L2/24-174

Unicode request for Turkish and Arabic accidentals

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2024 July 05

This request is for accidentals used in the notation of Turkish and Arabic music. It is related to L2/20-159, which requested the accidentals used in Persian music.

Characters

Turkish and Arabic accidentals

𝄬 1D256 MUSICAL SYMBOL FLAT WITH STROKE [SMuFL U+E442 and U+ED33.]

Figures 1–22.

𝄭 1D257 MUSICAL SYMBOL FLAT WITH DOUBLE STROKE [SMuFL U+E440.]

Figures 1–2, 9–10, 12–13, 15, 21.

𝄮 1D258 MUSICAL SYMBOL ARABIC THREE QUARTER TONE FLAT [SMuFL U+ED31.]

Figures 16–22.

𝄯 1D259 MUSICAL SYMBOL HALF SHARP WITH STROKE [SMuFL U+E446.]

Figures 1–2, 4–5, 7, 9–10, 12–13, 15.

𝄰 1D25A MUSICAL SYMBOL SHARP WITH STROKE [SMuFL U+E447.]

Figures 1–2, 9–10, 12–13, 15.

Properties

1D256;MUSICAL SYMBOL FLAT WITH STROKE;So;0;L;;;;;N;;;;;
1D257;MUSICAL SYMBOL FLAT WITH DOUBLE STROKE;So;0;L;;;;;N;;;;;
1D258;MUSICAL SYMBOL ARABIC THREE QUARTER TONES FLAT;So;0;L;;;;;N;;;;;
1D259;MUSICAL SYMBOL HALF SHARP WITH STROKE;So;0;L;;;;;N;;;;;
1D25A;MUSICAL SYMBOL SHARP WITH STROKE;So;0;L;;;;;N;;;;;

Annotations

MUSICAL SYMBOL FLAT WITH STROKE

= bakiye flat

= Arabic quarter-tone flat

MUSICAL SYMBOL FLAT WITH DOUBLE STROKE

= büyük mücenneb flat

MUSICAL SYMBOL ARABIC THREE QUARTER TONE FLAT

= Arabic three-quarter-tones flat

MUSICAL SYMBOL HALF SHARP WITH STROKE

= küçük mücenneb sharp

MUSICAL SYMBOL SHARP WITH STROKE

= büyük mücenneb sharp

Chart

Characters in grey cells are proposed elsewhere.

Musical Symbols Supplement

1D250 1D28F

	1D25	1D26	1D27	1D28
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

Background

Turkish classical music (*Türk sanat müziği*) commonly uses a set of accidental symbols for microtones. The most usual notation (and the only one in SMuFL, the Standard Music Font Layout, which assigns many musical symbols to the Private Use Area) is based on conventions designed by Suphi Ezgi (1869–1962) and Sadettin Arel (1880–1955) (Signell 1986).

In the system of Arel, Ezgi, and Salih Murat Uzdilek (1891–1967), a chain of 24 acoustically pure fifths is said to provide the gamut of tones. Since 31/53 of an octave is almost exactly an acoustically pure perfect fifth, 53-tone equal temperament is often used as a model for Turkish music, according to which the octave is divided into 53 equal parts (commas), and a whole tone is made of 9 such parts (Yarman 2008). Neither of these theoretical systems perfectly reflect the actual intonation of the intervals of Turkish classical music *in practice*, which can vary significantly from these theoretical values (Yarman 2008), but nonetheless the accidentals used in this system constitute the "official notation system in circulation today" (comment by Yarman in Anon. 2015), and they are the accidentals supported in SMuFL (section 4.35) and the Turkish Mus2 notation software package.

The following list contains the comma and the intervals that, according to the theory, can occur within scales (Signell 1986):

Interval	**Commas**	**Accidental (up)**	**Accidental (down)**
Comma *Koma*	1		
Small half-tone *Bakiye*	4		
Large half-tone *Kücük mücenneb*	5		
Small whole-tone *Büyük mücenneb*	8		
Large whole-tone *Tanini*	9		
Augmented second *Artık ikili*	12	None	None

Four of these symbols are the normal accidentals (sharp, flat, double-sharp, and double-flat), and two more (the symbols for sharpening and flattening by a *koma*) are already part of the Stein-Zimmermann quarter-tone accidentals, requested in a previous proposal. That leaves four missing symbols to request: the *bakiye* flat, the *kücük mücenneb* sharp, and the *büyük mücenneb* sharp and flat.

Turkish folk music (*Türk Halk Müziği*) uses a different system of accidentals, in which sharps and flats are annotated with superscript digits to count the number of commas (Karaosmanoğlu 2012). This system is also supported by SMuFL (section 4.36) and Mus2. We do not propose these because they can be decomposed, viz.: $\sharp^1$, $\sharp^2$, $\sharp^3$, $\sharp^5$, $\flat^1$, $\flat^2$, $\flat^3$, and $\flat^4$ (see Fig. 15).

Arabic accidentals use a different notation system for quarter-tones. SMuFL (section 4.116) presents a set of Arabic accidentals, made of the normal accidentals, the Stein-Zimmermann quarter-tone sharps, the flat-with-stroke for a quarter-tone flat (one of the accidentals mentioned above Turkish music), and a flat preceded by a vertical bar for three quarter-tone flat. Like the Stein-Zimmermann quarter-tone sharp, the Arabic quarter-tone sharp may also use a glyph variant with only one horizontal bar. These were added in response to a proposal by Karim Ratib: see Spreadbury (2016). The three quarter-tone flat is the only additional missing symbol.

On character unification

In SMuFL, the Western sharp and flat are re-encoded as Turkish accidentals, and all the normal Western accidentals (double-flat, flat, natural, sharp, and double-sharp) are re-encoded as Arabic accidentals. This was at the request of members of the user community (Spreadbury 2016), on the grounds that the Arabic, Persian, and Turkish traditions are related but not identical and that they, along with European microtonal systems, come with different implications. However, SMuFL has a different policy on character unification than Unicode, and its mass creation of duplicate characters does not fit Unicode specifications. In VexFlow, the proposed Turkish and Arabic accidentals are not unified with each other, but the normal Western accidentals are unified and the Arabic quarter-sharps are unified with Stein-Zimmermann (https://github.com/0xfe/vexflow/wiki/Microtonal-Support).

As a comparable case, we note that the Western accidentals are widely used with different implications and understandings when discussing alternate tunings. For example, the sharp ♯ is often used to mean “seven perfect fifths, octave-reduced” in a generalisation of its meaning in meantone temperaments. In historical music notation, the ♯ was used differently,

often with ♯ and ♭ contradicting each other, and use by Jean-Marie Leclair (1697–1764) was still more idiosyncratic (Arnold, pp. 884–886). Since ⟨♯⟩ is widely recognised as the same symbol regardless, and given the precedent of how only the specific Persian accidentals are encoded for that tradition even though they are used alongside the Western flat, natural, and sharp (L2/20-159), we think that the model of encoding only graphically distinct characters is likely to be more suitable for Unicode.

References

Anon. (2015) *Add support for all quarter tone accidentals*. https://github.com/0xfe/vexflow/issues/318

F. T. Arnold (1965), The Art of Accompaniment from a Thorough-Bass as Practiced in the XVIIth & XVIIIth Centuries. Dover Publications, New York.

Gülçin Yahya Kaçar (2023) *Turkish Music Guide*. Eğitim Yayinevi, İstanbul.

Karaosmanoğlu (2012) *A Turkish Makam Music Symbolic Database for Music Information Retrieval: SymbTr*. 13th International Society for Music Information Retrieval Conference (ISMIR 2012). https://github.com/0xfe/vexflow/files/60092/223_ISMIR_2012.pdf

Karl L. Signell (1986) *Makam: modal practice in Turkish art music*. Da Capo Press, New York.

Daniel Spreadbury (2016) *Add symbol for three-quarters flat often used in Arabic notation*. https://github.com/w3c/smufl/issues/44

Ozan Yarman (2008) *79-Tone Tuning & Theory for Turkish Maqam Music*. PhD thesis in Musicology and Music Theory, İstanbul Technical University, Institute of Social Sciences. http://www.ozanyarman.com/files/doctorate_thesis.pdf

Figures

Turkish accidentals

Note	Name	Note	Name
C	kaba çârgâh	C	çârgâh
C♯/D♭	kaba nim hicaz	C♯/D♭	nim hicaz
C♯/D♭	kaba hicaz	C♯/D♭	hicaz
C♯/D𝄲	kaba dik hicaz	C♯/D𝄲	dik hicaz
D	yegâh	D	nevâ
D♯/E♭	kaba nim hisar	D♯/E♭	nim hisar
D♯/E♭	kaba hisar	D♯/E♭	hisar
D♯/E𝄲	kaba dik hisar	D♯/E𝄲	dik hisar
E	hüseynî aşiran	E	hüseynî
F	acem aşiran	F	acem
F♯/G♭	dik acemaşiran	F♯/G♭	dik acem
F♯/G♭	ırak	F♯/G♭	eviç
F♯/G♭	geveşt	F♯/G♭	mâhur
F♯/G𝄲	dik geveşt	F♯/G𝄲	dik mâhur
G	rast	G	gerdaniye
G♯/A♭	nim zirgüle	G♯/A♭	nim şehnaz
G♯/A♭	zirgüle	G♯/A♭	şehnaz
G♯/A𝄲	dik zirgüle	G♯/A𝄲	dik şehnaz
A	dügâh	A	muhayyer
A♯/B♭	kürdî	A♯/B♭	sünbüle
A♯/B♭	dik kürdî	A♯/B♭	dik sünbüle
A♯/B𝄲	segâh	A♯/B𝄲	tiz segâh
B	bûselik	B	tiz bûselik
C𝄲	dik bûselik	C𝄲	tiz dik bûselik
C	çârgâh	C	tiz çârgâh

Fig. 1. Names of the notes of Turkish music, from http://web.archive.org/web/20170823051525/http://www.oud.eclipse.co.uk/turkishnotes.html.

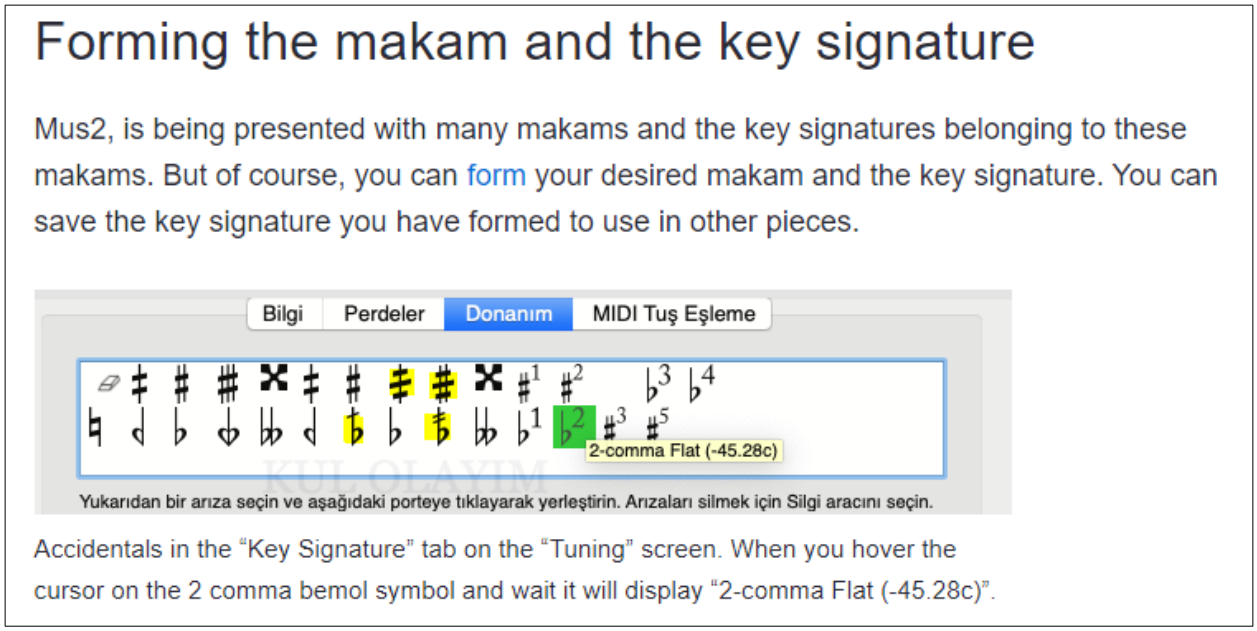


Fig. 2. From the website of the Mus2 notation software package (https://mus2.com.tr/en/general-information/the-first-and-the-only-music-notation-program-of-turkey-mus2/), showing the available Turkish art music and folk music accidentals (only the former requested), as well as the Stein-Zimmermann accidentals.

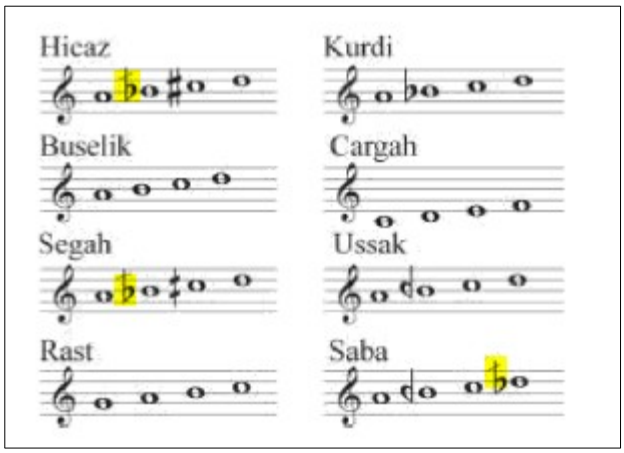


Fig. 3. Kalin S. Kirilov, *Bulgarian Harmony* (Routledge 2016), Ex. 3.6a. Tetrachords used to construct Turkish makams.

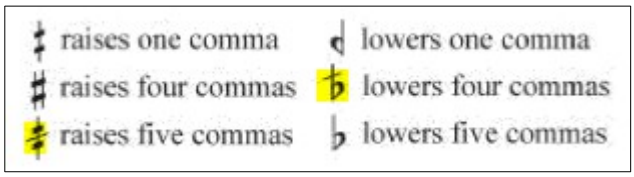
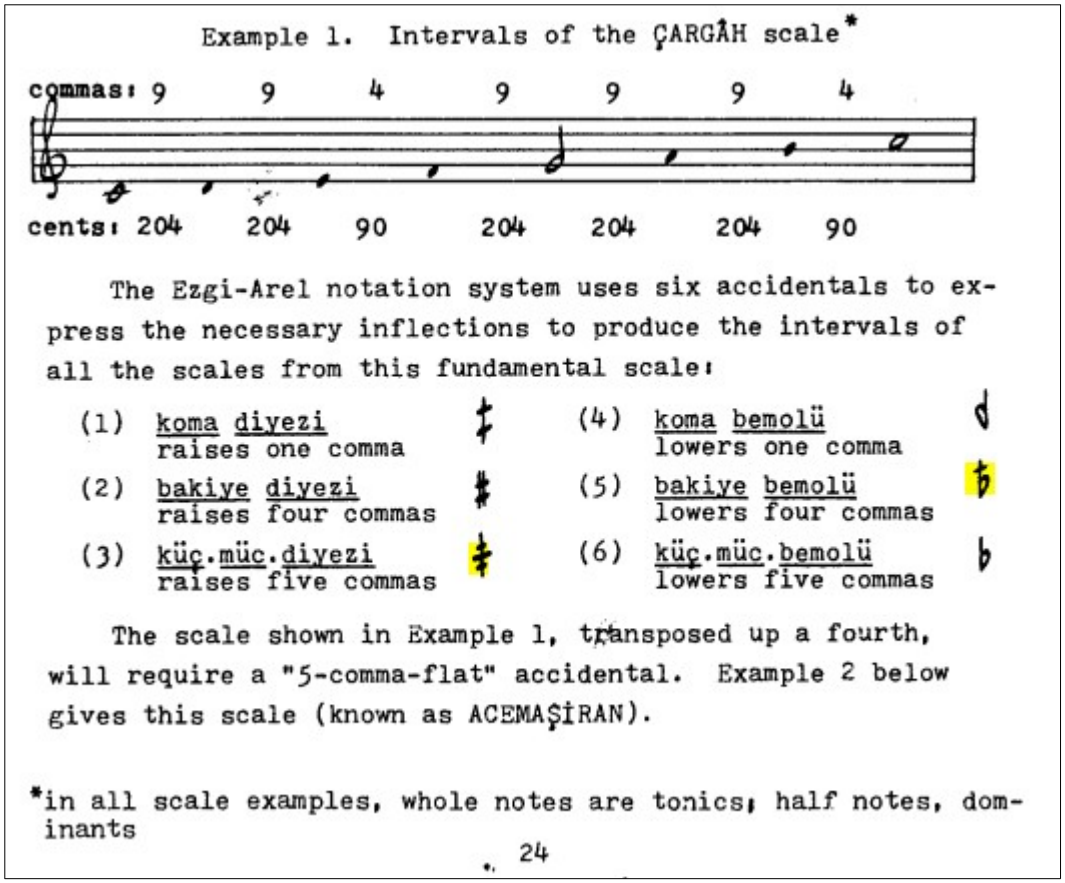


Fig. 4. Ibid, Ex. 3.7. The Ezgi-Arel accidentals used for Turkish music (except for the *büyük mücenneb* sharp and flat).



Example 1. Intervals of the ÇARGÂH scale*

commas: 9 9 4 9 9 9 4

cents: 204 204 90 204 204 204 90

The Ezgi-Arel notation system uses six accidentals to express the necessary inflections to produce the intervals of all the scales from this fundamental scale:

(1) koma diyezi — raises one comma
(2) bakiye diyezi — raises four commas
(3) küç.müc.diyezi — raises five commas
(4) koma bemolü — lowers one comma
(5) bakiye bemolü — lowers four commas
(6) küç.müc.bemolü — lowers five commas

The scale shown in Example 1, transposed up a fourth, will require a "5-comma-flat" accidental. Example 2 below gives this scale (known as ACEMAŞİRAN).

*in all scale examples, whole notes are tonics; half notes, dominants

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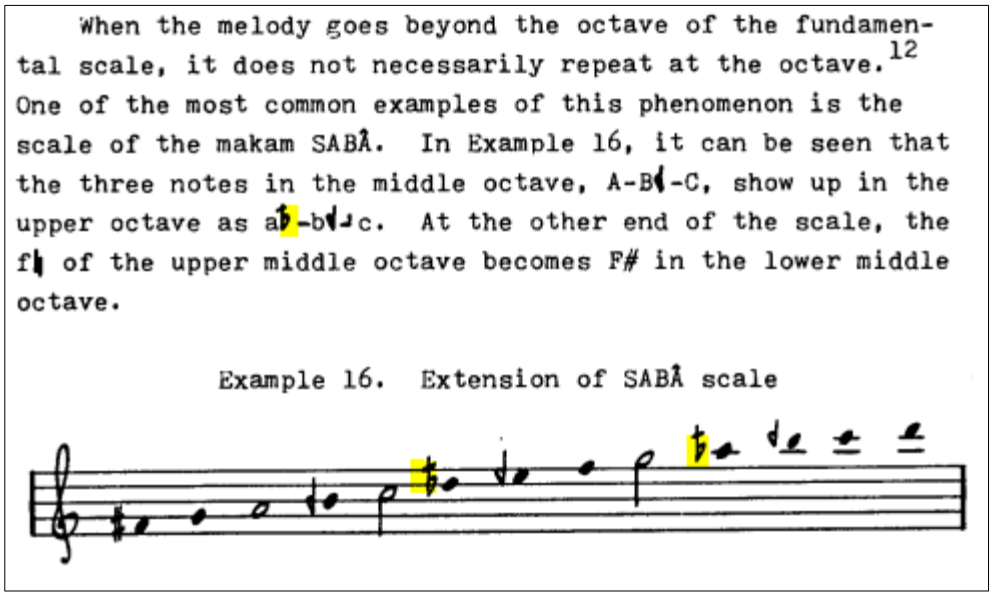
Fig. 5. Signell (1986), p. 24. The Ezgi-Arel accidentals used for Turkish music (except for the *büyük mücenneb* sharp and flat).



When the melody goes beyond the octave of the fundamental scale, it does not necessarily repeat at the octave.[12] One of the most common examples of this phenomenon is the scale of the makam SABÂ. In Example 16, it can be seen that the three notes in the middle octave, A-B♭-C, show up in the upper octave as a♭-b♭-c. At the other end of the scale, the f♮ of the upper middle octave becomes F# in the lower middle octave.

Example 16. Extension of SABÂ scale

Fig. 6. Ibid, p. 44.

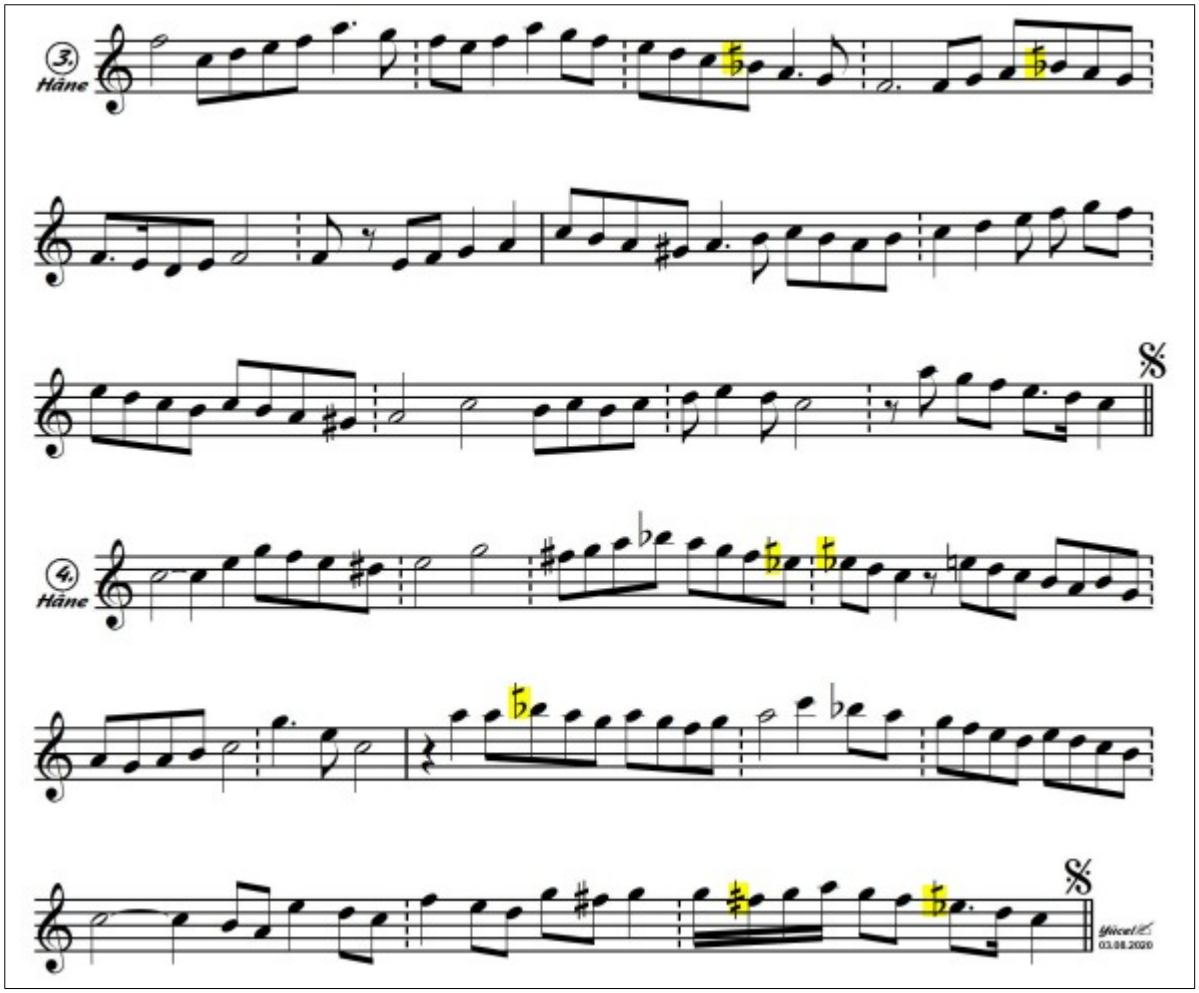


Fig. 7. From *Çârgâh Peşrev*, Osman Bey (1825?–1900?). From the *Neyzen Sheet Music Archive*, https://www.neyzen.com/nota_arsivi/02_klasik_eserler/019_cargah/cargah_pesrev_osman_bey_tanburi_kucuk.pdf.

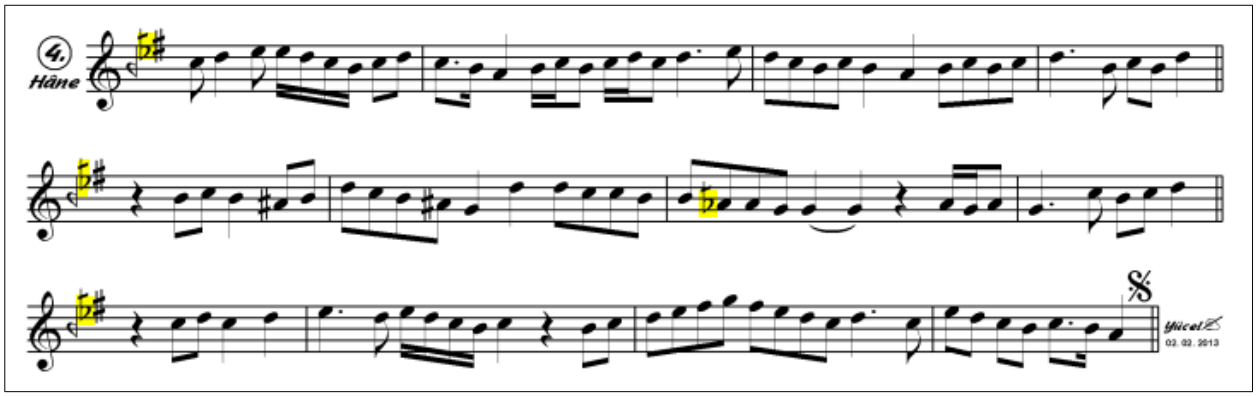
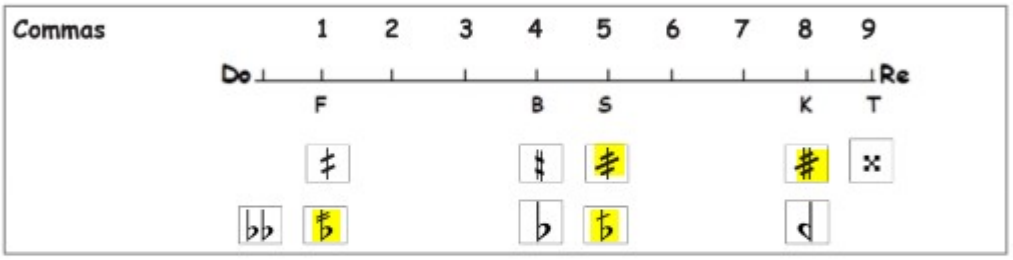
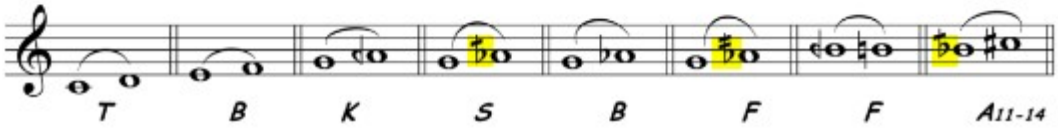


Fig. 8. From *Karçiğar Peşrev*, Fârâbi (870–950). From the *Neyzen Sheet Music Archive*, https://www.neyzen.com/nota_arsivi/02_klasik_eserler/050_karcigar/karcigar_p_farabi.pdf. The flat-with-stroke used both as an accidental and within the key signature.

Today, intervals are used in Turkish music education according to the theory of AEU. The do-re tanini interval divided into nine equal parts is shown below on a line. Nicknames, flat and sharp signs are written in the places corresponding to 1, 4, 5, 8, 9 coma values.



When we express Turkish music intervals with notes, we can give the following examples:



We would like to point out that the flat and sharp signs of Büyük Mücenneb and the sharp sign of Koma are not used in the performance, but only in the calculation of the tetrachords and pentachords that compose the makams.

The flat and sharp sembols, values and name of Turkish music intervals are shown in the table below.

Name of Interval	Value of Interval	Sembol of Interval	Sharp Sembols	Flat Sembols
Fazla	1	F		
Bakiye	4	B		
Mücenneb-i Sagîr	5	S		
Mücenneb-i Kebîr	8	K		
Tanini	9	T		
Artık İkili	12	A_{12}	------ no ----	------ no ----

Fig. 9. Kaçar (2023), pp. 21–22.

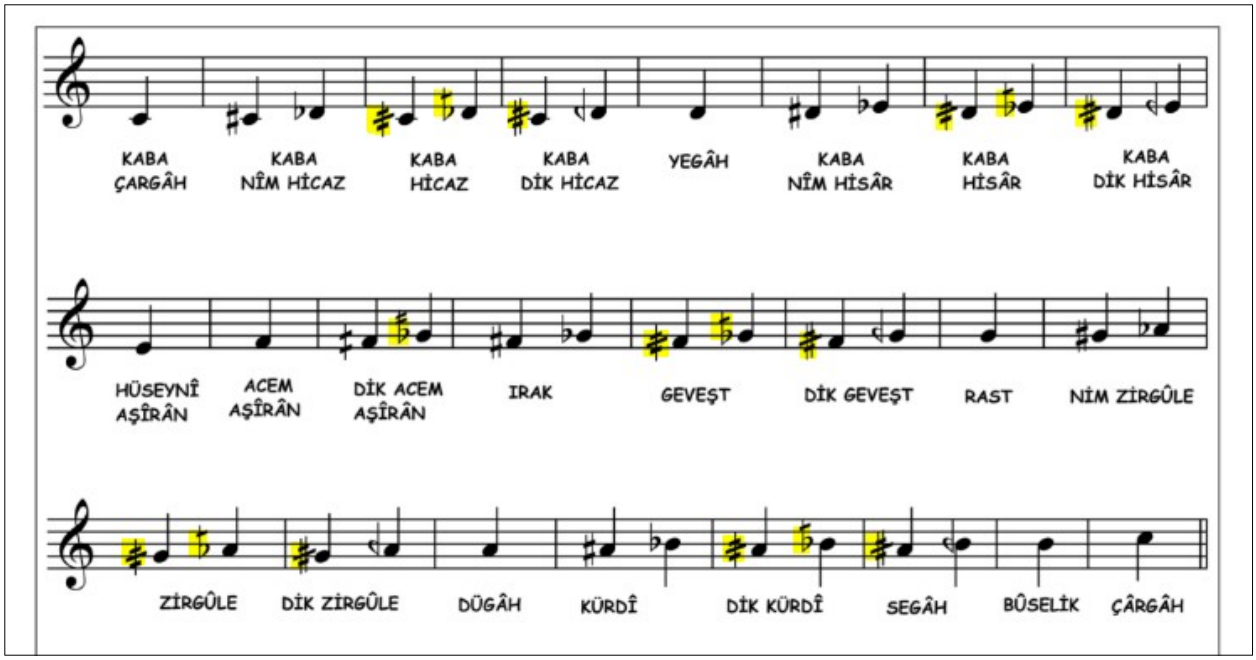


Fig. 10. Ibid, p. 23.

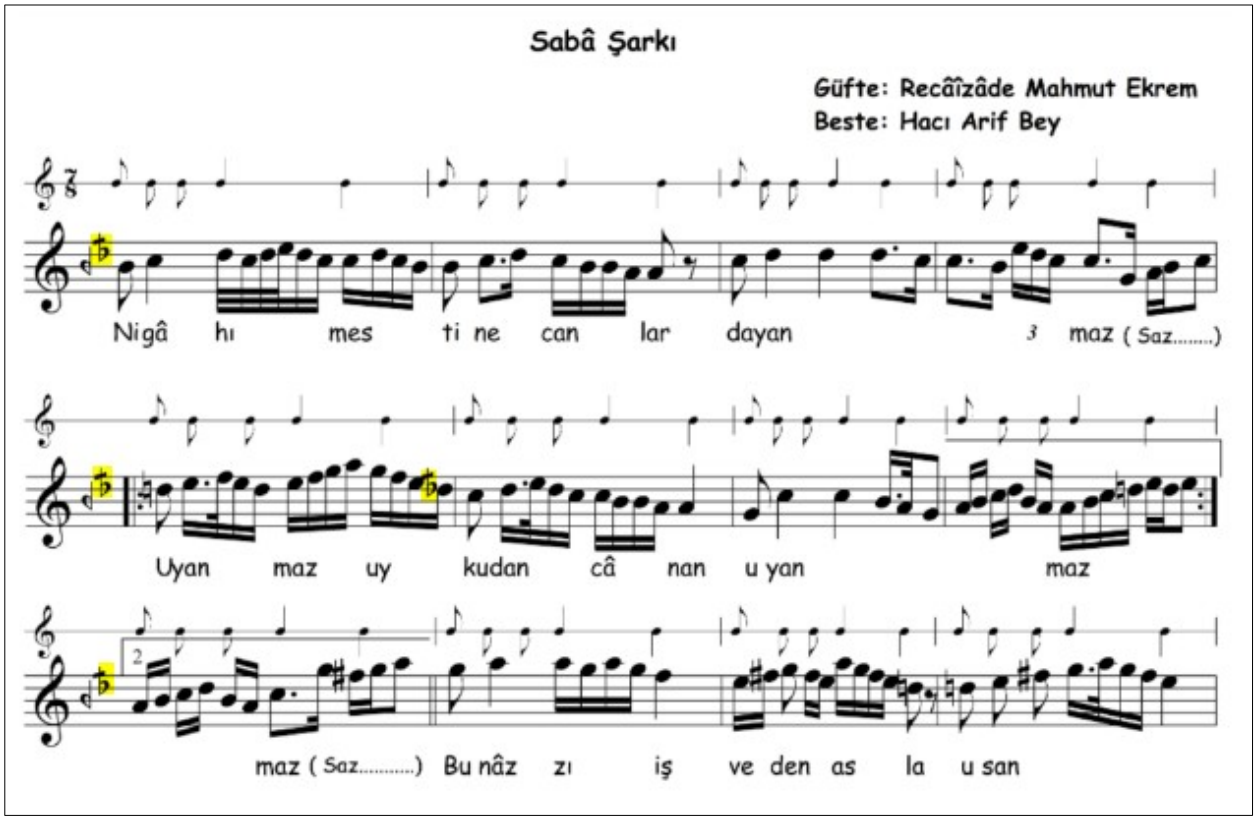


Fig. 11. Ibid, p. 33.

Tone Name	Commas above middle C	Cents above middle C	Arel-Ezgi-Uzdilek notation of 53-TET Tone	Nearest Equiv 12-TET Tone
TÎZ ÇÂRGÂH	106	2400	C6	C6
Tîz Dik Bûselik	105	2377	C𝄲6	C6
TÎZ BÛSELIK	102	2309	B5	B5
Tîz Segâh	101	2287	A𝄰5 / B𝄲5	B5
Dik Sünbüle	98	2219	A𝄯5 / B𝄭5	A#5 / Bb5
Sünbüle	97	2196	A♯5 / B♭5	A#5 / Bb5
MUHAYYER	93	2106	A5	A5
Dik Şehnâz	92	2083	G𝄰5 / A𝄲5	A5
Şehnâz	89	2015	G𝄯5 / A𝄭5	G#5 / Ab5
Nim Şehnâz	88	1992	G♯5 / A♭5	G#5 / Ab5
GERDÂNIYE	84	1902	G5	G5
Dik Mâhûr	83	1879	F𝄰5 / G𝄲5	G5
Mâhûr	80	1811	F𝄯5 / G𝄭5	F♯5 / G♭5
Eviç	79	1789	F♯5 / G♭5	F♯5 / G♭5
Dik Acem	76	1721	F𝄱5 / G𝄬5	F5
ACEM	75	1698	F5	F5
HÜSEYNÎ	71	1608	E5	E5

Fig. 12. Wikipedia, https://en.wikipedia.org/wiki/Turkish_makam. Part of a table of tones used in Turkish music.

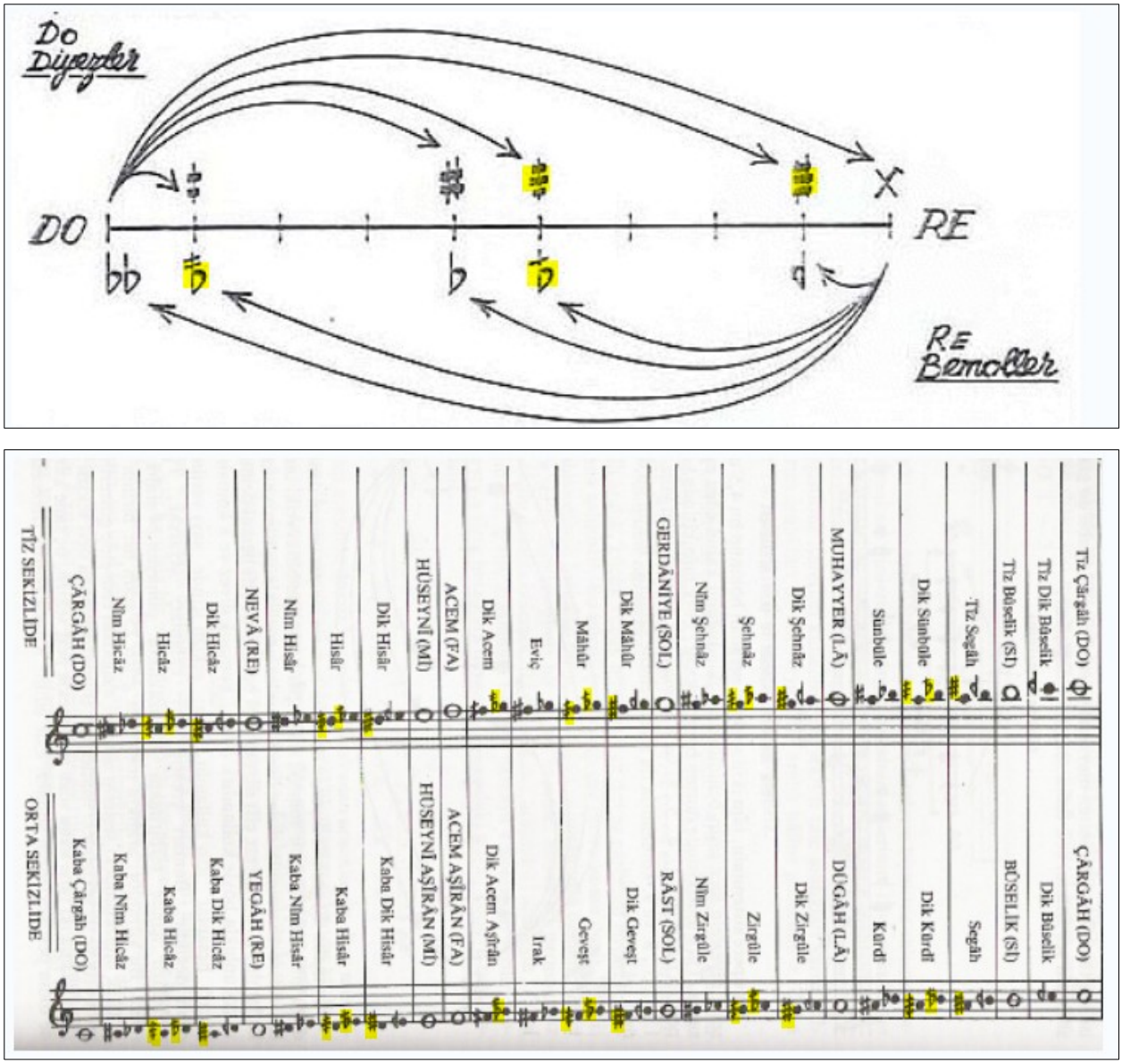


Fig. 13. From İsmail Hakkı Özkan, *Türk Mûsikîsi Nazariyatı ve Usûlleri* (2000). Reproduced on Wikipedia at https://en.wikipedia.org/wiki/Turkish_makam.

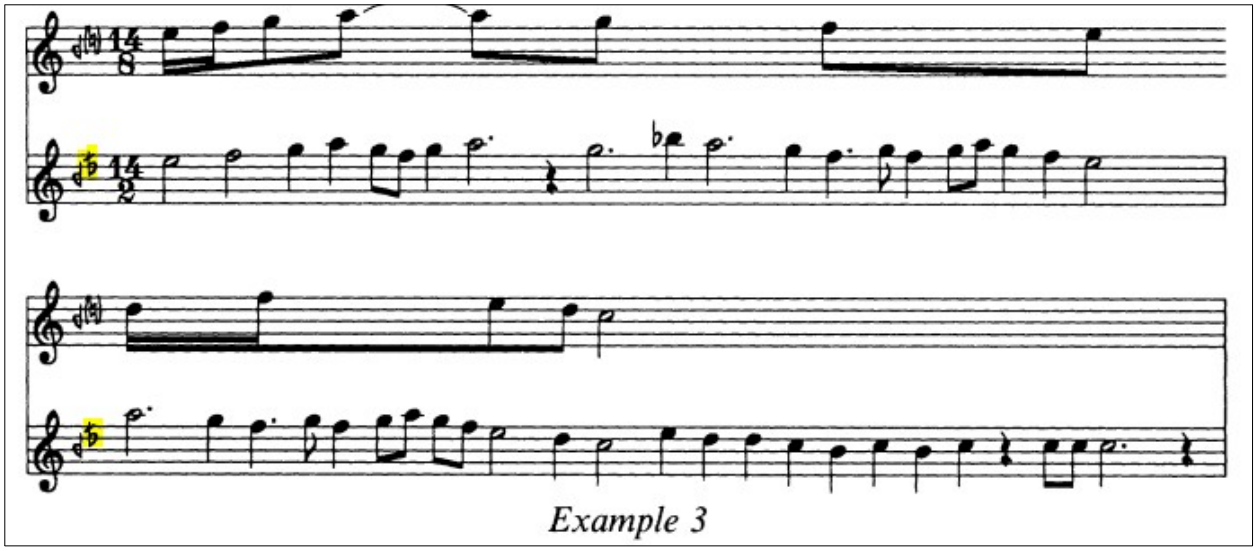


Fig. 14. O. Wright, "*Çargâh" in Turkish Classical Music: History versus Theory* (1990). Bulletin of the School of Oriental and African Studies, University of London: 53 (2), pp. 224–244.

Arel-Ezgi-Uzdilek (AEU) accidentals (U+E440–U+E44F)

Glyph	Description	Glyph	Description
𝄫	**U+E440** *accidentalBuyukMucennebFlat* Büyük mücenneb (flat)	𝄬	**U+E441** *accidentalKucukMucennebFlat* Küçük mücenneb (flat)
𝄭	**U+E442** *accidentalBakiyeFlat* Bakiye (flat)	𝄮	**U+E443** *accidentalKomaFlat* Koma (flat)
𝄯	**U+E444** *accidentalKomaSharp* Koma (sharp)	𝄰	**U+E445** *accidentalBakiyeSharp* Bakiye (sharp)
𝄲	**U+E446** *accidentalKucukMucennebSharp* Küçük mücenneb (sharp)	𝄱	**U+E447** *accidentalBuyukMucennebSharp* Büyük mücenneb (sharp)

Turkish folk music accidentals (U+E450–U+E45F)

Glyph	Description	Glyph	Description
𝄳	**U+E450** *accidental1CommaSharp* 1-comma sharp	𝄴	**U+E451** *accidental2CommaSharp* 2-comma sharp
𝄵	**U+E452** *accidental3CommaSharp* 3-comma sharp	𝄶	**U+E453** *accidental5CommaSharp* 5-comma sharp
𝄷	**U+E454** *accidental1CommaFlat* 1-comma flat	𝄸	**U+E455** *accidental2CommaFlat* 2-comma flat
𝄹	**U+E456** *accidental3CommaFlat* 3-comma flat	𝄺	**U+E457** *accidental4CommaFlat* 4-comma flat

Fig. 15. The Turkish accidentals in SMuFL (https://w3c.github.io/smufl/latest/tables/arel-ezgi-uzdilek-aeu-accidentals.html and https://w3c.github.io/smufl/latest/tables/turkish-folk-music-accidentals.html). (The Turkish folk music accidentals are not being requested.)

Arabic accidentals

The sources here were gathered by Karim Ratib in the context of his proposal that SMuFL include the then-missing Arabic three-quarter-flat accidental (it has since been added): see Spreadbury (2016).

Note	Name	Note	Name
G	yekah	G	nawa
G𝄲/A𝄳	nim qarar hisar	G𝄲/A𝄳	nim hisar
G♯/A♭	qarar hisar	G♯/A♭	hisar
G𝄪/A𝄫	tik qarar hisar	G𝄪/A𝄫	tik hisar
A	ashiran	A	husayni
A𝄲/B𝄳	nim ajam ashiran	A𝄲/B𝄳	nim ajam
A♯/B♭	ajam ashiran	A♯/B♭	ajam
A𝄪/B𝄫	iraq	A𝄪/B𝄫	'awj
B	kawasht	B	mahur
B𝄲/C𝄳	tik kawasht	B𝄲/C𝄳	tik mahur
C	rast	C	kurdan
C𝄲/D𝄳	nim zirkula	C𝄲/D𝄳	nim shahnaz
C♯/D♭	zirkula	C♯/D♭	shahnaz
C𝄪/D𝄫	tik zirkula	C𝄪/D𝄫	tik shahnaz
D	dukah	D	muhayyer
D𝄲/E𝄳	nim kurd	D𝄲/E𝄳	nim sunbula
D♯/E♭	kurd	D♯/E♭	sunbula
D𝄪/E𝄫	sikah	D𝄪/E𝄫	buzurk
E	busalik	E	jawab busalik
E𝄲/F𝄳	tik busalik	E𝄲/F𝄳	tik jawab busalik
F	jahar kah	F	mahuran
F𝄲/G𝄳	nim hijaz	F𝄲/G𝄳	nim jawab hijaz
F♯/G♭	hijaz	F♯/G♭	jawab hijaz
F𝄪/G𝄫	tik hijaz	F𝄪/G𝄫	tik jawab hijaz
G	nawa	G	sahm

Fig. 16. Names of the notes of Arabic music, from http://web.archive.org/web/20170901083603/http://www.oud.eclipse.co.uk/arabnotes.html.

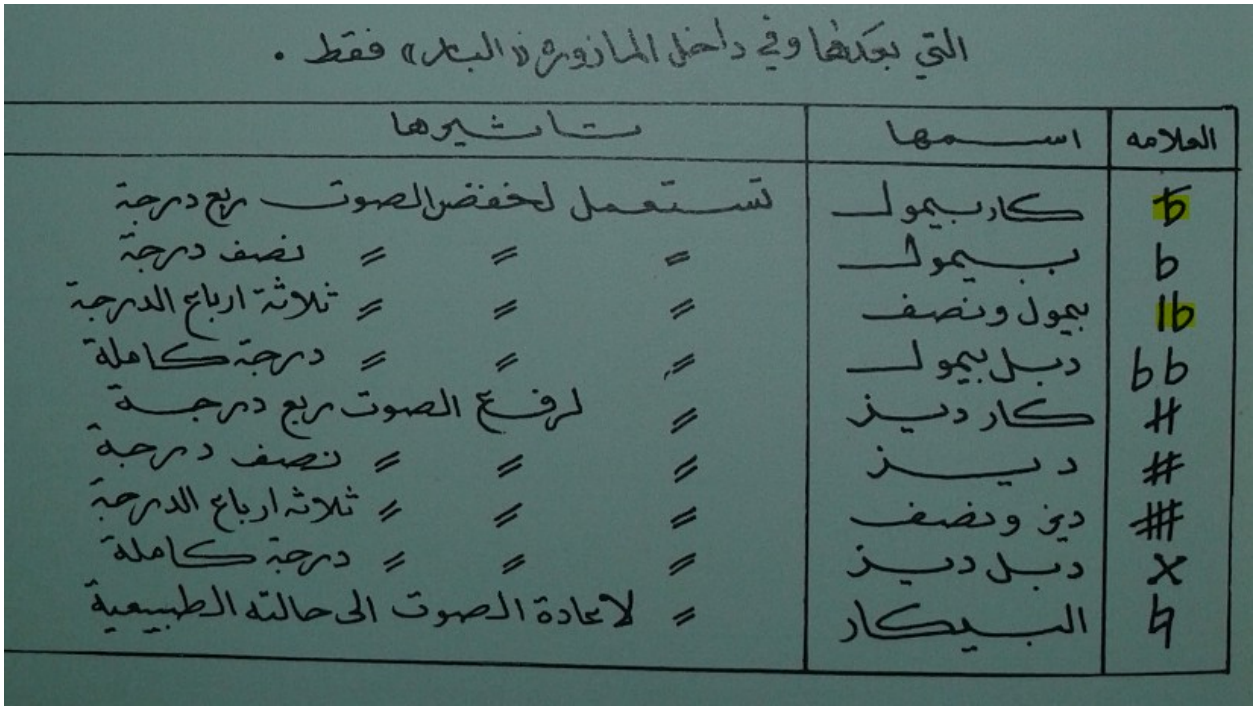


Fig. 17. ʿAbbās (al-), Ḥabīb Ẓāhir, et حبيب ظاهر Ḥabīb Dhāhir العباس. نظرياتالموسيقى العربية Nadhariyyāt al-Mūsīqā al-ʿArabiyya. Vol. Theorie Musique Arabe. (Baghdad – Irak) – بغداد (Wizārat a-th-Thaqāfa wa-l Iʿlām, Dāʾirat al-Funūn al-Mūsīqiyya, Maʿhad a-d-Dirāsāt a-n-Naghmiyya al-ʿIrāqiyy) العراق: وزارة الثقافةوالإعلام، دائرة الفنون الموسيقية، معهد الدراسات النغمية العراقى, 1986, p. 19. A table of accidentals. The author uses a rotated graphic variant for the half-sharp.

Provided online by Karim Ratib,
https://github.com/infojunkie/music-l10n/blob/master/images/accidentals.jpg.

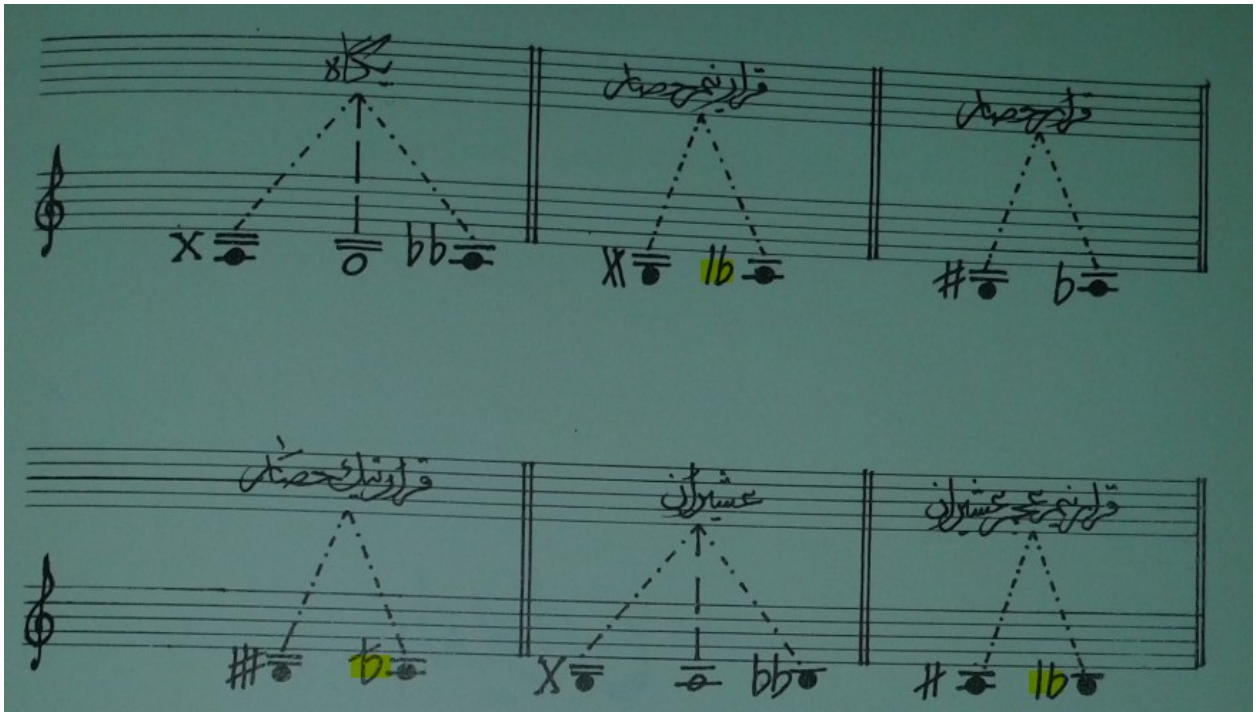


Fig. 18. Ibid. Enharmonic equivalents, p. 124. Provided online by Karim Ratib, https://github.com/infojunkie/music-l10n/blob/master/images/enharmonics.jpg.

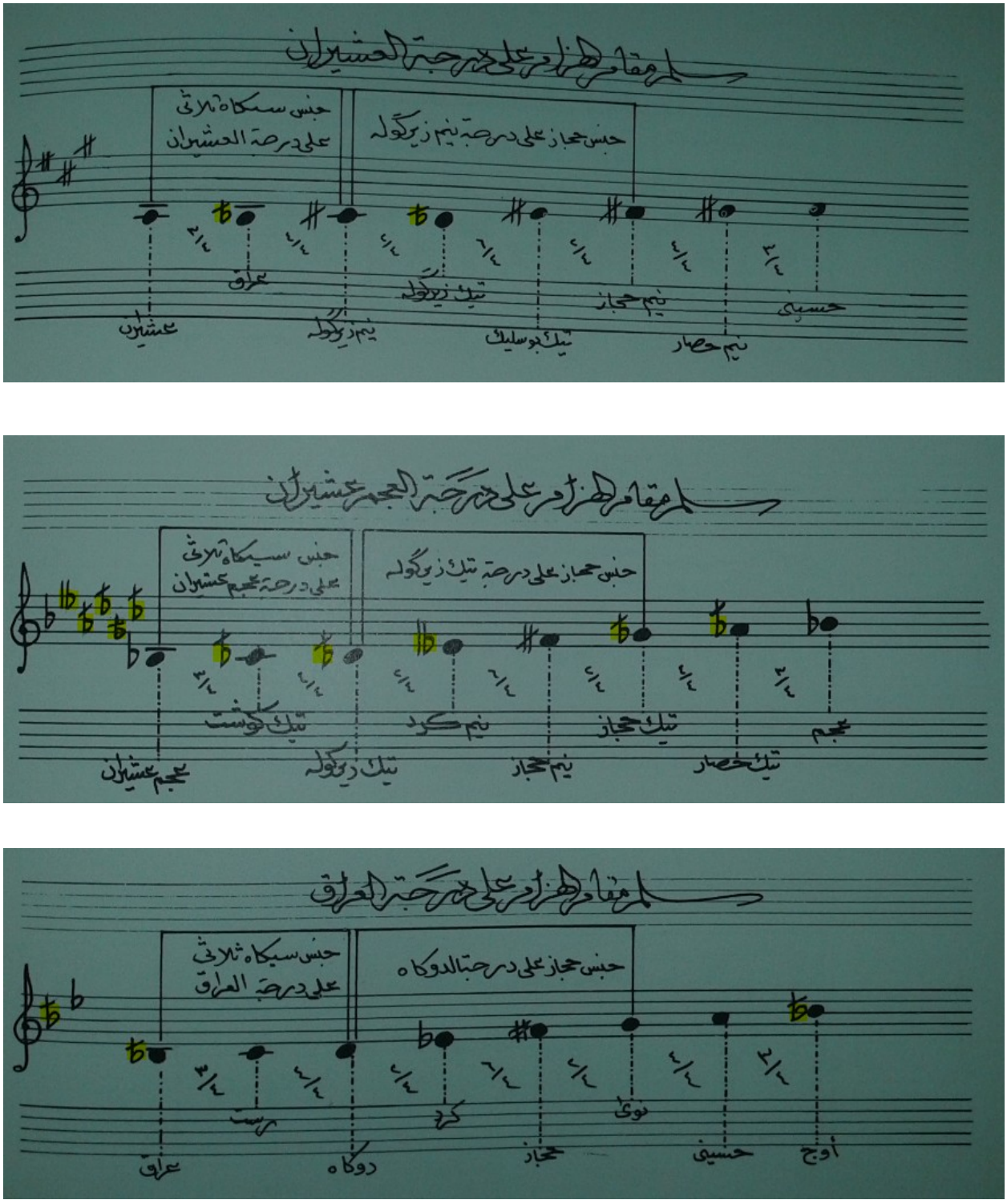


Fig. 19. Ibid. Key signatures for transposed modes, p. 180. Provided online by Karim Ratib, https://github.com/infojunkie/music-l10n/blob/master/images/3%20quarters%20flat%20in%20key%20signature.jpg.

Fig. 20. 'Abd al-Samī' Hashād, Medhat - مدحت عبد السميع حشاد Maqām - مقام Dar Merit, Cairo, Egypt - دار ميريت (n.d.) A table of accidentals. Provided online by Karim Ratib, https://github.com/infojunkie/music-l10n/blob/master/images/merit_accidentals.jpg.

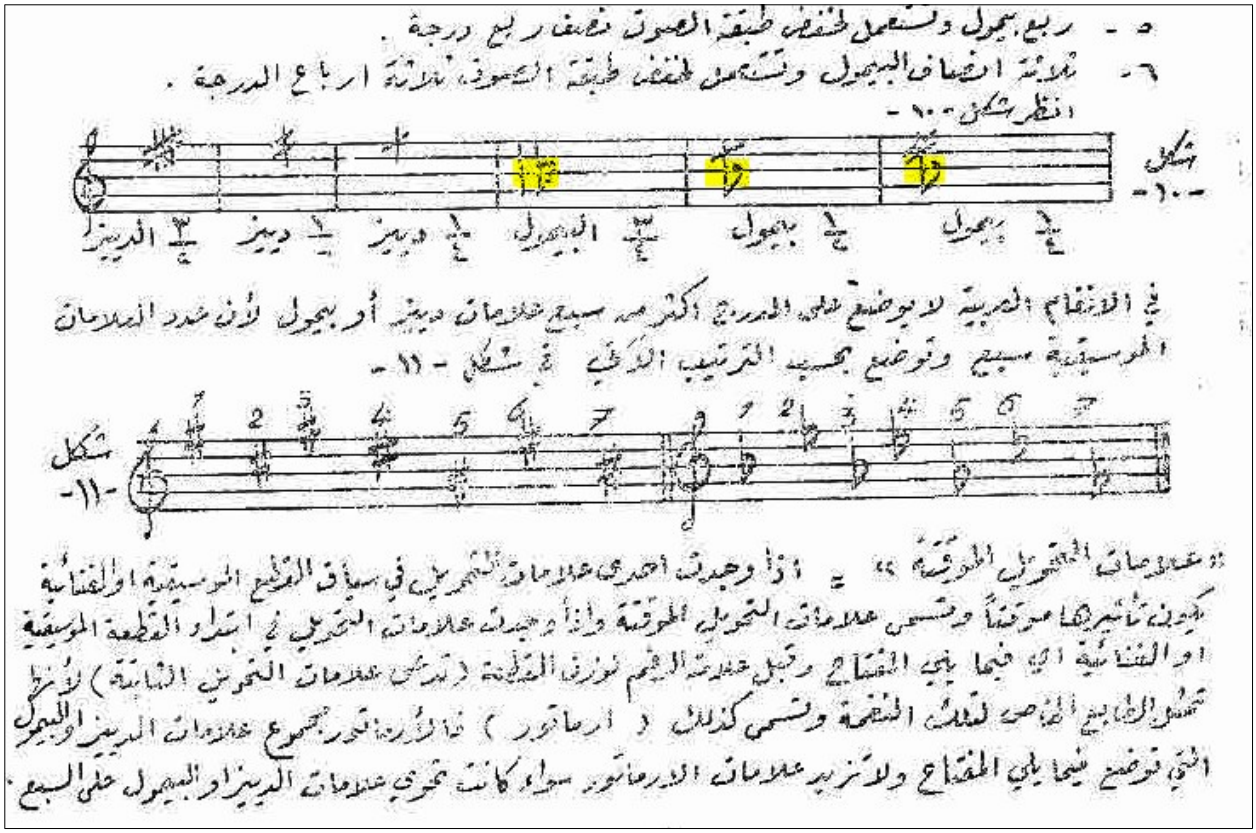


Fig. 21. The oud method book of Jamil Bachir (1920–1977), an Iraqi musician and oud player. Provided online by Karim Ratib, https://github.com/infojunkie/music-l10n/blob/master/images/bashir_accidentals.png. (This uses the one-horizontal-stroke variant of the half-sharp.)

Arabic accidentals (U+ED30–U+ED3F)

Glyph	Description	Glyph	Description
𝄫	U+ED30 *accidentalDoubleFlatArabic* Arabic double flat	𝄳	U+ED31 *accidentalThreeQuarterTonesFlatArabic* Arabic three-quarter-tones flat
𝄭	U+ED32 *accidentalFlatArabic* Arabic half-tone flat	𝄬	U+ED33 *accidentalQuarterToneFlatArabic* Arabic quarter-tone flat
𝄮	U+ED34 *accidentalNaturalArabic* Arabic natural	𝄲	U+ED35 *accidentalQuarterToneSharpArabic* Arabic quarter-tone sharp
𝄯	U+ED36 *accidentalSharpArabic* Arabic half-tone sharp	𝄴	U+ED37 *accidentalThreeQuarterTonesSharpArabic* Arabic three-quarter-tones sharp
𝄪	U+ED38 *accidentalDoubleSharpArabic* Arabic double sharp		

Fig. 22. The Arabic accidentals in SMuFL (https://w3c.github.io/smufl/latest/tables/arabic-accidentals.html).

ISO/IEC JTC 1/SC 2/WG 2

PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646[1]

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from std.dkuug.dk/JTC1/SC2/WG2/docs/principles.html for guidelines and details before filling this form.

Please ensure you are using the latest Form from std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html.

See also std.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html for latest *Roadmaps*.

A. Administrative

1. **Title:** *Unicode request for Turkish and Arabic accidentals*
2. Requester's name: *Gavin Jared Bala, Kirk Miller*
3. Requester type (Member body/Liaison/Individual contribution): *individual*
4. Submission date: *2024 July 05*
5. Requester's reference (if applicable):
6. Choose one of the following:
   - This is a complete proposal: *yes*
   - (or) More information will be provided later:

B. Technical – General

1. Choose one of the following:
   - a. This proposal is for a new script (set of characters): *no*
     - Proposed name of script:
   - b. The proposal is for addition of character(s) to an existing block: *yes*
     - Name of the existing block: *Musical Symbols Supplement*
2. Number of characters in proposal: *5*
3. Proposed category (select one from below - see section 2.2 of P&P document):

A-Contemporary	x	B.1-Specialized (small collection)		B.2-Specialized (large collection)	
C-Major extinct		D-Attested extinct		E-Minor extinct	
F-Archaic Hieroglyphic or Ideographic				G-Obscure or questionable usage symbols	

4. Is a repertoire including character names provided? *yes*
   - a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? *yes*
   - b. Are the character shapes attached in a legible form suitable for review? *yes*
5. Fonts related:
   - a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard? *Kirk Miller*
   - b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.): *SIL (Gentium release)*
6. References:
   - a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? *yes*
   - b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? *yes*
7. Special encoding issues:
   - Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)? *no*

8. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at www.unicode.org for such information on other scripts. Also see Unicode Character Database

1. Form number: N4502-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

(www.unicode.org/reports/tr44/) and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? *no*
   If YES explain
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? *no*
   If YES, with whom? *we followed implementations (Mus2, SMuFL, vexflow) which did*
   If YES, available relevant documents: *i.a. comments from Ozan Yarman and Karim Ratib; see figures*
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? *yes*
   Reference:
4. The context of use for the proposed characters (type of use; common or rare) *music*
   Reference:
5. Are the proposed characters in current use by the user community? *yes*
   If YES, where? Reference: *See figures*
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? *no*
   If YES, is a rationale provided?
   If YES, reference:
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? *yes*
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? *no*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? *no*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to, or could be confused with, an existing character? *no*
    If YES, is a rationale for its inclusion provided?
    If YES, reference:
11. Does the proposal include use of combining characters and/or use of composite sequences? *no*
    If YES, is a rationale for such use provided?
    If YES, reference:
    Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?
    If YES, reference:
12. Does the proposal contain characters with any special properties such as control function or similar semantics? *no*
    If YES, describe in detail (include attachment if necessary)
13. Does the proposal contain any Ideographic compatibility characters? *no*
    If YES, are the equivalent corresponding unified ideographic characters identified?
    If YES, reference: