SOME PHONOLOGY OF THE QUR'ĀN

A. Effendi Kadarisman

Abstract. The so-called at-tajwīd in Islamic scholarship is a branch of Qur'ānic studies which deals with refine Qur'ānic reading. Two major rules prescribed by at-tajwīd are selected for the present study: rules for vowel lengthening and rules for consonantal changes. The former rules are mostly text-specific, whereas the latter are in essence rules of natural phonological processes. This article, using the approach of generative phonology, explains the nature of consonantal changes in the Qur'ān, and redefines these phonological processes as word-internal and cross-lexical assimilation.

Key words: at-tajwīd, reading, consonantal changes, assimilation, generative phonology.

In their attempt to preserve the sanctity of the Holy Qur'ān, Islamic scholars of the earlier period set up the prescriptive rules which, since their inception, have served as a guide to precise and refine Qur'ānic reading (al-Qattân 1973: 188-95). These rules, taken together, constitute the so-called 'ilmu-t-tajwīd, or the tajwīd science. The Arabic word tajwīd itself means tāhṣīn al-qirā‘ah or refine reading. As noted in al-Munjid (1986), at-tajwīd in the context of Qur'ānic reading means “giving each letter its accurate pronunciation according to prescribed rules” (p. 109).1 Thus, in addition to correct pronunciation, which is required from every Qur’ānic reader, refine reading is strongly recommended.2

1 Al-Munjid is a monolingual Arabic dictionary; the original Arabic version of the definition translated above is “i’tiqā’u kulli harfin baqahu bi-muqta‘ad wa li ma’badh.”
2 Refine Qur’ānic reading is motivated religiously by the Qur’ān (73: 4) itself.
at present-day Islamic schools as well as in Islamic communities in general (in Indonesia, and presumably also in Malaysia and other "Islamic" countries), reading the Qur'an with the correct *tajwید* becomes obligatory.

Taking *at-tajwید* at the outset, this article will first discuss the vowel and consonant systems of standard classical Arabic, which is the language of the Qur'an. Next, it will highlight the major rules for consonantal changes as prescribed by *at-tajwید*, and then point out the universal phonetic features involved in the consonantal changes, particularly those specified as phonological processes. In this way, this article demonstrates the explanatory power of generative phonology. Finally, the concluding part of this article will briefly underscore how the present study, by investigating consonantal changes in the Qur'an, may give deeper insights at the theoretical level.

THE VOWEL AND CONSONANT SYSTEMS OF CLASSICAL ARABIC

The three vowels /i, u, a/ depicted in Figure 1 are the basic phonemic vowels in Arabic, as shown in the words [kataba] (کتبا) 'he wrote' and [kutiba] (کتیبا) 'it was written.' Moreover, there is phonemic distinction between long and short vowels. Thus, the three basic vowels /i, u, a/ are in phonemic contrast with long vowels /i:, u:, a:/, as shown by the following pairs of contrastive examples: [bi] (بی) 'with' vs. [bi:] (بی:) 'with me,' [āudū] (أعدو) '(you masculine singular) call!' vs. [āudū:] (أعدو:) '(you masculine plural) call!', and [jalasa] (جلسة) 'he sat' vs. [jalasa:] (جلسا:) 'they both (masculine) sat.' In addition, Arabic also has two rising diphthongs: /ai/ and /au/, as in [kai] (کی) 'so that' and [lau] (لی) 'if.'

which says, "Wa rattil-l-qur'āna tartielaa" (And with measured tone, recite the Qur'an). In addition, in a *hada th* transmitted by Abu Dawād and an-Nasāʿī, the Prophet recommended, "Zayyin-l-qur'āna bi-aqwātikum" (Make [the recitation of] the Qur'an beautiful with your voice).
The low vowel /a/ has two allophones: [a] and [A]. The allophone [a], which is a mid back round vowel, occurs after the trill [r] (ɣ), the uvulars [q, x, ɭ] (ق, خ, ١), and the pharyngealized consonants [ɭ, ɬ, ɭ] (ل, ل, ل). (The consonant chart in Table 1 depicts Arabic consonants; and their equivalents as represented by al-hur ḏī al-hij-yah or Arabic alphabet are given in Table 2.) All of these consonants, especially the pharyngealized consonants, are produced with lips rounding. Naturally, /a/ becomes [A] when it occurs after these consonants. To illustrate, /daraba/ (دارب) 'he hit' and /qa:la/ (قلا) 'he said' at the phonemic level become [daraba] and [qala] at the phonetic level.

The thick geminate /ll/ in the word Allah (آلل) 'God' is part of the pharyngealized consonants. In producing this thick /ɭɭ/, the tongue root is raised against the pharynx, accompanied by lips rounding. So, the word /allaːh/ is pronounced [allah], where /a/ occurring after the pharyngealized, and hence rounded, /ɭ/ becomes [A]. In contrast, the

Table 1. Chart of Arabic Consonants

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>L-D</th>
<th>D-A</th>
<th>A</th>
<th>F</th>
<th>V</th>
<th>P</th>
<th>Ph</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>stop</td>
<td>-</td>
<td>-</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>fricative</td>
<td>-</td>
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<td>-</td>
<td>k</td>
<td>q</td>
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<tr>
<td>affricate</td>
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<td></td>
<td></td>
<td>s</td>
<td>l</td>
<td></td>
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</tr>
<tr>
<td>nasal</td>
<td>m</td>
<td>n</td>
<td>n</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>liquid</td>
<td>l1</td>
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</tr>
</tbody>
</table>
Table 2. Arabic Consonants as Represented by Arabic Letters

<table>
<thead>
<tr>
<th>Arabic Consonants</th>
<th>Arabic Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>B</td>
</tr>
<tr>
<td>Fricative</td>
<td>L</td>
</tr>
<tr>
<td>Nasal</td>
<td>D</td>
</tr>
<tr>
<td>Liquids</td>
<td>A</td>
</tr>
<tr>
<td>Semivowels</td>
<td>P</td>
</tr>
<tr>
<td>Plosives</td>
<td>U</td>
</tr>
<tr>
<td>Stops</td>
<td>Ph</td>
</tr>
<tr>
<td>Fricatives</td>
<td>G</td>
</tr>
</tbody>
</table>

Legend for points of articulation:
- B: Bilabial
- L: Labiodental
- D: Dental
- A: Alveolar
- P: Palatal
- V: Velar
- U: Uvular
- Ph: Pharyngeal
- G: Glottal

The phrase /lilla:h/ (الله) is pronounced [lilla:h], and not [lill: h]. The reason is obvious. The vowel /i/ is pronounced with lips spreading, not rounding, represented in phonology by the feature [-round]. This feature is carried forward affecting the geminate [l], i.e., deleting the secondary feature [pharyngealized], since pharyngealization does not occur without lips rounding. Thus, because of the absence of the feature [pharyngealized], and hence also [round], in the phrase /lilla:h/, the vowel /a/ occurring after /ll/ remains [a] at the phonetic representation. Briefly, [a] in [ʔa][l][l]:h and [a] in [lilla:h] are instances of assimilation. That is, the presence of pharyngealization in [ll] changes /a/ into [], and its absence makes it remain the same. (More on assimilation will be presented in the discussion of consonantal changes in the next section.)

With respect to the consonantal system, a chart of Arabic consonants is given in Table 1. Equivalents of these consonants are represented in
Muchsin Achmadi, Epigraph Syair dan Epigram, 5

Arabic letters and given in Table 2. It is possible to present these consonantal equivalents because the Arabic writing system is consonantal alphabetic (Jannedy et al. 1994: 433). In this writing system, especially for "mature" readers, only the consonants are written, and the vowels, added to them as diacritics, are left out. The Qur’an as religious text, however, is written in full: the consonants are provided with all necessary diacritics and punctuation marks to prevent misreading, and hence to avoid distortion of meaning.

At this point, it should be noted in passing that a number of Arabic consonants are often considered "difficult to pronounce," especially by adult learners of Arabic as a foreign language. This "difficulty" is best explained by referring to the linguistic concept of markedness. That is, the presence of a particular linguistic feature may cause "inherent difficulty" in a certain linguistic item (see Crystal 1991: 211-12). For instance, across languages, the sound [t] is more marked or more difficult to pronounce than [l], and [l] is more marked than [d]. This is because the production of the fricatives [l] and [d] requires more phonetic efforts than the production of the stops [t] and [l] does. The fricatives are produced by putting the tip of the tongue between the teeth and letting the air out of the mouth through this partial blockage, whereas the stops are produced by a sudden release of the air blocked by the tongue whose tip is pressed against the alveolar or dental/velar ridge. The production of the former is harder than that of the latter.

In Arabic, the "inherent difficulty" of [l] is compounded by adding pharyngeality to it, yielding the consonant [l]. Pharyngealized consonants, as noted earlier, are produced by retracted the root of the tongue against the pharynx, accompanied by lips rounding (see Kentstowics and Kisseberth 1979: 19). From observing children as well as adults learning to pronounce pharyngealized consonants [t, d, s] (ت، ّ، س) while learning to read the Qur’an, I am led to conclude that these sounds are marked, if not highly marked. Similarly, the uvular consonants [q, x, r] (ق، خ، ر) and the nasalized pharyngeal stop [m] (م) are equally marked, because their production requires "unusual" phonetic efforts.

Just as vowel length carries phonemic distinction, geminate or double consonants also have a phonemic value, as shown by the following
contrast: /bala/ (he arrived) vs. /balla/ (he delivered something). Gemination in the Qur’-n occurs not only word-internally but also cross-lexically, as can be seen in the sequence /kam#min.../ (how many among...) to be read [kammin]. (The double cross # at the phonemic representation indicates a boundary between two adjacent words (see Pullum and Ladusaw 1986: 202).) In a language with no gemination, when two identical consonants occur between two adjacent words, one of them is deleted at the phonetic level. In Indonesian, /bممakan/ (do(es) not eat yet) is pronounced [bممakan] in a natural speech, and not [bمم Hmmakan]. Likewise, in English what time ?t is to be pronounced [w?t], and not [w?tt].

Prominent among the prescriptive rules constituting at-tajw?d are two major categories: rules dealing with vowel lengthening and rules dealing with consonantal changes, both occurring word-internally and between adjacent words. The rules for vowel lengthening are partly universal but largely text-specific. By “text-specific” is meant that many rules concerning vowel lengthening are Qur’-n-specific. To illustrate, when a long vowel occurs before the glottal stop | or hamzah () word-internally, it is extended to five beats. In at-tajw?d, this vowel lengthening is called mad w-?ib mutta?il ‘obligatory word-internal vowel lengthening.’ Thus the words /wara:/ (behind), /ji:/ (it was delivered), and /su:/ (wickedness) are to be pronounced [war::a], [ji::a], and [su::a], respectively. By comparison, when a long vowel occurs word-finally and is followed by the glottal stop | at the beginning of the next word, the five-beat lengthening is optional. This is called mad j-?i munfa?il ‘optional interlexical vowel lengthening.’ For example, it is recommended that the sequence /indahu:balla/ (for him except) be read [iindahu::balla]. (Recall that the double cross # indicates a word boundary at the phonemic representation. In contrast, the plus symbol “+” indicates a juncture or a brief pause between words at the phonetic representation (Moulton as cited by Lass 1984: 36).) However, the original two-beat length (i.e., [iindahu:]) is not prohibited. These text-specific rules, as noted earlier, apply only to refine Qur’-n reading. They do not apply, for instance, in the reading aloud of standard Arabic texts, either modern or classical. Accordingly, these text-
specific rules are outside the domain of modern phonology.

In contrast, rules for word-internal and cross-lexical consonantal changes can be recaptured, and hence explained, by phonology, since they involve changes of phonetic features owing to a given phonetic environment. Most, if not all, of the consonantal changes can be captured by the well-known "rewrite rule" in generative phonology: $X \ X > Y /\ Z$. This formula reads, "Sound X becomes sound Y in the phonetic environment Z." As suggested by the title, the present article is confined to discussing consonantal changes in the Qur’an which yield to universal principles of phonological analysis.

FROM AT-TAJWĪD TO MODERN PHONOLOGY

Like traditional grammar which came up with intuitive notions useful to modern syntactic theory (Chomsky 1965: 5-6), at-tajwīd prescribed consonantal changes involving "natural classes" and "phonetic features" as defined by modern phonetics and phonology. This section deals with four major consonantal changes: (a) word-internal and cross-lexical consonantal changes involving syllable/word-final alveolar nasal /n/, (b) word-internal and cross-lexical phonetic behavior of syllable/word-final bilabial nasal /m/, (c) affixation involving the lateral in the definite-article prefix al-, and (d) word-internal and cross-lexical consonantal changes involving two identical and similar consonants. Results of these phonological analyses are summarized at the end of this section. In discussing these consonantal changes and also non-changes, I refer at the outset to traditional terms in at-tajwīd, with their English translations provided, and move toward modern phonology, by explaining the changes in terms of universal phonetic features.

Word-internal and Cross-lexical Consonantal Changes Involving Syllable/Word-final Alveolar Nasal /n/

\footnote{These consonantal changes and also non-changes are part of the primary subjects of at-tajwīd, taught at Islamic schools in Indonesia, in the latest grades of the elementary level (al-madrasah al-ibtid‘iyyah) and/or in the first- or second-year of the secondary level (al-madrasah ath-th-nawwiyah).}
In at-tajwīd, the syllable/word-final alveolar nasal includes (a) al-
-nān bis-sūkān (‘who’ and ‘kun/ (කොළා) be,’ and (b) at-tanwien or the /n/ sound at the end of the indefinite
markers -an, -in, -an ( thugs, ) for nouns and adjectives, as in /lān/i
‘something,’ /haki:min/ (الخليجيفي) ‘most wise,’ and /azi:zun/ (الخليجيفي) ‘most glorious.’

Hār Halqiy (Clear reading of /n/ occurring before hār g皈 al-halqi or
‘pharyngeal consonants’)

A clear reading of /n/ is required when it occurs before the conso-
nants /h, s, r, b, d, j, / (b, m, l, n, ɡ, ɡ). In this phonetic environment,
/n/ remains intact. There is no assimilation between /n/ and any of these
six consonants. The reason for the absence of assimilation should be self-
evident. The alveolar nasal /n/ is characterized by the features [+anterior]
[+back], whereas the six consonants above are [−anterior] [−back]. Thus,
with respect to points of articulation, they are so far apart. As a result, no
assimilation is expected to happen. Examples of word-internal non-
assimilation are /al-munxaniqwatu/ (المثنىعرف) ‘the flesh of strangled
animals’ and /al-anhaxīf/ (الأنحاقيفي) ‘the rivers,’ to be pronounced [ال-
munxaniqwatu] and [al-anhaxīf]. Cross-lexical examples are /man+a:mana/
(الخليجيفي) ‘whoever believed’ and /lafu:run+mālik/ (المالك) ‘most
forgiving, most wise,’ pronounced [man+a:mana] and [lafu:run+mālik],
respectively.

While the term hur g皈 al-halqi ‘pharyngeal consonants’ differs from the modern term (in that pharyngeal consonants in the latter sense include
only /h, s, r, / (م), the traditional term is superior to the natural class
[back consonants] in catching all members of the whole ‘class.’ That is,
the former excludes the velar /k/ (ک) and the uvular /q/ (ق), which belong to
back consonants. However, as we proceed, the advantage of using natural
classes in phonology to explain consonantal changes in the Qur’ān will
become more obvious.
Iqlaab (Reversing [alveolar] to [bilabial])

When /n/ occurs before the bilabial stop /b/, the feature [alveolar] becomes [bilabial] while the feature [nasal] remains. Thus, the word /anbatna:/ (we caused the growth of) is pronounced [am-batna:], and the phrase /min#ba#dihim/ (among them) is pronounced [mimb#dihim]. (Notice that [mimba#dihim] contains no plus sign “+” indicating a brief pause between two words. This plus sign deletion will be discussed shortly.) This is an example of a phonological process called assimilation; it is shown in Figure 2.

Assimilation is a process whereby a sound becomes more like a neighboring sound (Ladehoff 1982: 98; Lass 1984: 99). The above is called regressive assimilation since the feature [bilabial] in /b/ spreads backward or regressively and eliminates the preceding feature [alveolar] in /n/, changing it into [m].

Three things are worth noting with regard to this assimilation. First, as shown by the sequence [mb], the feature [nasal] retains after the assimilation. Second, the sequence [mb] forms the so-called homorganic cluster. It is a cluster consisting of [nasal + stop] having the same place of articulation (see Lass 1984: 48). The cluster [mb] here, for instance, shares the same feature [bilabial]. Third, when the sequence [mb] occurs word-internally, it is a true homorganic cluster, since it is derived from /nb/ at the phonemic level, as in /anbatna:/ ‘we caused the growth of’ above. In contrast, when [mb] occurs cross-lexically, it is best considered a pseudo-homorganic cluster, since its phonemic representation is /n#b/, as in /min#ba#dihim/ ‘from among them.’ As pointed out above, in its phonetic representation (i.e., [mimba#dihim]), the plus sign “+” indicating juncture is deleted. Because of the assimilation, the phonemes /n#b/ at the phonemic level become the “cluster” [mb] at the phonetic
level. In other words, the two adjacent words “merge” through the resulting pseudo-homorganic cluster [mb].

In human language, assimilation is a very natural process; it is inherently driven by ease of production. As a comparison, in normal speech in English, the word input and the phrase in between are often pronounced [imput] and [imbëtwi:n]. The feature [alveolar] occurring before [bilabial] becomes [bilabial], changing /n/ into [m], in anticipation of pronouncing the bilabial stops /p/ and /b/. Notice that the cluster [mp] in [input] is true homorganic, whereas [mb] in [imbëtwi:n] is pseudo-homorganic.

**Ikhfaa’ (The Feature [alveolar] being Hidden)**

Ikhfaa’ deals with the occurrence of /n/ before the fifteen consonants /f, ə, c, t, d, s, z, j, k, q, r, ɾ, l, ɾ, z, ʃ, ʒ, ʁ/. Presented here along the points of articulation, from the labiodental /f/ at the most front to the uvular /q/ at the most back. In terms of their manner of articulation, these consonants fall into three major categories: [stop], [affricate], and [fricative] consonants. The stops are /t, ɾ, d, k, q/; the affricate (there is only one affricate) is /ʃ/; and the fricatives are /ʃ, ʒ, s, z, j, k, q/. According to the feature system, stops and affricates are characterized as [+continuant], meaning that in their production the air flow in the oral cavity is totally blocked by the tongue and then given a sudden release. On the other hand, fricatives are [+continuant]. They are produced through continuous release of the air flow through partial obstruction by the tongue.

When /n/ occurs before a stop or an affricate, it assimilates in place with this consonant. For example, the word /munkiru:n/ (‘those who deny’) is pronounced [muₖɪkɪɾu:n]. Notice that the alveolar /n/ becomes the velar [ʃ] in anticipation of pronouncing the velar /k/ (‘t’). Similarly, the phrase /min#ju:/ (‘from hunger’) is pronounced [miʃu:j:], where /n/ becomes [ʃ] before the palatal /ʃ/ (v). In line with the argument presented in section 2.1.2 above, [muₖɪkɪɾu:n] contains a true homorganic cluster [ʃk], while [miʃu:j:] contains a pseudo-homorganic cluster [ʃ].

The place assimilation of /n/ to the following stop or affricate can be formally stated by the following rule:
The formula in (1) reads, "When alveolar nasal occurs before a stop or an affricate word-internally or cross-lexically, it assimilates in place." The symbol alpha "\(\alpha\)" indicates "the place of articulation" of "any stop/affricate" occurring in the above phonetic environment. Since "any stop/affricate" here means any one of the consonants /t, d, d, k, q/, \(\alpha\) in this respect may refer to [dent alveolar], [palatal], or [velar]. Recall that /\(b\)/ is a stop. Thus the rule for \(iq\)-\(b\) (i.e., /\(n\)/ becomes [m] before /\(b\)/, discussed earlier in section 2.1.2) is also included in formula (1).

Like the examples added to the discussion of \(iq\)-\(b\), English also provides similar examples for \(ikh\)\(fi\)\(a\). The word incomplete is always pronounced [\(\alpha\)mpli:t], and the phrase in general is very probably pronounced [\(\alpha\)mpl\(\alpha\)nt]. Thus /\(n\)/ becomes /\(\alpha\)/ before /\(d\)/ word-internally and becomes /\(\alpha\)/ before /\(\beta\)/ cross-lexically. These additional examples reaffirm that place assimilation is a very natural phonological process.

While /\(n\)/ assimilates in place to a stop or an affricate that follows, it behaves differently when followed by a fricative. For example, /\(\alpha\)n\(f\)us\(\alpha\)hum/ (themselves, ' /\(y\)an\(\alpha\)ru\(\gamma\)/ (they see, and /\(m\)in\(\alpha\)\(r\)\(\alpha\)/ (from the wickedness of ...) are to be pronounced [\(\alpha\)\(f\)us\(\alpha\)hum], [\(\gamma\)\(\alpha\)\(r\)\(\gamma\)/] and [\(\alpha\)\(r\)\(\alpha\)/], respectively. This is because the nasality in /\(n\)/ must be retained, while the blade or the tip of the tongue is searching for the place of articulation of the following fricative. Thus the only place for securing nasality is the velar. Below is the second rule for \(ikh\)-\(f\).

This rule states, "The alveolar nasal becomes velar nasal when it occurs before a fricative word-internally or cross-lexically." Briefly, /\(n\)/ becomes /\(\alpha\)/ before a fricative.

Now, how does phonology classify the fifteen consonants above in terms of a natural class? It does the grouping, first, by taking all the consonants termed 'pharyngeal consonants' (\(h\)\(\alpha\)\(\alpha\)\(\gamma\)-\(\alpha\)\(\alpha\)\(\gamma\)) under the term
[back obstruents], excluding /k/ and /q/; and secondly, by combining all other consonants (including /k, q/ and also /h/ under *iqlaab*) under the term "others," referring to all obstruents other than those called 'pharyngeal consonants' listed under *idgh* (See Table 3 for concise description.)

Idgh-m bi-Ghunnah (Assimilation with nasality remaining)

When /n/ occurs before the consonants /w, m, n, y/ (..., *, →), abbreviated traditionally by the verb *yanm* (\(\breve{\text{y}}\text{m}\)), meaning 'it grows,' it assimilates in [place]. However, this assimilation is cross-lexically conditioned. That is, it does not take place word-internally. The word /duña:/ (\(\breve{\text{d}}\text{y}\text{m}\)) 'the present world,' for instance, is pronounced [dunya:], not [\(\breve{\text{d}}\text{y}\text{y}a:\)]. Similarly, the word /gilwa:n/ (\(\breve{\text{g}}\text{il}\text{w}\text{a:n}\)) is pronounced [gilwa:n], and not [\(\breve{\text{g}}\text{il}\text{w}\text{a}\text{w}\text{a:n}\)].

As regards the assimilation, /n/ occurring before /n/ results in the geminate [nn], as in /min#nu:ɾ/ (\(\breve{\text{m}}\text{n}\text{u}:\text{ɾ}\)) 'from light,' pronounced [minnu:ɾ]. And /n/ occurring before /m/ becomes a geminate [mm], as in /min#maːɾ/ (\(\breve{\text{m}}\text{m}\text{aːɾ}\)) 'from water,' pronounced [minmaːɾ]. Here the feature [alveolar] becomes [labial] before [labial]. Likewise, /n/ becomes [w] or [y] when it occurs before /w/ or /y/. For instance, /?ilaːhun#waːd/ (\(\breve{\text{i}}\text{l}\text{aːh}\text{w}\text{aː}\text{d}\)) 'the One God' is pronounced [\(\breve{\text{i}}\text{l}\text{aːh}\text{w}\text{aː}\text{d}\)], and /man#yaqu:lu/ (\(\breve{\text{m}}\text{y}\text{a}:\text{Ɂ}\text{l}\text{u}\)) 'who says' is pronounced [\(\breve{\text{m}}\text{y}\text{a}\text{q}\text{u}\text{Ɂ}\text{l}\text{u}\)]. The rule for *idgh-m bi-ghunnah* can be stated as follows.

\[
\begin{array}{c|c|c}
\text{[nasal]} & V \text{[place]} & \_ \_ \_ C \\
\hline
\text{[+ sonorant]} & \_ \_ \_ \_ & \_ \_ \_ \_ C \\
\text{[- liquid]} & \_ \_ \_ \_ & \_ \_ \_ \_ C \\
\end{array}
\]

The rule in (3) reads, "The alveolar nasal assimilates in place when it occurs before a nasal or a semivowel cross-lexically." The feature [ + sonorant] (see footnote 1) includes [nasal], [liquid], and [semivowel]; and the feature [ - liquid] is used to exclude the liquids /l/ and /ɾ/, which will be

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4 As a natural class, the term [obstruent] includes three natural classes: [stop], [fricative], and [affricate]. This term is usually opposed to [sonorant], which includes [nasal], [liquid], [semivowel] as well as [vowel].
discussed in the next section.

Just as the plus sign “+” (indicating a brief pause) is deleted in the resulting homorganic clusters discussed in sections 2.1.2 and 2.1.3 above, it is also deleted in the resulting geminates in this section. As shown in the above examples, the sequences /ndhu/, /nbdhu/, /ndhw/, /nbdhw/ at the phonemic level become geminates [nn], [mm], [ww], [yy], respectively, at the phonetic level. In this regard, it is justifiable to conclude that cross-lexical assimilation, by means of producing geminates or identical consonants, makes the adjacent words "merge" at the phonetic level.

**Idgh-m bil- Ghunnah (Assimilation with Nasality Deleted)**

Recall that when /n/ occurs before a semivowel, it assimilates in [place] and results in a geminate semivowel (i.e., [ww] or [yy], as shown in [mwwar]:.ahim ‘from behind them’ and [myyaqua:lu] ‘who says’ in section 2.1.4 above), with the feature [nasal] retaining indicated by the diacritic tilde [\(\ddot{\cdot}\)] in [\(\ddot{\cdot}\)] and [\(\ddot{\cdot}\)]. In contrast, when /n/ occurs before a liquid (i.e., /l/ or /r/), it assimilates in [manner]. Hence the feature [nasal] is deleted and replaced by [lateral] or [trill]. To illustrate, the sequences /man#lam/ (\(\rightarrow\ddot{\cdot}\)) ‘one who did/does not’ and /min#rabbikum/ (\(\rightarrow\ddot{\cdot}\)) ‘from your Lord’ are pronounced [mallam] and [mirr\(\ddot{\cdot}\)bbikum]. Again, lexical "merging" occurs at the phonetic level as a result of assimilation. For better clarity, the loss of nasality (e.g., in [mal-lam]) is shown in Figure 3.

\[\text{Fig. 3}\]

Since both /n/ and /l/ are alveolar (i.e., having the same [place] feature), the only possible assimilation between them is manner assimilation. That is, the feature [lateral] spreads backward and deletes the feature [nasal], resulting in a geminate alveolar [ll]. The rule formulated in (4) expresses the nasal-to-liquid assimilation.
The formula in (4) states, "Alveolar nasal becomes a liquid when it occurs before a word-initial liquid cross-lexically." Alternatively, /n/ becomes [l] before /l/, and becomes [r] before /r/.

To compare, in English word formation, the phoneme /n/ in the prefix /-/ becomes /l/ before a word beginning with /l/, and becomes /r/ before a word beginning with /r/. Thus /n/ becomes /l/ or /r/, depending on the following consonant. This is the same assimilatory process as in the Arabic examples above. However, according to Lexical Phonology (see Mohanan 1986), the assimilation in English occurs at the lexical level accompanying word formation, and hence called morpho-phonological process, whereas the assimilation in Arabic occurs at the post-lexical level, and thus considered a pure phonological process.

In traditional Arabic morphology, what occurs in English examples above is called /a/-tajweed al-ibdall or sound changes and replacement (Nadz 1955: 25-26). At this point, it is interesting to note that this kind of assimilation is not dealt with by /-tajweed. For example, the word /muddakir/ (مذقني) 'one who takes heed' is the nominal agent of the verb /?iddakara/ (؟ذكروا) 'he took heed.' This verb is the end result of the following derivation: /akara/ (اكروا) /itakara/ (اِتَّكروا) /dakara/ (ذكروا) /?iddakara/ (؟ذكروا) /?iddakara/ (؟ذكروا) [Arabic transcription adjusted] /?iddakara/ (؟ذكروا).

This derivational process goes through the following steps. First, the verb /akara/ (اكروا) 'he remembered' takes the affix /-a...t...j.../ (-أ...ت...ج...), resulting in /itakara/ (اِتَّكروا). This affixation is a morphological process. Second, the voiceless stop /t/ occurring after the voiced interdental fricative /d/ becomes voiced, giving /dakara/ (ذكروا). This is a progressive assimilation: the feature [voiced] in /d/ spreads forward to /t/, changing it into /d/. Third, the fricative /d/ occurring before the stop /d/ becomes a stop, producing the final result /?iddakara/ (؟ذكروا). Then the Arabic orthography is adjusted (؟ذكروا) /?iddakara/ (؟ذكروا). This is a regressive assimilation: the feature [stop] (represented formally by [continuant]) spreads backward to /d/, changing it into /d/. Both types of assimilation
are phonological processes, which can be summed up as follows: /t/ > /d/ > /dd/. Since both morphology and phonology are involved here, the overall derivation is called morpho-phonological process.

Then from the verb toward the formation of a nominal agent, there is a conjugation to be followed. In English, for example, teach becomes teacher and exterminate becomes exterminator. In Arabic, /ḏakara/ (ذكَرَا) 'he remembered' becomes /ḏakir/ (ذكِر)، and /a:dḏakara/ (أذَكَر) 'he took heed' becomes /muddakir/ (مذَكِر). This conjugational process is besides the point of the present discussion. What is relevant here is that, following both types of assimilation above, the nominal agent /muddakir/ is also the end result of the same phonological processes: /mu:dḏakir/ (مذَكِر) > /mu:dakir/ (مذَكِر) > /muddakir/, which involve the same consonantal changes: /t/ > /d/ > /dd/.

Why does at-tajwīd leave out the morpho-phonological process? The end result of a derivational process of this type, as represented in Arabic orthography, has identical values in both the phonemic and phonetic representations. Thus, no confusion would occur in the course of Qur’nic reading. Conversely, as made clear in the previous discussion, confusion is expected to occur in refine Qur’anic reading when the phonetic Table 3. Word-internal and Cross-lexical Consonantal Changes Involving Syllable/word-final Alveolar nasal /n/. representation is different from what is represented in Arabic orthography. Concretely, /muddakir/ (مذَكِر) 'one who takes heed' is pronounced
Leaving the morpho-phonological process aside, the discussion on word-internal and cross-lexical consonantal changes involving the syllable/word-final alveolar nasal /n/ in this section is summed up in Table 3. As shown in this table, there is in fact only one major phonological process taking place, namely assimilation. All types of place assimilation, due to contact with either obstruents or sonorants, (traditionally called ḍāl, ḥāfṣ, and ḍāgh-m bi-ghunnah) retain the feature [nasal]. In contrast, manner assimilation, as the name implies, causes the loss of nasality and changes /n/ to [l] or [r] (called ḍāgh-m bil- ghunnah). As shown above, each type of assimilation can always be expressed by a formal rule: sound X becomes sound Y in the phonetic environment Z. In other words, assimilation is always phonetically conditioned. The non-assimilation (idzh-r), in this context, can be seen as a supplementary issue, since what is represented in Arabic orthography has the same phonemic and phonetic values. Thus idzh-r is nothing but an affirmation of the absence of consonantal changes in the process of deriving phonetic form from its underlying phonemic representation.

Word-internal and Cross-lexical Phonetic Behavior of Syllable/word-final Bilabial Nasal /m/

The specific treatment of the syllable/word-final /m/ by at-tajwīd is apparently motivated by the concern for the feature [nasal] in it. Recall that in section 2.1, major attention has been given almost exclusively to what happens phonetically to the syllable/word-final /n/, especially with respect to its [nasal] feature. This is because /n/ in this phonetic environment occurs most frequently in the Qur’an as a text. Recall also that the traditional terms bi-ghunnah ‘with nasality’ and bil- ghunnah ‘without nasality’ become significant as they characterize the nature of the assimilatory process, making explicit the nature of the assimilation or assimilation.

In terms of their frequency of occurrence, the word-final /m/ occurs much less often than does the word-final /n/. In fact, aside from the con-
cern for nasality, there is no assimilation involving /ml/ in this section. There are three minor issues related to the word-final /ml/. First, when it occurs before a word-initial /ml/, the sequence /m#ml/ become a geminate [mm] at the phonetic level. For example, /qam#man/ (\(\text{who-}
\text{ever}\)) and /kam#min .../ (\(\text{how many among-}\)) are pronounced [\(\text{qammn}\)] and [\(\text{kammin}\)]. This is called idgh\(\text{m m}\)miy, meaning 'the sequential sounds [mm] become geminate, with their nasality getting stronger.' Naturally, the resulting geminate [mm] deletes the interlexical juncture (indicated by plus sign "+") at the phonetic level.

Secondly, when /ml/ occurs before /b/ (\(\langle\rangle\)), the nasality in [m] gradually decreases in anticipation of pronouncing the bilabial stop [b], as in /hum#bariza\(\text{n}\)at (\(\langle\ldots \text{they rise up}, \text{pronounced humbariza\(\text{n}\)}\rangle\)). In at-raj\(\text{m d}, \) it is called ikh\(\text{f shafawiy,}\) suggesting that 'the nasality is partly hidden because of the adjacent bilabial stop.' Just like the previous pseudo-homorganic clusters resulting from assimilation, the sequential sounds [mb] here, attracted to each other because of the place feature [bilabial] they share, also forms a pseudo-homorganic cluster. Just like the geminate [mm] above, the homorganic [mb] also deletes the interlexical juncture at the phonetic representation.

Third and finally, when /ml/ occurs before consonants other than /m/ (\(\langle\rangle\)) and /b/ (\(\langle\rangle\)), its [labial] and [nasal] features remain intact. This is called idzh\(\text{r shafawiy,}\) or 'making nasality in /m/ sound clear as it is produced with closed lips.' Examples are /\(\text{am}\)\(\text{mta}/ (\(\langle\rangle\)) and /lam#yalid/ (\(\langle\rangle\)) 'thou blessed' and /lam#yalid/ (\(\langle\rangle\)) 'he does not beget,' which remain the same at the phonetic representation: [\(\text{ammta}\)] and [\(\text{lam+yalid}\)]. At this point, it is worth nothing that nasality in /ml/ (\(\langle\rangle\)) does not spread partially forward to /f/ (\(\langle\rangle\)) or /w/ (\(\langle\rangle\)), despite the fact that /ml/, /f/, and /w/ share the same feature [labial]. Thus, /\(\text{al-amwaa\(\text{l}\)}/ (\(\langle\rangle\)) 'the wealth' and /\(\text{hum+fi:ha\ldots}/ (\(\langle\rangle\)) 'they in it...' are pronounced [\(\text{al?amwa:l}\)] and [\(\text{hum+fi:haa}\)]. Notice that in [\(\text{hum+fi:haa}\)], the brief pause (represented by +) between the two adjacent words remains at the phonetic level, indicating that nasality does not spread forward to /f/. Apparently, the feature [labial] by itself is not strong enough to attract the nasality in /ml; it has to be accompanied by the feature [stop]. That is why, only in the cluster [mb] the nasality in /ml/ spreads partially forward. Table 4 summarizes the phonetic behavior of syllable/word-final /ml/ discussed in this section.
Table 4. Word-internal and Cross-lexical Phonetic Behavior of Syllable/word-final Bilabial nasal /m/

<table>
<thead>
<tr>
<th>syllable/word-final consonant</th>
<th>syllable/word-initial consonant</th>
<th>phonological process</th>
<th>nasality</th>
<th>traditional term</th>
</tr>
</thead>
<tbody>
<tr>
<td>bilabial nasal /m/</td>
<td>- bilabial nasal /m/</td>
<td>gemination</td>
<td>yes</td>
<td>idgh-m miy</td>
</tr>
<tr>
<td></td>
<td>- bilabial stop /b/</td>
<td>homorganic</td>
<td>yes</td>
<td>idkhf-shafawiy</td>
</tr>
<tr>
<td></td>
<td>- others</td>
<td>no assimilation</td>
<td>NA</td>
<td>idkhf-shafawiy</td>
</tr>
</tbody>
</table>

As shown in Table 4, the syllable/word-final /m/ behaves very differently from /n/. Whereas /n/ more often than not assimilates largely in place and partly in manner with the consonant that follows, the phonetic behavior of /m/ involves no assimilation. But it involves what I propose to call "conjunction," or mutual attraction between two consonants sharing at least one identical feature. The conjunction produces the geminate [mm], called idgh-m miy, and the homorganic [mb], known as idkhf-shafawiy. Notice that both types of conjunction are made possible by the [bilabial] feature.

In the geminate [mm], the nasality of /m/ becomes more prominent, while in the homorganic cluster [mb], it fades away slowly in anticipation of pronouncing the voiced stop [b]. Anywhere else, "clear reading" or idzh-r is expected. It is called idzh-r shafawiy, suggesting 'a clear reading of /m/ as a bilabial nasal by confining the nasality to itself.' Just like idzh-r halqiy, which confines nasality to /n/, idzh-r shafawiy also gives emphasis on the fact that nothing changes in the process of deriving the phonetic form from its underlying representation.

Affixation Involving the Phonetic Behavior of Lateral /l/ in the Definite-article Prefix al- (-ُئلاء)

In Arabic, the definite article is represented morphologically by a prefix, known as alif l-m tu’rif or the definitive al- (-ُئلاء). For instance, /kitab/ (ِکِتاب) means ‘a book,’ and /al-kitab/ (ِکِتاب) means ‘the book.’ In standard Arabic, both classical and modern, the affixation of al- to common nouns is phonologically conditioned. The lateral /l/ in al- remains intact when followed by al-hur f al-qamarriyyah or "moon letters," but it assimilates in place when followed by the so-called al-hur fja ash-
**Muchsin Achmadi, Epigraf Syair dan Epigram, 19**

Shamsiyyah or “sun letters” (see Kenstowics 1994: 52). Two examples nicely catching these two groupings are /al#qamaru/ (لَقَامَر) ‘the moon’ for the former, and /al#amsu/ (لَامُس) ‘the sun’ for the latter. These two words are pronounced [al+qmaru] and [a+amsu], respectively.

How is the place assimilation phonologically conditioned? To answer this question, let us first list the phonetic symbols for the 14 “sun letters”ː /q, g, k, t, d, s, z, ɾ, l, r, ꞌ/, (e, a, o, u, i, y). These phonetic symbols are listed along the points of articulation, and best depicted by slicing the consonant charts from Tables 1 and 2 above, and re-presenting them in Tables 5a and 5b.

**Table 5a. Coronal Consonants**

<table>
<thead>
<tr>
<th></th>
<th>LD</th>
<th>D-A</th>
<th>A</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>stop</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>fricative</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>affricate</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>nasal</td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>liquid</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5b. Arabic Equivalents**

<table>
<thead>
<tr>
<th></th>
<th>LD</th>
<th>D-A</th>
<th>A</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>stop</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>fricative</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>affricate</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>nasal</td>
<td>8</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>liquid</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Legend

<table>
<thead>
<tr>
<th></th>
<th>LD</th>
<th>D-A</th>
<th>A</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>interdental</td>
<td>D-A</td>
<td>dental-velar</td>
<td>alveolar</td>
<td>palatal</td>
</tr>
</tbody>
</table>

As shown in Tables 5a and 5b, the so-called “sun letters” include interdental, dental-velar, alveolar, and palatal consonants except /l/. In the Chomsky-Hale feature system, these four points of articulation are combined into a single natural-class feature: [coronal] (see, e.g., Ladefoged 1982: 40-41; Kenstowics 1994: 30-31). The place assimilation of /l/ (in *al-*) with the “sun letters” is expressed by the formula in (5).

(5) \([\text{lateral}] \times [\text{coronal}] / \_ \_ / [\text{coronal}]\)
This formula reads, “Lateral becomes coronal before a coronal which occurs word-initially.” Additional examples for this assimilation are /al#rasma:n/ (الْمَجْمَعُ ‘the most gracious’), /al#gabru/ (الْحَمْسَةُ ‘the patience’), and /al#nu:r/ (الْنَّورُ ‘the light’). They are respectively pronounced [ar#masn], [agbr], and [an#r]. As expected, the resulting sequential coronals in these examples become geminates: [rr], [ss], and [nn].

Recall that the phonological process here accompanies al- affixation, which is part of word formation. The whole process is thus called morpho-phonological process. However, unlike the morpho-phonological process producing /muddakir/ (مُدْدَكِر ‘one who takes heed’ (discussed in section 2.1.5 above), in the case of al- affixation, the phonetic representation is not shown explicitly in the orthography. In other words, the lateral /l/ in al- (-ل) may be pronounced [l] or “something else.” Consequently, the task of at-tajwid is to provide the assimilation rule for pronouncing this “something else.”

The exclusion of /j/ (ج) from among the “sun letters” is rather puzzling. In at-tajwid, /l/ (ل) belongs to the “moon letters.” For example, /al#annah/ (النَّاَنْحَةُ) ‘the heaven’ is pronounced [al+jannah], and not [a:nnah]. Interestingly, in Egyptian Arabic, /l/ may change into /j/ or /l/. In the latter case, the /l/ in al- undergoes assimilation when it occurs before the word-initial /l/. For example, since /aras/ (الْأَرْاضِ ‘bell’) changes dialectally into /ar#s/, /al#aras/ is pronounced [a#ars] (see Kenstowics and Kisseberth 1979: 249). This dialectal example indicates that, in some Arabic dialects, /l/ (ل) has a tendency to belong to the “sun letters.” Or, phonologically, it tends to behave like the rest of the members of the natural class [coronal].

This Egyptian example is not intended as an excuse to take /j/ (ج) out from among the “moon letters” and to put it in among the “sun letters.” No, the purpose of the exposition above is simply to show that, in the same phonetic environment, members of a natural class usually behave the same way. While in at-tajwid, the “sun letters” and the “moon letters” remain two separate categories, the formula presented above seems to be a valid generalization. That is, considering /l/ an exceptional case, when /l/ in al- occurs before a [coronal] consonant, it becomes [coronal];
elsewhere, it remains the same.

Cross-lexical Consonantal Changes Involving Two Identical and Similar Consonants

This section deals with three types of idgh\-m or assimilation: idgh\-m mutam\-thilain 'assimilation of two identical consonants,' idgh\-m mutaq\-ribain 'assimilation of two closely related consonants,' and idgh\-m mutaj\-nisain 'assimilation of two similar consonants.' The last two, for their overlap with respect to phonetic features involved, are combined into one section.

Idgh\-m Mutam\-thilain ("Assimilation" of two identical consonants)

As discussed in section 2.2 above, when /m/ occurs before /m/ they become the geminate [mm]. To repeat the previous example, /\textit{am\#m}man .../ (\textit{... or whoever...?}) is pronounced [\textit{am\#man}]. In a language allowing gemination, such as Arabic, it is natural that, when two identical consonants occur side by side, they merge and become a geminate. In this regard, idgh\-m mutam\-thilain, also called idgh\-m mithlain, is not assimilation in a phonological sense, but rather it is a merging of two identical consonants into a geminate. Examples of this geminate formation is /\textit{id\#rib\#bi\#sa\#ka}/ (\textit{... \\
\textit{... or whoever...?}) 'beat [it] with your walking stick' and /\textit{\#i\#ha\#ba}/ (\textit{... }\textit{... }\textit{... }\textit{...}) 'when they went off.' The first is pronounced [\textit{id\#rib\#bi\#sa\#ka}], and the second [\textit{\#i\#ha\#ba}]. Thus /\#b\#b/ and /\#y\#y/ in the phonemic representation become geminates [bb] and [yy] at the phonetic level.

It is interesting to note that \textit{at-taj\-w} d states an exceptional rule, "Sequential semivowels /w\#w/ (\ldots , \ldots ) and /y\#y/ (\ldots , \ldots ) do not become geminates [ww] and [yy]." For example, /\textit{kulu:\#w\#a\#r\#a\#b\#u}/ (\textit{... }\textit{... }\textit{... }\textit{...}) 'eat and drink' and /\textit{fi\#ya\#m\#i\#n}/ (\textit{... }\textit{... }\textit{... }) 'on a day when ...' are to be pronounced [kulu:+w\#a\#r\#a\#b\#u] and [fi:+ya\#m\#i\#n], and not [kuluw\#w\#a\#r\#a\#b\#u] and [fiy\#a\#m\#i\#n]. While in Arabic orthography they look like sequences of semivowels, in reality they are not. In phonemic representation, these presumed "adjacent semivowels" are transcribed /\#w\#l/ and /\#y\#l/X the vowel length (i.e., /:/) in /u:/ and /i:/ repre
sented orthographically by the Arabic letters (٣) and (٥). Obviously, in this regard at-tajwll is confused by Arabic orthography. As seen by phonology, the exceptional rule stated above is unnecessary, since the geminate formation is captured by the following rule:

(6) C#C \[ \{Y \text{ features} \} \]

\[ X > CT \]

The rule in (6) reads, “When two identical consonants occur side by side interlexically, they become a geminate.” The notion “identical” is captured formally by \( \{ Y \text{ features} \} \), signifying that both consonants are identical in place and manner of articulation, as well as in voicing. Once this rule is stated, the exceptional rule prescribed by at-tajwll would become redundant. Since, phonologically speaking, it unknowingly states, “The sequence of vowel length in /u:/ or /i:/ and word-initial /w/ or /y/ does not merge into [ww] or [yy].” There is no phonetic motivation for such gemination. Or, supposing there were such gemination, the long vowel involved would lose its phonemic value.

To recapitulate, idgh-m mutam-dillain does not deal with assimilation, but with geminate formation. As a consequence of this gemination, the two adjacent words “merge” at the phonetic representation, e.g., /\( \text{i\#ahaba} / \) ‘when they went off’ becomes \( \text{i\#ahaba} \). Finally, confusion caused by Arabic orthography may be eliminated by the use of phonetic transcription.

Idgh-m Mutaq-ribain and Mutaj-nisain (Assimilation of two “closely related” and “similar” consonants)

The reason or phonetic motivation for dividing the assimilatory processes into idgh-m mutaq-ribain and idgh-m mutaj-nisain is unclear to me. Literally, the former means ‘assimilation of two closely related consonants,’ and the latter means ‘total

Table 6. Idgh-Mutaq-Ribain and Mutaj-Nisain
assimilation of two similar consonants.’ However, as the rules and examples of each type of idgh-m or assimilation will show, the meanings of “two closely related consonants” and “two similar consonants” become questionable. Therefore, it is necessary to expose and shed light on the nature of assimilation involving these adjacent consonants.

For concise exposition, the consonantal changes occurring in the two types of idgh-m are listed in Table 6. Across the five columns in this table, items 1 through 3 are rules and examples for idgh-m mutaq-ribain, and items 4 through 9 are rules and examples of idgh-m mutaj-nisain. Each of the rules in the second column (under “Phonological Process”) is a rewrite rule, stating, “The phoneme /X/ becomes an allophone [Y] in the phonetic environment Z.” The rule in (1), for example, reads, “/b/ becomes [m] before /m/ occurring word-initially.” An illustrative example is provided along the first row.

A closer look at the rules listed in the second column in Table 6 reveals that there are four phonetic features involved in the assimilation: place, manner, voicing, and pharyngealization. Accordingly, the nature of consonantal changes stated by the rules in Table 6 requires regrouping or reclassification according to these four features. Table 7 presents this regrouping.

Table 7. The Nature of Assimilation as Determined by Phonetic Features
What can we learn from the assimilation in Table 7? Two things stand out in this table. First, all assimilatory processes here belong to regressive assimilation. That is, as shown in figures 2 and 3 above, a phonetic feature of the syllable/word-initial consonant spreads backward or regressively to the preceding consonant (which occurs syllable/word-finally), replacing and hence eliminating its counterpart. For example, in place assimilation in Table 7, the feature [velar] in /k/ replaces [uvular] pertaining to /q/, and hence changing /q/ to [k]. To repeat the illustrative example, /naxluqkum/ 'we have created you' is pronounced [naxlukkum]. Similarly, in manner assimilation, the features [nasal] and [trill] spread backward, replacing [stop] and [lateral], respectively. And so does the presence or absence of voicing and pharyngealization; it spreads backward, replacing its opposite counterpart.

The second thing we learn from Table 7 is that most of the consonants undergoing changes are obstruents (i.e., stops and fricatives), and only a few of them are sonorants (i.e., nasal and liquid). The obstruents are /b, d, k, q, t, d, k, q, kh, l, y/, and the sonorants are /m, l, r/. This unequal ratio is natural because there are a lot more obstruents than sonorants in Arabic (see the consonant charts presented as Tables 1 and 2).

Moreover, the rules for manner assimilation involving sonorants do not apply when the order is reversed. That is, [stop] becomes [nasal] before [nasal] (e.g., /irkammaka/ 'be on board with us' is pronounced [irkamma]). But [nasal] does not become [stop] before [stop] (e.g., /hum#ba:rizu:n/ 'they rise up' is pro-
nounced [humba:rizu:n], and not [humma:rizu:n]). Likewise, [lateral] becomes [trill] before [trill] (e.g., /qul#rabbi/ (iqāla $\text{قلبّي}^{1}$) 'say, “My Lord ...” is pronounced [qurrabbi]). But, [trill] does not become [lateral] before [lateral] (e.g., /an#(u)kur#li:/ (Yan$^{2}$na $\text{kulli}^{2}$ $\text{kulli}^{2}$ 'be grateful to Me' is pronounced [ani$^{2}$kurli:]), and not [ani$^{2}$kulli:]).

As regards obstruents (i.e., stops and fricatives), in contrast, the assimilation rules involving these consonants apply equally well in a reversed order, as made clear by assimilation in voicing and pharyngealization listed in Table 7. That is, [+voiced] become [+voiced] before [-voiced]; and [+voiced] becomes [-voiced] before [-voiced]. So does [+phar] [Xan abbreviation of [pharyngealized]] becomes [+phar] before [-phar]; and [+phar] becomes [-phar] before [-phar]. (Examples for each rule are given in Table 6.) With respect to the rule of place assimilation, namely, [uvular] becomes [velar] before [velar] (see Table 7), a question arises: does [velar] become [uvular] before [uvular]? Since this rule is not substantiated by the existing data (the Qur‘ān as text), a hypothetical example is needed to test this rule. Given a sequence /an#yahl#ik#qabla .../ (Yan$^{2}$na$^{2}$ $\text{yahliqqabla}$ ‘if he gets destroyed before ...’ in classical Arabic, a Qur‘ānic reader will probably pronounce it [ani$^{2}$yyahl$^{2}$ik$^{2}$qabla$^{2}$]. Notice that /k#q/ at the phonemic representation is pronounced [qq] at the phonetic level. It means that the answer to question posed above is in the affirmative. That is, [velar] becomes [uvular] before [uvular].

Concerning the different phonetic behaviors of sonorants and obstruents with respect to assimilatory processes, what can we conclude? First, we have to state separate rules for the sonorants (as given in the second row of Table 7). Second, since obstruents have a uniform phonetic behavior, it is possible for us to state a more general rule, unifying the assimilation rules for obstructions stated separately in Table 7.

\[
(7) \quad C \xrightarrow{\text{sonorant}} \ x \xrightarrow{\text{voiced}} \ y \xrightarrow{\text{pharyngealized}} \ / \xrightarrow{\text{voiced}} \ y \xrightarrow{\text{pharyngealized}} \ C \xrightarrow{\text{sonorant}}
\]

The rule in (7) states, "When an obstruent occurs word-externally or cross-lexically before another obstruent, it assimilates in one feature:
place, voicing, or pharyngealization pertaining to the latter.” The feature [-sonorant] below C means “non-sonorant consonant,” thus referring to "obstruent consonant.” The symbol "V" is a cover term, meaning "any place of articulation” before [place], and also suggesting a positive [+] or negative [-] value before [voiced] and [pharyngealized]. The curly brackets [...] are used to mean "take one among the options listed here.” Despite its complexity, the rule in (7) is theoretically preferable to the separate rules for obstruent assimilation in Table 7, because it has greater power of generalization.

Results of Phonological Analysis

Phonological analysis of consonantal changes and non-changes in this section yields three major results. They may be categorized, phonologically, as (a) non-assimilation, (b) "conjunction," and (c) assimilation. (The traditional term idgh-m or 'assimilation' covers both "conjunction" and assimilation.) The non-assimilation, traditionally called idgh-r or 'clear reading,' refers to the absence of phonetic changes in /n/ and /m/ that occur syllable/word-finally. The term "clear reading" implies full retention of [nasal] plus [dentalvooral] in /nl, and plus [bilabial] in /ml/. At the same time, "clear reading" also suggests its opposite, "unclear reading" or ikhf-'2. That is, [nasal] becomes "blurred," particularly audible in the resulting homorganic cluster [nasal + stop], as substantiated phonetically, for instance, by [mb], [nd], and [Jb].

The newly proposed term "conjunction" refers to mutual attraction between /nl/ and /ml/ (/nl/ml/) and also between /nl/ and /bl/ (/nl/bl/). The former sequence becomes the geminate [mm], and the latter becomes the homorganic [mb]. The mutual attraction in /nl/ml/ is obviously motivated by their identical place and manner features (i.e. both are [bilabial nasal]), and the mutual attraction in /nl/bl/ by their identical place feature (i.e. both are [bilabial]). Notice that in "conjunction," which yields either a geminate or a homorganic cluster, there is no change of phonetic feature. Moreover, through the resulting geminate or consonant cluster, the two adjacent words "merge" at the phonetic level. Along this line of reasoning, the term "conjunction" also refers to the so-called idgh-m mutam-thilain, or conjunction between two identical consonants other than
/m#m/. That is, the sequence /C#C/ having identical features becomes the
geminate [CC] at the phonetic level. It should be noted in passing that
cross-lexical gemination is possible partly because Arabic allows word-
internal gemination. In other-words, cross-lexical gemination is phoneti-
cally or universally motivated but language-specifically or locally condi-
tioned.

The third category, assimilation, is most abundant. Assimilation or
consonantal changes in the Qur’-n may be viewed from four different
vantage points: the linguistic level, the domain or locality, the direction
of assimilation, and the nature of feature changing. First, with respect to the
linguistic level, when assimilation accompanies word formation, it is
called morpho-phonological process. This type of assimilation accompa-
nies al- (ā-ā) affixation. When al- occurs before a word beginning with a
"sun letter," /l/ assimilates in place. This assimilation is formally stated as
follows: [lateral] becomes [coronal] (except /s/ (s) before [coronal]. This
is the only morpho-phonological process dealt with by at-tajw. Other
such processes, though involving feature changes (as in the derivation
/muddakir/ (C. al-n) ‘one who takes heed’ discussed earlier) are treated by
Arabic morphology. All the other assimilatory processes discussed in at-
tajw are purely phonological.

Secondly, as regards its domain or locality, assimilation may occur
word-externally or cross-lexically. The sequence /nk/, pronounced /k/, is
an example of word-internal assimilation, and /n#k/, pronounced [k], is
an example of cross-lexical assimilation. Examples given by at-tajw (Murta-
d1999) give an impression that cross-lexical assimilation o-
curs more frequently than word-internal assimilation. In fact, some assimila-
tion is cross-lexically conditioned: /l/ assimilates in place with /m/, /w/, or
/y/ when they occur cross-lexically. Thus, /ml/, /lw/, /ly/ are pronounced
[m],[w],[y], respectively. Conversely, /m#l/, /w#l/, /y#l/ are pro-
nounced [mm],[ww],[yy], respectively. The feature [nasal] getting more
prominent in the geminate [mm], and retained in the first [w] and [y] in
the last two geminates.

Thirdly, concerning its direction, most assimilation is regressive.
As shown by the rules in (1) through (7) above, regressive assimilation is
best considered the norm. Namely, in the consonantal sequence /XY/ or
/X#Y/, the consonant /X/ becomes more like the consonant /Y/. In other
words, a phonetic feature in /Y/ spreads backward or regressively to /X/. Thus, /XY/ or /X##Y/ at the phonemic representation may become [YY] or [XyY] at the phonetic level. (The symbol [Xy] indicates that /X/ becomes more like /Y/ by absorbing a feature of /Y/.) All the abbreviated examples in the last two paragraphs above are examples of regressive assimilation. To repeat some of them, the sequence /nthm/ is pronounced [nm], and the sequence /n#k/ or /n#k/ is pronounced [k]. While regressive assimilation is the norm, progressive assimilation is an exception. For example, as noted in section 1, the feature [round], or lips rounding, from a pharyngealized consonant spreads forward or progressively to the following vowel, changing /a/ to [a]. While regressive assimilation.

Fourth and finally, in terms of the phonetic features involved, consonantal changes may be defined in terms of one of the three major parameters: place, manner, or voicing. In Arabic, the secondary feature [pharyngealized] becomes a distinctive feature in its consonant system. Thus, it also serves as an additional, albeit language-specific, parameter. The following are abbreviated examples of the four types of assimilation: /nth/ pronounced [nh] (place assimilation), /h#d/ pronounced [td] (manner assimilation), /h#d/ pronounced [dd] (voicing assimilation), and /h#l/ pronounced [dl] (pharyngealization assimilation). Referring to the four determining parameters, place assimilation occurs most often in the Qur’an. Therefore, the term idgham or ‘assimilation,’ though including “conjunction” too, is used most frequently in at-tajwid. It deals chiefly with place assimilation. In this respect, I would assume that place assimilation is probably the most common type of assimilation in natural languages. For example, /sawaina:/ (‘we saved [them]’ in the Qur’an) is pronounced [sawaina:], where /s/ becomes [z] before /l/. That is, [alveolar] becomes [palatal] before [palatal]. The place assimilation of /s/ becoming [z] before /l/ word-internally is a very natural phonological process across languages. In English, /engine/ is pronounced [eิงก attenuated], in Indonesian, /panjang/ ‘long’ is pronounced [panjang attenuated], and in Javanese /банју/ ‘then’ is pronounced [banjurr]. To verify the above assumption, providing more examples from other languages is of course desirable. But I would further assume that, with additional data, the rule for place assimilation substantiated here probably remains valid.
Like "conjunction," cross-lexical assimilation may result in a geminate [CC] or in a homorganic cluster [nasal + stop], causing the two adjacent words to "merge" at the phonetic level.

3. CONCLUSION

The shift from at-tajwid to phonology is a shift of scholarly orientation from prescription (providing rules for "what should be") to description (providing rules for "what is"). Of special interest to note are the traditional terms in at-tajwid, which, in the light of modern phonology, refer to place of articulation (e.g., ḥalqiy 'pharyngeal,' shafawiy 'labial,' and ēq-ōb 'reversion of alveolar to bilabial'), manner of articulation (e.g., bi-ghanā 'with nasality' and bi-lāa ghannah 'without nasality'), and a phonological process (e.g., ḍugh-m 'assimilation'). While these terms help make at-tajwid a self-contained discipline, they are inadequate for descriptive purposes. As shown in the analyses of consonantal changes in the Qurʾān presented in section 2, phonology, in order to come up with adequate description, requires both substantive and formal universals. The former include, particularly, the complete set of distinctive features specifying place and manner of articulation, voicing, and, in the case of Arabic, pharyngealization; and the latter include, most notably, the seven phonological rules above which put in operation the general formula: the phoneme /X/ becomes the allophone [Y] in the phonetic environment Z.

The primary task of phonology, or more specifically generative phonology, is to describe how phonetic/surface representation is derived from phonemic/underlying representation by means of phonological rules. Results of phonological analyses in the present study indicate that nearly all the consonantal changes in the Qurʾān are assimilation, and almost all types of assimilation are regressive. As common within natural languages, the assimilation in the Qurʾān is always phonetically motivated and intrinsically driven by ease of articulation. In other words, while the Qurʾān as religious text is regarded as sacred, the language of the Qurʾān (namely, classical Arabic), like any other natural language, yields to phonological analysis. If the present study is considered to have accomplished observational adequacy (i.e., adequate description of some chosen observable data), then it is justifiable to expect that generative phonology may accomplish descriptive adequacy (i.e., adequate description of tacit
phonological knowledge of native speakers), while demonstrating the explanatory power of linguistics on the nature of consonantal changes.

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