RESEARCH ARTICLE

The efforts of Anatolian scholars in Arabic phonetics through the book "Juhd al-Muqil" by al-Mar'ashi

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Abstract
Arabic phonetics, like other linguistic sciences, has gone through various stages, beginning with the early beginnings of linguists and grammarians in the first century AH (seventh century AD) with al-Du'ali and his companions. The study of Arabic phonetics was not limited to Arab scholars or those from the Arabian Peninsula; rather, it extended to all scholars belonging to the Islamic civilization as its geographic scope expanded. The most prominent of these scholars were the scholars of the Anatolian region, especially during the Ottoman era, including Muhammad ibn Abi Bakr al-Mar'ashi. The study aims to focus on his most prominent phonetic contributions to the Arabic language and the extent of their novelty and innovation compared to his predecessors. The importance of this research paper lies in its focus on Al-Mar'ashi's phonetic innovations, strengthening the study in some phonetic aspects with analytical data from the popular Praat program..

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1. Introduction:

The first beginnings of Arabic phonetic studies were manifested with the first century of Hijri history; that is, in the seventh century AD, its origin was not as an independent science, but its material and its beginnings appeared as a way to reach non-phonetic goals and objectives, and because most of the sciences among the Arabs at that time had religious purposes, namely, to understand the Holy Quran, being the Holy Book of Muslims and their first source of Islamic legislation, as well as to understand the noble Hadith because it is the second source of legislation among Muslims as well, because it is the second source of legislation among Muslims, and and this understanding is only through Therefore, one of the first Arabic linguistic Sciences that appeared was the science of grammar and lexicography, so that the first would be a standard keeper of the Arabic system of displacement, and the second would preserve the Arabic vocabulary structure and meaning‹Among the first grammatical studies we find the famous story of Abu Al-Aswad Al-Du'ali with his servant when he said to him: "If you see me open my mouth with a letter, then put a dot above it on top of it. If I close my mouth, then put a dot in front of the letter. If I break it, then put the dot under the letter. If you follow something of that with a nasal sound, then put two dots in place of the dot."(Abu Sa'id al-Sirafi, 1966, 13)

We also find among the first lexical studies the book Al-Ayn by Al-Khalil bin Ahmad Al-Farahidi. It may come to mind to ask about the relationship between what we have mentioned and phonetic studies. When we contemplate the origin of the two sciences, we find it to be purely phonetic, through the construction of the science of grammar at the beginning - starting from the aforementioned story - on the phonetic side in the position of the articulation

apparatus, the movement of the lips, and the mechanism of producing consonants and short vowels such as fatha, damma, and kasra, and through the construction of Al-Khalil's dictionary of 'Ayn on a phonetic basis that appears in its title and in the reason for the name, which is on a purely phonetic basis through Al-Khalil's choice of the first of the fixed consonants as a point of articulation and description in the case of singular or compound, which is the sound of 'Ayn. Or we find the phonetic side also in the introduction to the dictionary through Al-Khalil's definition of the points of articulation and descriptions of Arabic sounds, as they are the material of the Arabic word. This reminds us of Ibn Jinni's definition of language in his book Al-Khasais when he makes it essentially "sounds" in his saying: "As for its definition They are sounds through which every people express their purposes"(Ibn Jinni,1/ 34).

The vocal material is the basis of human language, and therefore all encyclopedias define it as having primarily vocal material. Britannica says in its latest update on 07/17/2025: language, a system of conventional spoken, manual (signed), or written symbols by means of which human beings, as members of a social group and participants in its culture, express themselves. The functions of language include communication, the expression of identity, play, imaginative expression, and emotional release.[1]

The Oxford Dictionary also defines language by referring to its phonetic principle, as it defines it: LANGUAGE: a system of communication consisting of sounds, words, and grammar:[2]

In this research paper, we will work on enumerating Al-Mar'ashi's most prominent contributions to Arabic phonetic studies, in what we see as a new contribution or a scientific innovation that has not been preceded by any of the previous phonetic works we have seen. Although there are previous studies that intersect with this study, we have tried to determine what highlights the man's creativity in the study of phonetics, because he is the greatest determinant of the extent of the contribution made in this field of Arabic sciences. Herein lies the importance of the study, and before embarking, it is necessary to introduce and present what the situation was like before Al-Mar'ashi.

2. The Pre-Mar'ashi Era:

We previously mentioned that the Arabs addressed several aspects of phonology in their study of grammar and lexicography. In the introduction to Mu'jam al-'Ayn, we find al-Khalil discussing the articulation points and characteristics of Arabic sounds. (Al Khalil,1/ 51).

We then find his student Sibawayh in more detail in the book when he discusses morphological issues and the phenomenon of idgham, which modern scholars call total phonetic similarity. He lists the correct spoken Arabic sounds and the incorrect ones, which are not considered desirable in the Quran or poetry. He also explains the articulation points of Arabic consonants and vowels, both short and long. According to him, there are 16 articulation points. He then explains the set of phonetic characteristics that characterize Arabic sounds, classifying them into opposing and non-opposing groups, including voiced, unvoiced, stressed, soft, and others. (Sibawayh,1988,431).

Arabic linguists continue to address phonetic issues in the service of grammar and morphology. We hardly find the independence of Arabic phonetics in its subject matter, methodology, and objectives until Ibn Jinni in the fourth century AH and the end of the tenth century AD (d. 392 AH) (zirkli,2002,204). through his book, (sir sina't al-I'rab)

However, we find the independence of phonetic issues from the linguistic sciences before Ibn Jinni, albeit by a short period, through the emergence of the science of Tajweed. We trace the beginnings of phonetic studies, making linguistic sounds the subject and objective of the study, to the authors of Tajweed books. Perhaps the first to write on it, specifying its terminology, topics, and objectives, was Abu Bakr al-Shidhai, who died in 373 AH, and it was said in 370 AH(Ibn al-Jazari,2006, 1/131).; that is, 19 years before the death of Ibn Jinni. His sheikh, Ibn Mujahid, who died in 324 AH, preceded him in mentioning some phonetic issues related to errors in the vocal performance of Arabic linguistic sounds when reciting the Qur'an.

3. Al-Mar'ashi and his scientific phonetic efforts:

[1] https://www.britannica.com/topic/language
[2] https://dictionary.cambridge.org/us/dictionary/english/language

The science of Tajweed developed, like any other science, moving from its foundational stage to its maturity and innovation. The spread of Islam in the non-Arab countries neighboring the Arabian Peninsula was the most important reason for the spread and development of the science of Tajweed, due to Muslims' need for it to pronounce the words of the Holy Quran correctly and without errors, whether singular or compound. Based on this, we can understand the abundance of Tajweed and recitation scholars in non-Arab cities near the Arabian Peninsula, including the Anatolian region, which was famous for its scholars of Tajweed and recitation. No one today discusses the phonetic studies of Tajweed scholars without mentioning Ibn al-Jazari, who died around 1430 CE. Ibn al-Jazari is considered the reference for all subsequent Tajweed scholars. He was originally from Anatolia and was nicknamed Ibn al-Jazari after "Al-Jazira" or "Ibn Umar Island," which is currently the Cizre region of Turkey. Among the Anatolian scholars who studied Arabic sounds through their compositions of Tajweed books or their grammatical commentaries and compositions, we find Muhammad ibn Mahmud ibn Ahmad, known by the nickname "Dabbaghzadeh," who died around 1702 AD. (Reda Kahala,11/ 313).

He was a scholar of grammar and interpretation, and he was the Sheikh of Islam in Turkey. Among the Anatolian scholars is also Muhammad ibn Abi Bakr al-Mar'ashi, known by the nickname "Sajkli Zadeh," who died around 1737 AD. He is the subject of this research paper, and we will talk about him and his compositions later. We find Mustafa ibn Abd al-Rahman al-Izmiri, who died around 1743 AD. The nickname "Izmiri" is in reference to the İzmir region in Turkey. He was a scholar of readings and one of the most important and prominent scholars in the region after al-Mar'ashi. We also find among the Anatolian scholars Hussein ibn Ahmad al-Barsawi, known by the nickname "Zini Zadeh," who died around 1758 AD. The nickname "al-Barsawi" is in reference to the region of Bursa is currently in Turkey. (Al Hossein ibn ahmed, 2019, 31).

Let's return to al-Mar'ashi, the subject of this research paper. Muhammad ibn Abi Bakr al-Mar'ashi was a man of knowledge and religion. He was born in the city of Mar'ashi, located in southern Turkey today. Its current administrative name is Kahramanmaraş, meaning "heroic Maraş," in honor of its resistance to the French occupation. It is a historical center rooted in successive civilizations, including the Islamic civilization. During the Ottoman era, it was famous for its religious schools. Ghanem Qaddouri al-Hamad mentioned some of these schools in his introduction to al-Mar'ashi's book, "juhd al-muqil." (al-Mar'ashi, 2008, 12).

Al-Mar'ashi lived a scholarly life in this great scholarly city, which was full of teachers and schools, which contributed to his strong and diverse scholarly upbringing, so he became a teacher of Arabic sciences, including jurisprudence, interpretation, and intonation. Among his most famous works are the book "Juhd al-Muqil" on the science of intonation, and a commentary on the book called "Bayan Juhd al-muqil," the book "Tahdhib al-Qira'at al-'Ashr," and the book "Taritib al-'Ulum," in which he discusses the various sciences and arranges them according to importance and what is related to teaching and learning them. (Ismail al-Baghdadi, 322).

He also wrote many other diverse books due to the diversity of his scholarly interests, such as books on the science of debate and logic, which had a great impact on establishing the phonetic issues in his books, especially the book "Juhd al-muqil." Whoever examines this book will find a detailed account of phonetic issues and quotes from others who preceded him. Most notable of these are his own opinions and analyses of some phonetic issues that were not detailed before him, or Ambiguous as that related to the chapter on the exits of sounds and their characteristics, as we will explain.

4. Subtle Phonetic Issues in Al-Mar'ashi's "Juhd al-muqil:"

In this section of the research paper, we will present a number of contributions to phonetics based on Al-Mar'ashi's book "Juhd al-muqil." We will focus on those that are novel and innovative, or those that demonstrate the strength of scientific grounding compared to those that preceded them.

4.1 Terminological Boundaries between the Sciences of Tajweed and Recitation:

Al-Mar'ashi emphasized the need to clarify the semantic boundaries between the science of Tajweed and the science of recitation, despite their close connection. This is because the science of Tajweed cannot exist without the presence of the science of recitation, given that the subject of the science of Tajweed is the Qur'anic text in its vocal performance. This science cannot exist without its established corpus—I mean the Holy Qur'an through the regulation of the Qur'anic recitations. Al-Mar'ashi also realized the need to clarify the concept of the science of

Tajweed at the beginning of the book, immediately after the introduction. To clarify for the reader what phonetic issues he will mention related to the science of Tajweed and what he will leave out due to its connection to the science of recitation, he says: "If you ask: What is the difference between the sciences of Tajweed and Qira'at? I say: The science of Qira'at is a science in which the differences of the imams of different regions in the arrangement of the Qur'an are known, whether in the letters themselves or in their characteristics. If something about the nature of the characteristics of the letters is mentioned in it, then it is a completion, since the purpose is not related to it. As for the science of Tajweed, its purpose is to know the nature of the characteristics of the letters. If something about the differences of the imams is mentioned in it, then it is a completion." Thus, Al-Mar'ashi systematically and scientifically establishes the phonetic issues he will study, or what can be expressed in the language of science as defining the concept and subject of this science.

4.2 The Concept of Sound and Air:

Al-Mar'ashi mentions the views of his predecessors, such as Sibawayh, Mulla Ali al-Qari, and Ahmad ibn Muhammad ibn al-Jazari, in his definition of sound, breath, and the relationship between them. He then provides a summary of his precise understanding of the concept of sound and the mechanism of its production. He states that sound is audible air. This indicates that air never becomes sound before passing through the larynx, and that the origin of sound is air. This phonetic analysis is completely consistent with the definitions indicated by international dictionaries. The Encyclopedia Britannica, in its most recent edition, defines the term "phonetics" as the beginning of sound production through the passage of air from the lungs. A Dictionary of Phonetics and Phonology also defines the consonant and confirms the above, stating:

consonant /lkDns˜n˜nt/ n. 1. (also contoid) In phonetics, a segment whose articulation involves a significant obstruction to air flow in the vocal tract. (Trask, 1996, 87).

We should not overlook the fact that Al-Mar'ashi refers to the issue of the vocal cords vibrating and not vibrating when air passes over the larynx. He calls the air that vibrates the vocal cords "audible breath," while the air that does not vibrate with them is called air.

4.3 Consonants and Vowels:

Al-Mar'ashi stated that consonants are essentially formed by stress and interruption, whether that interruption is weak or strong, as he says: "All letters, except for the long alif, share the same basic reliance on the point of articulation, but vary in the strength of that reliance." Immediately following this text, he compares consonants and vowels, clearly defining the difference between consonants and vowels, stating that the air rushing in clearly interrupts the sound, while the interruption is much less or nonexistent in vowels. Therefore, he excluded the long alif in the previous definition. Because it is an extended sound without interruption, there is no difference between what Al-Mar'ashi mentioned and what we find in our time in terms of an analysis of the difference between them with the development of instruments. The Encyclopedia Britannica mentioned this in the following text: Most authorities would agree that a vowel is a sound that is produced without any major constrictions in the vocal tract, so that there is a relatively free passage for the air. The encyclopedia indicates that vowels do not undergo major constriction, which is something shared between Arabic and English in the mechanism of vowel production, such as a, i, o. Al-Mar'ashi emphasizes this when he gives us another reminder that consonants can be interrupted at their point of articulation by interruption, unlike vowels, which are projected without effort.

4.4 Details of the points of articulation of the letters nūn and ra:'

Nūn and ra' are alveolar sounds that are produced jointly by the tip of the tongue, which is the tip, and the gums at the bases of the upper incisors. (Ahmad mokhtar omar, 1997, 317).

I have not found in the international phonetic dictionaries available to me a clear explanation and comparison of the position of the tongue when producing the two linguistic sounds, despite their shared interception area. In ancient and modern Arabic phonetic studies, there is disagreement about whether these two sounds are united in their point of articulation or not. However, al-Mar'ashi explained to us in detail the mechanism of producing each sound. The intercepted part of the tongue when producing the nūn sound is its head, and the intercepted part in the lām is the tip of the tongue with its back near its head. This is a detail I have not found anyone mentioning. Ghanim Qadduri

al-Hamad also stated this explicitly, saying: "I have not found anyone who preceded al-Mar'ashi in such detail in determining the points of articulation of the rā'." and the letter "nun".

4.5 The effect of the vocal cords:

Arabic sounds are characterized by various characteristics, including whether they are voiced or voiceless. The voiceless sounds, which are unanimously considered voiceless, are ten: /fa/, /ha/, /tha/, /ha'/, /shin/, /kha/, /sad/, /sin/, /qaf/, and /ta/(/ت/، /ك/، /س/، /ص/، /ش/ ، /خ/ ، /ح/ ، /ث/ ، /ه/ ، /ف/) .

All other Arabic sounds are voiced. Voiceless is a state of stillness of the vocal cords in the larynx when air rushes in due to their opening, while voiced sounds result from the vibration of the vocal cords. The phoneticians who preceded al-Mar'ashi differed in defining the concept of voiced and unvoiced speech due to their inability to determine the reason for voiced and unvoiced speech. The school of phonetics from the beginning of the linguistic sciences among the Arabs until the time of al-Mar'ashi was the school of taste and self-observation. (al-Mar'ashi, 2008, 12). Al-Mar'ashi tried to search for the essential difference between the two phonetic groups by representing the sounds /dh/ and /th/.

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5.6 The Attribute of Emphasis:

Emphasis is a phonetic characteristic of seven Arabic linguistic sounds: /kh/, /s/, /d/, /gh/, /t/, /q/, /z/. (/خ/ ، /ص/ ، /ض/ ، /غ/ ، /ط/ ، /ق/ ، /ظ/.)

This group of sounds is called the emphatic sounds, and this characteristic is produced by the elevation (raising) of the tongue toward the upper palate. However, this elevation of the tongue occurs in two forms:

The first form: When producing emphatic sounds, the tongue is elevated until it aligns with the upper palate. This intense elevation necessarily generates another characteristic, which is the characteristic of "occlusion." The tongue is

in an occlusion position when producing four of the seven emphatic sounds, which is what is called in Arabic phonemes are "emphatic letters," which are: /q/, /t/, /b/, /j./

The second form: where the tongue is raised and raised toward the upper palate, but does not close to it. This position of the tongue occurs when producing the three remaining sounds: /g/, /kh/, and /q./

We find that the letters of emphatic pronunciation—like many adjectives—have been mentioned in linguistic books since the beginning of Arabic linguistic studies. Sibawayh mentioned them when discussing "imala," saying: "The letters that prevent imala are these seven: Ṣād, Ḍād, Ṭā', Ḍā', ghin, kaf,and kha'.(الصّاد، والضّاد، والطّاء، والظّاء والغين، والقاف، والخاء) (al-Mar'ashi, 2008, 14)

These letters are prohibited from imala because they are letters that are raised to the upper palate. We find that most of the scholars of tajweed after Sibawayh agree with him in defining isti'la and specifying its Arabic sounds. I have followed their definitions in the books of tajweed scholars that I have, starting with Makki and al-Dani and reaching al-Mar'ashi, and I found their expressions to be almost identical. They explain the characteristic of isti'la by the elevation and ascent of the tongue to the upper palate with the seven letters: Ṣād, Ḍād, Ṭā', Ḍā', Ḍā', Ḍā', Ḍā', Ḍā', and Ḍā'. However, although Al-Mar'ashi agreed with his predecessors in their description of the mechanism of isti'la', he went further in clarifying it and elaborated on the position of the tongue in precise detail. What is meant by isti'la' is not the entire tongue, but rather its back part, or what the scholars of Tajweed call "the back of the tongue. (al-Mar'ashi, 2008, 151-152)

" Al-Mar'ashi explained the difference between the isti'la' and others that are produced by raising the tongue, such as the letters in the middle of the tongue /j/ and /sh/, saying: "What became clear to the poor person after much contemplation of Al-Jarbardi's words is that what is considered in isti'la' in their terminology is the elevation of the back of the tongue, whether the rest of the tongue is elevated with it or not. The letters in the middle of the tongue, which are the jim, the shin, and the ya', are only elevated in the middle of the tongue, and the kaf is only elevated between the back of the tongue and its middle. Therefore, these four are not considered as isti'la', even if the tongue is elevated, because its elevation in these four is not like its elevation with the isti'la' letter." The maximum degree of emphasis is consonant consonant, as we mentioned. Therefore, every consonant that is consonant is consonant, but the opposite is not true. It should be noted that modern phoneticians call the three sounds: /q/, /kh/, and /g/ "consonantal" (tabak) in reference to the palate, which is the soft palate toward which the tongue ascends. Al-Mar'ashi's detailed explanation of the part of the tongue that ascends is supported by modern phonetic studies and described by phoneticians. Technical studies have proven that the root of the tongue (which al-Mar'ashi calls the "extreme part of the tongue") is the one involved in emphasis. The Encyclopedia Britannica mentioned this in its Arabic Phonetic System update dated 03/06/2025.

5.7 Emphasis:

Emphasis is a vocal characteristic that is considered an auditory effect resulting from emphasis. Al-Mar'ashi defines it as: "A fatness that enters the body of the letter, filling the mouth with its resonance." By "the mouth is filled with its resonance," he means that emphasis fills the resonance chamber. It is formed when the back of the tongue is raised, the passageway is narrowed, and the movement and shape of the articulatory organs involved in sound production are interfered with. This confirms Al-Mar'ashi's understanding through his definition of this auditory phenomenon as being linked to phonetic performance, unlike many modern scholars who have confused the two concepts.

Such as Cantino, who considers emphasis and closure to be one and the same, stating: "It is not possible to differentiate emphasis from closure and superiority." Samir Sharif Istitieh objected to this confusion among some modern scholars, saying: "It may be a common assumption among phonetics students that emphasis and closure are two terms that refer to the same meaning. This is an assumption whose prevalence does not prove its validity." To complete Hassan's precise description, he must mention it, where he says: "Exaggeration is, therefore, a phonetic phenomenon resulting from organic movements that alter the shape of the resonating chambers to the extent that it gives the sound this emphasized vocal value." The reason for this emphasis can be summarized by mentioning the most important articulatory positions assumed by the articulatory organs:

-The movement of the tongue root backward toward the palatal wall.

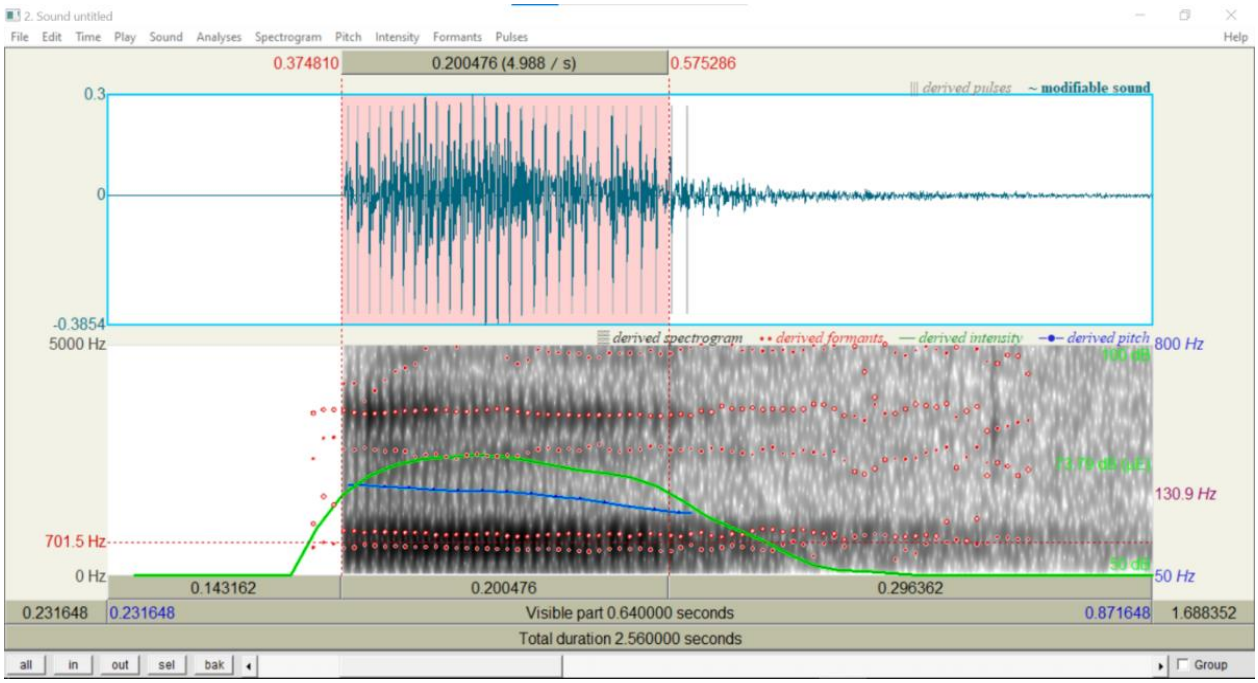
-The occurrence of a narrowing resulting from the retraction of the tongue root.

-Changes in the shape of the tongue.

All of this creates an oral resonance chamber, a precise description mentioned by Al-Mar'ashi in his previous statement, "The mouth is filled with its echo".

5.8 Degrees of Emphasis:

In this part of the study, we will analyze a sample of audio recordings I previously made using PRAAT, a free computer program designed by Dutch scientists David Weeninck and Paul Boersma at the Institute of Phonetics at the University of Amsterdam. It analyzes sound waves and spectrally analyzes the sound, allowing for the analysis of its acoustic properties, such as voiced or whispered, and friable or explosive sounds. It provides values for the sound waves in terms of amplitude, length, frequency, and other parameters. It also displays the values of the various acoustic parameters (resonant frequencies) that we rely on to analyze the emphatic quality. Here is a sample of a spectral image of a linguistic sound:



The red dots indicate the five vocal folds, and the solid blue line represents the voice pitch (vibration of the vocal cords). The spectral image shows the vertical blue lines that represent the vibrational image of the sound. The vocal part selected for analysis is colored pink, with its articulation time in seconds and fractions of a second. For example, the attached image has a part with a time length of 0.200476 seconds. To analyze the degrees of emphasis, the values of the second vowel F2 for the sound under study are relied upon, because F2 represents the resonant chamber associated with the back of the tongue. Its value decreases with its height and increases with its lowering and the forward movement of its tip. Accordingly, the lower the values, the more luxurious the sound, and the higher they are; The sound was less emphasized or thin, and the following table gives us a representation of the value of F2 when pronouncing the letter seen with a fatha vowel versus the letter sad with a fatha vowel, and the same is the case with the letter dhal versus the letter dhal. We chose these sounds because the distinguishing phonetic feature between each sound and its counterpart is emphasis.

Table No. (01): Table of audio F2 values

/dha/ـَـ/ + /	/dhal/ـَـ/ + /	/sad/ـَـ/ + /	/sin/ـَـ/ + /

1220.1610Hz	1703.0585Hz	1436.7967Hz	1845.0053Hz

We clearly notice that the value of F2 increases with the softened sound /sin/ and decreases with its emphatic counterpart /sad/, and the same is true with /dhal/ and /dha/.

In light of what was previously stated and by referring to Al-Mar'ashi in his analysis of the phenomenon of emphasis, we see him making a comparison between the degrees of emphasis in the emphatic sounds, dividing them into two groups: the group of emphatic sounds and the group of non-emphatic sounds, taking into account the position of the tongue and the organs of speech when producing these sounds. This in itself is evidence of understanding the phonetic behavior, unlike most of those who preceded him, where they make a comparison in a single sound in all its structural states with the vowels. Al-Mar'ashi says in the comparison: "The emphatic letters are more expressive than the rest of the emphatic letters... In short: the degree of emphasis is according to the degree of emphaticity and emphaticity. The silent ta' is the most emphatic of the letters, and since the qaf is more expressive in emphaticity than the voiced ghayn and kha', as you know, it is more emphatic than them." He also says: "...and since the silent ta' is stronger in emphaticity than its sisters; Its emphasis was greater than that of its sisters, as in "Al-Ri'ayah" and "Al-Tamhid." I say: Since "Ṣād" and "Ḍād" are medium in emphasis, as you know, they were also medium in emphasis. And since "Ḍā" is the weakest of the emphatic letters in emphatic articulation, its emphasis was less than that of its sisters. The gist of the matter, according to him, is that the order of the degrees of emphasis in the group of emphatic sounds is: /ṭa/, /ṣad/, /ḍhad/, /dha/. (./ظ/، /ض/، /ص/، /ط/)

He emphasizes that the letter ta' is more emphasized and the letter dhā' less emphasized, with the letters Ṣād and Ḍād between them, without indicating their order.

The order of the degrees of emphasis in the group of non-emphatic, emphatic sounds is/:qaf/, /gḥayn/, /kha./(، /ق/ ./خ/ ، /غ/)

He emphasizes that the letter qaf has the highest emphasis, while the letters ghayn and kha' have the lowest. By referring to the PRAAT program and analyzing the recordings I made previously, we find the following:

Table No. (02): Table of the values of the sound points F1 and F2 for the applied high sounds

second value (F2)	First value (F1)	The silent, lofty one + the short, voweled one
هرتز 1201.91267Hz	هرتز 582.14830Hz	/ta/ó / + /
هرتز 1449.95674Hz	هرتز 1201.91267Hz	/sad/ó / + /
هرتز 1414.62875Hz	هرتز 505.67686Hz	/dhad/ó / + /
هرتز 1505.37340Hz	هرتز 602.65136Hz	/dha/ó / + /

The table shows the total values for the first and second diacritics. We will focus more on the second diacritical mark, as it is more closely associated with emphasis than the first. What the recording analyses revealed is that the sounds characterized by emphatic diacritics differ in their degrees of emphasis, and that they fully agree with Al-Mar'ashi's analysis, despite its reliance on subjective observation and a sense of taste. The following table shows the values of the diacritical marks for the non-emphatic emphatic sounds:

Table No. (03): Table of the values of the F1 and F2 pitches for the unvoiced, high sounds

Second value (F2)	First value (F1)	The silent, exalted, non-applied consonant + the short vowel
854.9911Hz	561.2018Hz	/qaf/ó / + /
945.5272Hz	553.4845Hz	/kha/ó / + /
971.8825Hz	574.9502Hz	/ghayn/ó / + /

PRAAT analyses of the un-emphasized emphatic sounds show complete agreement with al-Mar'ashi's views on their degrees of emphaticity. We found that the qaf is the most emphatic of them, as it is given the lowest value of F2 compared to the other two sounds.

5.9 Warning against nasalization during prolongation:

In the Arabic phonetic system, nasalization is the sound produced as a result of air rushing from the nasal cavity. It is a characteristic of the sounds /mim/ and /nun/, which is why phoneticians call them nasal sounds. We find Al-Mar'ashi warning against nasalization with the three long vowels, saying: "...and that is why some people pronounce the prolongation accompanied by nasalization in words like 'we seek help' without realizing it. This is a mistake. The way to know if it occurs in such a situation is to pronounce it once while holding your nose and once without. If the prolongation sound differs in the two cases, know that it is accompanied by nasalization." This warning was well-known and well-known before Al-Mar'ashi. However, I did not find anyone who explained the method of knowing this warned vocal performance in singing long vowels in the sources that I read to which Al-Mar'ashi referred. Thus, Al-Mar'ashi shows us the strength of his vocal thought and his deep understanding of the mechanisms of producing Arabic sounds. (al-Mar'ashi, 2008, 311)

6. Conclusion:

In conclusion, the study aimed to highlight the various contributions of scholars of Islamic civilization from outside the Arab region to the study of Arabic at the phonetic level. It focused on the Anatolian region, as it is the region closest to the Arabian Peninsula geographically and the most scientifically dynamic throughout the history of Arab-Islamic civilization. It was also the capital of the Islamic Caliphate. The research paper uses Muhammad ibn Abi Bakr al-Mar'ashi as a model for this significant contribution to Arabic phonetics. The study demonstrated the extent of novelty and innovation that characterized his studies in his book "Juhd al-muqil." We listed a number of results that emerged from this paper, the most prominent of which are:

-Al-Mar'ashi was able to define the boundaries and features of the science of Tajweed and separate them from the features of the science of reading.

-Al-Mar'ashi defined the mechanism of linguistic sound production and clarified, more than his predecessors, the reality of voiced and unvoiced pronunciation. - With his profound ability to understand the position of the articulatory organs, Al-Mar'ashi was able to differentiate between the mechanism of producing the sounds of Ra and Nun. No one else, as far as we know, preceded him in identifying the part of the tongue involved in producing these two sounds.

-Al-Mar'ashi is considered the most prominent figure to distinguish the elevated part of the tongue from the elevated sounds. Most of his predecessors considered elevation to be an ascension of the tongue without further elaboration.

-Al-Mar'ashi understood the reality of emphasis and explained its degrees with great precision. He arranged the sounds according to emphasis and was very successful in dividing the elevated sounds into mutaqabbed and non-mutaqabbed sounds, and the technical analytical results were consistent with his position.

- Al-Mar'ashi explained the method for determining whether a sound is nasalized, and he provided a practical method for doing so, demonstrating his scientific understanding of the positions of the articulatory organs.

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Conflict of Interest

The author declares that there is no conflict of interest regarding the research, authorship, or publication of this article.

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