variation.

With the three structures compared next to each other, several main differences are immediately obvious. The most striking is the fact that this specific structure of Kufi has only two variations per letter rather than the minimum of four. The fluidity of movement present in Naskh and Nasta'liq is in stark contrast to the formal and rectilinear design of Kufi. This example of Kufi is built around geometric lines and curves while Naskh and Nasta'liq are based on purely organic forms. This results in having a more disciplined and formal appearance for the Kufi while the other two give an impression of a more human and personal touch.

In terms of the progression of words into lines, Kufi appears to be quite static and firmly rooted on the baseline. On the other hand, Naskh is more in keeping with a handwritten style that flirts with the baseline without actually merging with it. Nasta'liq, on the other hand, is simply divorced from horizontality and is in reality based on a series of downward diagonal strokes.

The relationship of Naskh and Nasta'liq, from a purely structural perspective, is similar to that of the Roman and Italic. While the Italic is in most of its letters forms a variation of the Roman but with a slanted y-axis, Nasta'liq is similar to Naskh but with a slanted x-axis. However, the similarity ends there. The stacking order in both Roman and Italic is the same: a simple side-by-side left-to-right horizontal stacking. The characters in Naskh interact in quite complex formations such as vertical and diagonal stacking. The diagonal stacking in Naskh goes in both directions, diagonal pointing downwards either to the left or to the right. While in Nasta'liq, the stacking order is almost exclusively diagonal pointing downward to the left.

⁷ Having looked at manuscript styles so far in the chapter, it was interesting to turn to the typographic forms to see how these have fared in the transformation into automated setting. The structures on the main body parts have more or less remained intact and so a comparison of typographic or manuscript forms would lead to very similar results.

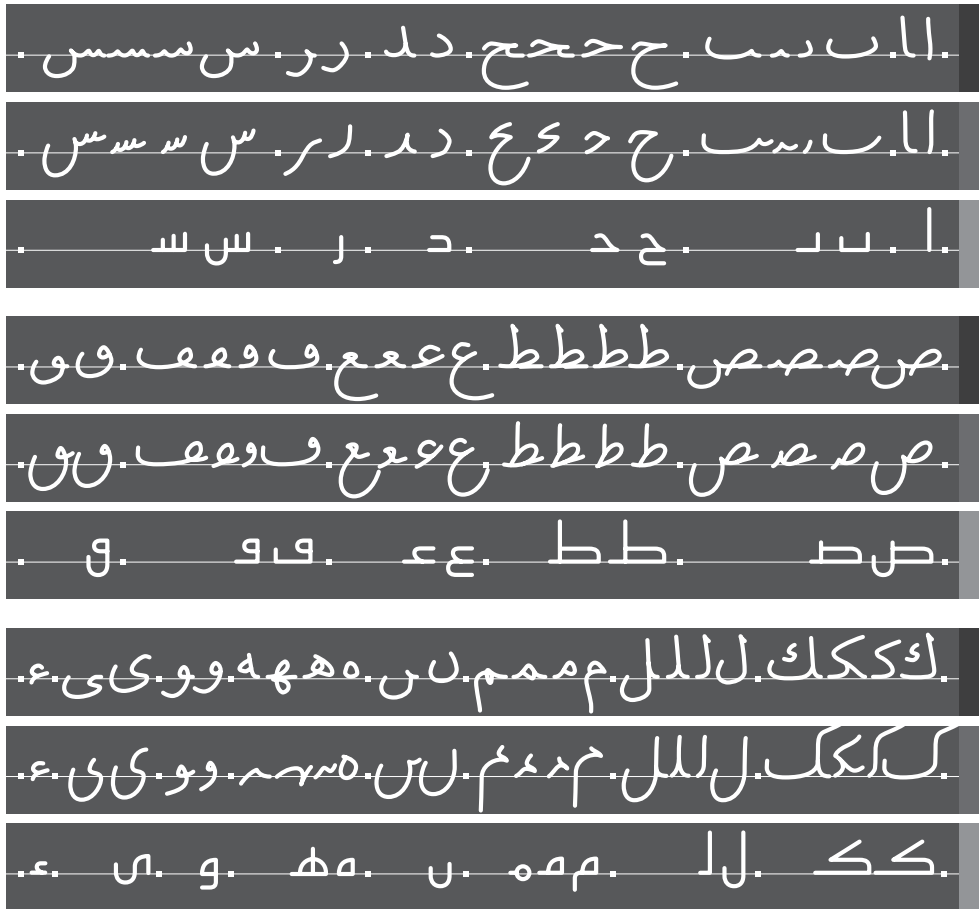


Fig. 2.16 Structural comparison of Naskh (top), Nasta'liq (middle), and a version of Kufi (bottom).

In terms of vertical proportions, Naskh and Nasta'liq are closer together than Kufi. This is especially evident in the depth of descenders. Kufi usually has quite shallow descenders especially in the Jim and Ayn families. These are made up of a small curve that often transforms into a horizontal line parallel to the baseline. This is in contrast to the arched descenders of the Naskh and Nasta'liq styles where these curves bloom into full-scale swashes that are significantly larger than the top parts.

As to horizontal proportions, when set at the same optical size and weight, this Kufi is tighter, and Naskh and Nasta'liq have quite generous final and isolated characters as the fluid nature of the styles lends itself to swash finials. However, this is offset by their stacking nature as their characters merge together into quite dense and complex strokes. The density of Kufi, on the other hand, is quite widely spaced out.

Relationship of Elements

As can be found in music or dance, the Arabic script has a set of repetitive forms that can be found in several characters. This is true in both manuscript as well as typographic forms, and to a certain extent in all the different styles of the Arabic script. These forms serve to create a sense of continuity and rhythm. The fact that many forms are repeated in several other characters further multiplies this effect.

Alif–Beh–Sin Relationship

The Alif–Beh relationship is the first to be addressed in a typeface. The Alif ا indicates the height of the ascenders, and the Beh ب will provide the dimensions that govern both the optical size of a typeface as well as its width proportions. As seen in the Naskh alignments, the initial Beh rises by one dot higher than the base ribbon. In the Kufi styles, the height is quite flexible but becomes almost set once the Beh is drawn. The tooth of the initial Beh is related to the first tooth of the initial Sin س {Fig. 2.17}. Similarly, the middle Beh ب is related to the middle teeth of Sin س.

Waw–Reh Relationship

The descending strokes of Waw و and Reh ر are almost identical (Fig. 2.18 Right). Together they are the most frequent descenders, and they very quickly set the rhythm of the paragraph. There are several variations on how they are drawn. In the Kufi styles, they start as a vertical descender that ends in a curve to the left. In the rounded styles, they are either a downward diagonal or a curved stroke that might or might not curl upwards after it flattens out.

Waw–Qaf–Feh Relationship

The heads of the initial Waw و, and initial and isolated Feh ف and Qaf ق are usually identical (Fig. 2.18 Left). These are closed loops that vary significantly between the squarish and rounded styles. They have either a single-story or double-story head.

Beh–Feh–Kaf Relationship

The horizontal stroke and upward finishing stroke in the isolated and final Beh ب is found in the corresponding contextual forms of Feh ف and Kaf ك (Fig. 2.19). The upward finishing stroke is usually shorter than the initial tooth. This sweeping finial is one of the ways to add elegance to the design. An elongated and nicely drawn swash adds to the generous proportions of the typeface. A short Beh finial might make the design look somehow cramped.

Nun–Sin–Sad–Lam Relationship

The final Nun ن is duplicated in the final and isolated forms of Sin س and Sad ص (Fig. 2.20). The Lam ل is comparable to Nun but with an elongated initiating stroke. Nun is a shallow descender that appears frequently. In the rounded styles, the stroke is fully curved with an unequal weight shift to the lower right corner and giving an unequal triangular shape. In the squarish styles, it varies from fully curved to having straight verticals with a connecting semi-circle at the bottom.

Sad–Tah Relationship

The head of the Sad ص is similar to that of the Tah ط (Fig. 2.21). In the rounded styles, it is usually a triangle with a tilt towards the upper right. Its sides are never equal. The upper right corner is always an area of emphasis. In the squarish styles, it is the only curved corner while the other three are straight angles.



Fig. 2.17
Alif, Beh, and Sin.

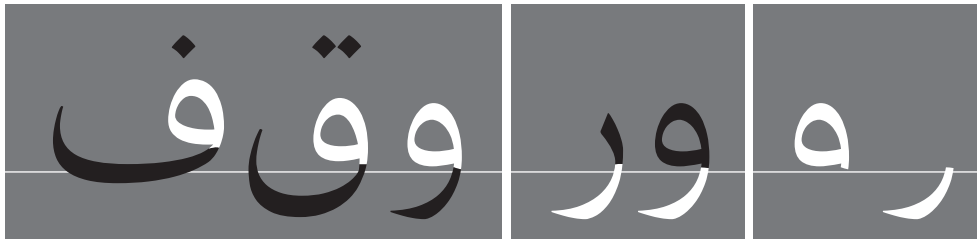


Fig. 2.18
Right: Waw and Reh
Left: Waw, Qaf, and Feh.

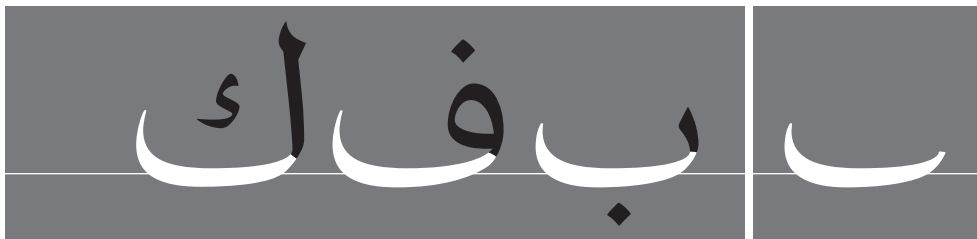


Fig. 2.19
Beh, Feh, and Kaf.

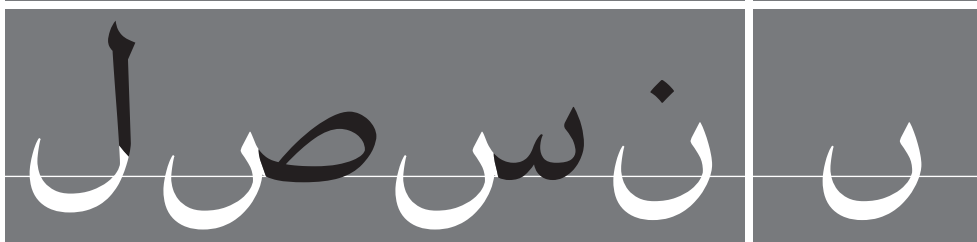


Fig. 2.20
Nun, Sin, Sad, and Lam.

Dal–Kaf Relationship

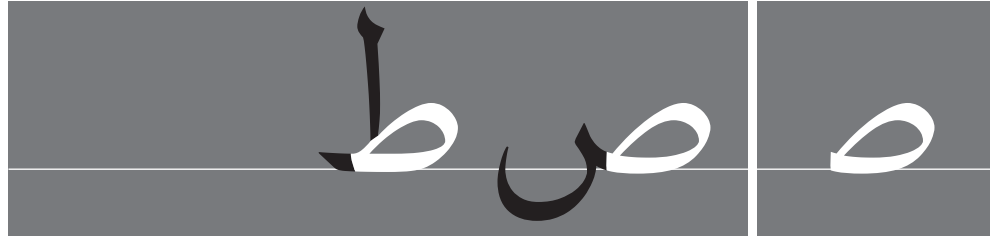
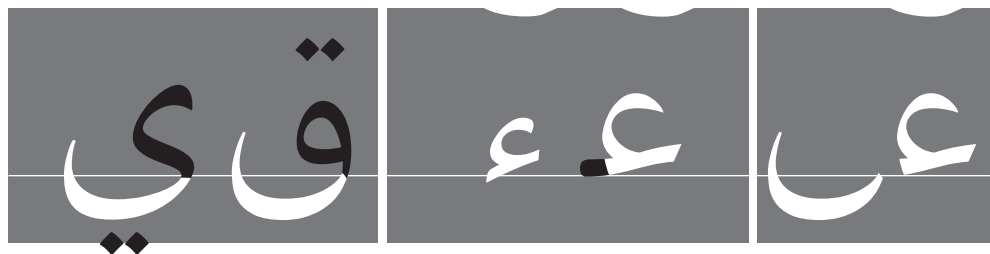
The upper part of Dal د finds resonance in the middle part of the initial and middle Kaf ك . Though it is not exact the same, they are still related in form and proportion. In the rounded styles, it is often a curved or diagonal stroke (Fig. 2.22 Left). In the squarish ones, it is a horizontal line with a circular transition to a vertical stroke.

Jim–Ayn Relationship

The descenders of the isolated and final forms of Jim ج and Ayn ع are closely related (Fig. 2.22 Right). These are the deepest strokes and often extended below previous characters. They are characterized by an elegance of movement even though they are not frequently used. Their depth can cause clashes in tightly spaced lines.

Qaf–Yeh Relationship

The semi-circular stroke of the isolated and final forms of Qaf ق and Yeh ي are related though Qaf can occasionally be tighter (Fig. 2.23 Right). The movement is similar to that of the Nun but is a little bit wider. The ending stroke is the same.

Fig. 2.21
Sad and TahFig. 2.22
Right: Jim and Ayn
Left: Dal and KafFig. 2.23
Right: Ayn and Hamza
Left: Qaf and Yeh

Ayn–Hamza Relationship

The head of the initial Ayn **ع** is related to the Hamza **ء** even though the Hamza is smaller in size (Fig. 2.23 Left). The head of the Ayn is the only stroke above the base ribbon that is open to the right. It is also the head that has the largest counter.

Homogeneous and Heterogeneous Letters

Homogeneous letters can be defined as ones that maintain their basic initiating form in all contextual positions (Fig. 2.25). Heterogeneous letters are ones that do not (Fig. 2.26). The basic initiating form can be found in the first one or two strokes of the initial form of a letter. In a homogeneous letter, this shape remains unchanged in the isolated form, but is complemented by a finishing stroke. Finishing strokes can be a horizontal swash as in Beh **ب**, a downward right-facing semi-circle as in the Jim **ج** and Ayn **ع**, an upward facing semi-circle as in Nun **ن**, Qaf **ق**, and Yeh **ي**, or a vertical descender as in Mim **م** (Fig. 2.24 Left). It is interesting to point out here that within such a definition, the letters that do not connect to the right do not have a finishing stroke. The entire letter is essential to its recognition. By contrast, other letters can be easily recognized by their initiating strokes, and the finishing strokes function as purely decorative swashes. This is not to say that these strokes are superfluous for they give the script the space needed to flourish. As it is, the beauty of Arabic calligraphy is greatly enhanced by the alternating rhythm between the Waw **و** and Reh **ر** descenders (Fig. 2.24 Right) and the finishing strokes that mark the end of a word.

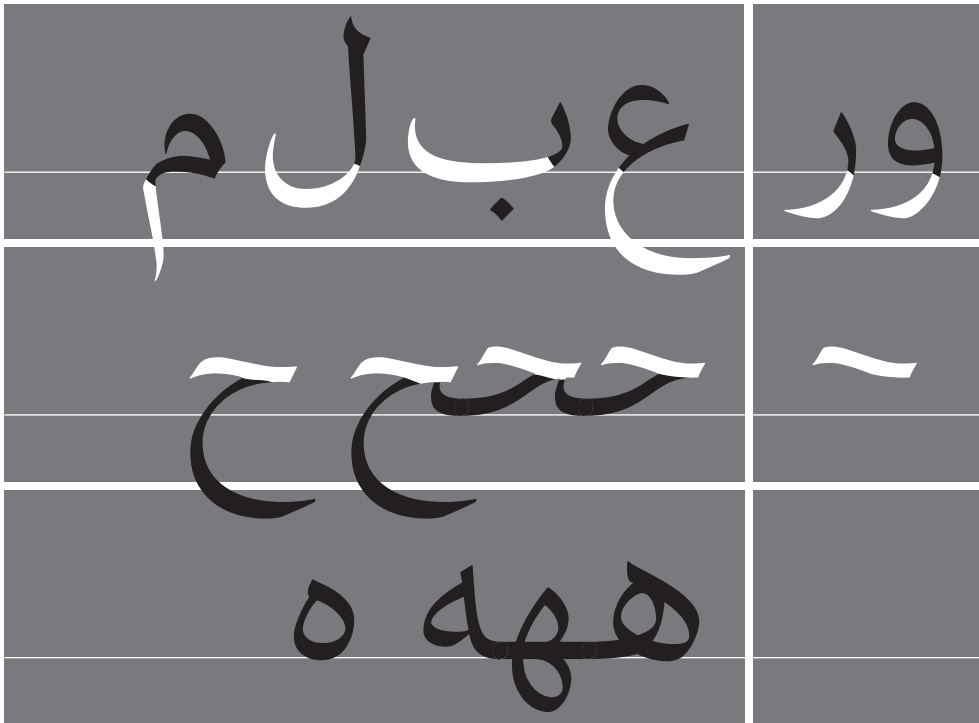


Fig. 2.24
Right: Word finishing strokes. Left: descenders that occur in the middle of a word.

Fig. 2.25
Homogenous letters retain a common shape in all positions

Fig. 2.26
Heterogenous letters change their shape significantly.

Letter Frequency in the Arabic Language

Historians note that it was the Arab polymath Al-Kindi in the ninth century who first noted that Arabic had a characteristic letter frequency, and that this could be utilized in breaking ciphers. He thus pioneered the field of cryptography, as well as many others. Of his many achievements, one is quite interesting to this paper, and that it was he who was mostly responsible for introducing the Hindi numerals into both the Middle Eastern and European cultures.

Given this background, it is shocking that there are barely any sources today of letter frequency in Arabic. An online search revealed only 2 studies. One used the Quranic text as source material and the other used an impressive 193 million words. The first is not representative of all sorts of Arabic texts and so is interesting to note, but not to take as a reference. The second is very impressive, but the online source seems to be truncated as it is hosted on the web archives and contains no indication of who the author is. This is unfortunate, but at least the results are very close to the analysis that this author made on a sample of 503,000 words.

The corpus was gathered from various online magazines and newspapers and was divided in the following categories: business, culture, legal, literature, math, religious, science and technology, and sports. The most interesting aspect of the results was that half of the letter count was made up of 6 letters only. These were: Alif, Lam, Yeh, Mim, Waw, Nun. If put together they make up the word: Allaymoun, meaning “the lemon.”

Though the appearance of Arabic text seems quite varied, it is surprising to find out that 80 percent of the letter count is made up of 15 letters only (Fig. 2.27). Most of the rest of the alphabet has a percentage occurrence of less than one percent. From the top 15 most frequent letters, the top 2 are ascenders, 2 are descenders, and 5 have descending finishing strokes.

Fig. 2.27 Fifteen letters account for 80% of letter frequency in the Arabic language.

Name	Percentage	Shape
Alif	14.86%	ا
Lam	11.75%	ل
Yeh	7.38%	ي
Mim	6.27%	م
Waw	5.53%	و
Nun	5.35%	ن
Teh	4.39%	ت
Reh	4.36%	ر
Beh	3.53%	ب
Ain	3.41%	ع
Heh	3.10%	ه
Teh Marbuta	3.07%	ة
Dal	2.78%	د
Feh	2.58%	ف
Sin	2.26%	س

The reason this is included here is mainly due to rhythm. The frequency of characters informs the general rhythm that a language creates. For example, the Latin language frequently uses the letters m, n, and u. This gives a sense of uniformity since these letterforms are very similar and built with straight upright strokes connected by a curved line. In Arabic, the Alif ا and Lam ل are very frequent, and often together as they form the article “the.” The final versions of the Jim ج family and Ayn ع family are not often seen so that descender does not show up often. However, the Nun ن shape that also shows up in the final and isolated version of the Sin س family, the Sad ص family, and the Lam ل is very often seen. The Waw و and the Reh ر are also common so this gives up the view of what kind of descenders to expect in Arabic. The deep descenders are therefore less common, and as a result, Arabic tends to shoot up rather than down.

Why Anatomy?

This dissertation could have worked well without having to delve into the different calligraphic styles or into the details of how letterforms are formed. This chapter is more fitting in a dissertation related to type design itself, rather than the study of typeface legibility. However, at the heart of legibility is the understanding of the forms that people are used to reading, and the question of complexity of style is rooted in the manuscript traditions and their evolution into typographic forms. In that sense, this chapter provides the first glimpse of the visual setting in which the question of legibility is being asked. This will be further expanded and clarified once we move on to the next chapter and we look at the typographic norms in place today.