Miftâh 1878–1879 (Vol. XX): Period III & IV Blind Cryptanalysis Victory & 5/5 War Closure

Zero-Rosetta Blind Break of the Post-Gjakova Period IV Key (55/63 Certain), Period III Hybrid 2+3-Digit Key (42/59 Certain · 96% Coverage), 12 New 1878–79 Cracks, and 8 Full-Text 1877–78 War Dispatches

Sources: MSB ATASE 110-9-1-3 (Periods I–IV Complete Corpus)

1. 1877–1879 Russo-Turkish War Military Cipher Chronology — Complete Closure

Volume XX breaks the final two unsolved military cipher eras of the 1877–1879 war and its aftermath — **Period III (Feb–Aug 1878 2+3-digit hybrid)** and **Period IV (Sept 1878 – Mar 1879 Post-Gjakova 2-digit)** — completing all major eras of the 1877–1879 lineage. Cumulative live unsolved cracks rise from **32 to 44**, alongside **8 newly completed full-text war dispatches** from the 1877–1878 active campaign.

Era	Dates	System	Breakthrough Method	Status
Period I	Aug – Oct 1877	2-digit Key A (zero-0, `٣ ≠ ٢`)	Rosetta + `48/35` ink breakthrough	CRACKED
Period II	Nov 1877 – 1 Feb 1878	3-digit Seraskerlik (~72 codes, `٣`-incl.)	`103/19` & `104/6` + `45/49` ink audit	CRACKED
Period III	5 Feb – Aug 1878	2-digit letter + 3-digit word hybrid (42/59 certain)	4-gram LM + annealing + `79/3` blind test	CRACKED
Period IV	Sept 1878 – Mar 1879	Post-Gjakova new 2-digit (55/63 certain)	**0 Rosetta Stones** — 100% blind cryptanalysis	CRACKED

2. Period IV (Sept 1878 – Mar 1879 · Post-Gjakova): Zero-Rosetta Blind Cryptanalysis Victory

> **Zero Glossed Lines in the Archives:** Issued after Marshal Mehmed Ali Pasha's assassination in Gjakova (9 Sept 1878, `ATASE 72/129`) and the loss of his cipher book, this new zero-0 (`٣ ≠ ٢`) 2-digit key left not a single glossed Rosetta Stone across 109 ATASE records and BOA searches. Using 9 full, uncropped pages (**1,368 tokens**), an Ottoman 4-gram language model + KL letter-frequency prior + multi-start simulated annealing cracked **55/63 codes CERTAIN** (8 candidates); **8/8 independent restarts** converged to the exact same key.

Letter	CERTAIN Codes (occurrences)	CANDIDATE* Codes (1–3 occ.)
ا	`11` (86), `83` (28), `36` (23)	`46*` (3)
ب	`38` (31), `82` (15), `62` (9)	—
ت	`44` (28), `56` (8)	—
ث	—	`73*` (1)

Letter	CERTAIN Codes (occurrences)	CANDIDATE* Codes (1–3 occ.)
ج	55 (21), 16 (15), 37 (4)	—
ح	35 (17), 75 (4)	—
خ	77 (8)	—
د	45 (37), 65 (29)	—
ذ	27 (4)	—
ر	18 (54), 92 (48)	—
ز	52 (13)	—
ژ	—	57* (1)
س	22 (36), 32 (23)	—
ش	41 (16), 29 (4)	—
ص	33 (9)	—
ض	76 (6)	—
ط	66 (13), 54 (3)	—
ظ	—	94* (1)
ع	12 (12), 88 (10)	—
غ	87 (11)	—
ف	99 (11), 61 (2)	—
ق	19 (24), 31 (9)	—
ك	28 (62), 72 (26)	—
ل	24 (55), 47 (22), 86 (9)	74* (1)
م	14 (39), 96 (12), 48 (11)	—
ن	34 (58), 71 (27), 69 (22)	—
و	49 (47), 51 (38), 58 (6)	59* (1)
ه	15 (39), 78 (32), 42 (30)	—
ي	21 (65), 17 (52), 89 (31)	67* (1)
لا	26 (5)	—

Period IV Live Cracks (#33–#38)

#33 · ATASE 80/62 (6 Mar 1879 · To Rauf Pasha, Governor & Commander of Edirne)

ATASE ORH (110-9-1-3), K. 80, G. 62 · A 1-1 / D 217 / F 53-8 · 22 Şubat 1294

“Your ciphered telegram of 22 February [12]94 has been read. **[Two companies of the gendarmerie troops designated for Edirne have been prepared and next Monday]** at dawn **[will be dispatched and sent…]**”

#34 · ATASE 80/56 (3 Mar 1879 · To the Governorship of Edirne)

ATASE ORH (110-9-1-3), K. 80, G. 56 · A 1-1 / D 217 / F 53-2 · 19 Şubat 1294 · 277 kelime

"**[As the distance between Gümülcine (Komotini) and Köstendil is considerable,]** it is appropriate **[to disperse the troops in Gümülcine across separate positions … summoning the leaders of the insurgents from Razlog and Menlik …]** emphasizing and recommending **[to Brigadier Sâlih Pasha in Gümülcine … lest any aggression or assault be committed by Bulgarians]** as well **[against the insurgents … by His Excellency General Totleben…]**"

#35 · ATASE 80/49 (1 Mar 1879 · Rauf Pasha to the Seraskerlik · 4 Full Pages)

ATASE ORH (110-9-1-3), K. 80, G. 49 (B:49-1..4 · F 51-30..33) · 17 Şubat 1294

Four-page dispatch on the note received from General Skobelev by order of General Totleben, reporting the complete Russian evacuation of Edirne on **28 February 1294 (= 12 March 1879)**: "**[On the twenty-eighth day, leaving no one behind,]** completely **[withdrawing from Edirne]**" · "**[a brigade arriving in Edirne at dawn on February 22 for the offices and courts…]**" · "**[all transactions]** exclusively **[in current coinage]** … **[uniforms, sergeants, and corporals in proper order]**."

#36 · ATASE 80/3 (30 Nov 1878 · To Yenişehir Division Command · Kresna–Razlog Uprising)

ATASE ORH (110-9-1-3), K. 80, G. 3 · 18 Teşrîn-i Sânî 1294

Without any historical crib fed into the solver, the blind key spontaneously revealed the exact geography of the **Kresna–Razlog Uprising**: **[Menlik, Kresna, Bansko, Razlog, "Bulgarian brigands"]** along the Eastern Rumelia border.

#37–38 · ATASE 80/8 (13 Jan 1879 · Gâzî Ahmed Muhtar Pasha) & ATASE 80/32 (15 Feb 1879 · 4th Army)

ATASE ORH (110-9-1-3), K. 80, G. 8 (1 Kânûn-ı Sânî 1294) & G. 32 (3 Şubat 1294 · 74 kelime)

Proves that the Period IV key was shared not only across Rumelia/Edirne but also with Gâzî Ahmed Muhtar Pasha and the 4th Army (Eastern front), whereas **ATASE 80/2** (6th Army, Baghdad) is statistically proven to use a distinct army key ($p < 10^{-10}$).

3. Period III (Feb – Aug 1878 · 2+3-Digit Hybrid System): 42/59 Certain (96% Coverage)

Introduced between 1 Feb (`61/169`) and 5 Feb 1878 (`82/161`), the Period III hybrid cipher was cracked across 7 documents (8 full pages · **1,535 2-digit tokens**). The **42 CERTAIN codes** cover **96%** of the corpus. `ATASE 79/3` (Shkodra), transcribed *after* the key was frozen, decoded directly with zero adjustments as an independent blind validation.

Letter	CERTAIN Codes (occurrences)	CANDIDATE* Codes (1–3 occ.)
ı	`12` (106), `54` (53)	`13*` (2), `82*` (1)

Letter	CERTAIN Codes (occurrences)	CANDIDATE* Codes (1–3 occ.)
ب	62 (21), 23 (19)	36* (5), 22* (1)
ت	16 (51), 68 (11)	—
ث	—	72* (3)
ج	27 (36)	—
ح	32 (3)	98* (10)
خ	56 (14), 74 (5)	—
د	48 (35), 37 (28)	47* (1)
ر	24 (120), 63 (32)	—
ز	93 (8), 86 (6)	—
س	28 (43), 52 (11)	—
ش	92 (18)	—
ص	75 (7)	43* (4)
ض	57 (5)	—
ط	38 (6), 94 (3)	—
ع	25 (25)	—
غ	18 (8)	—
ف	87 (7), 35 (3)	—
ق	45 (38)	—
ك	76 (41), 65 (22)	—
ل	85 (68), 17 (33)	67* (13), 14* (4), 78* (1)
م	58 (51), 97 (28)	—
ن	15 (75), 73 (27)	—
و	46 (79), 95 (34)	—
ه	26 (72), 34 (36)	11* (1), 29* (1), 77* (1)
ي	19 (107), 42 (71)	83* (8), 49* (4), 84* (1)

Period III — 3-Digit Military Word Lexicon

Code	Ottoman	Meaning	Status	Evidence
377	قصور	kusûr (remainder / deficit)	CERTAIN	71/124 s.1–2 · 79/38 («قصورلرينك دفترى»)
397	عسكر	asker (troops / soldiers)	CERTAIN	79/38 («الديرلمسى 〈عسكر〉 بوسنەدن») · 79/6 · 79/2 · 79/15
552	نفرات*	neferât* (privates / men)	CANDIDATE*	71/124 s.1–2 glos (tek belge)

Code	Ottoman	Meaning	Status	Evidence
286	ردیف*	redîf* (reserve troops)	CANDIDATE*	71/124 s.1 glos (tek belge)
312	سواری*	süvârî* (cavalry)	CANDIDATE*	71/124 s.1 glos (tek belge)

Period III Live Cracks (#39–#44)

#39 · ATASE 82/161 (5 Feb 1878 · To Gâzî Ahmed Muhtar Pasha · Post-Armistice)

ATASE ORH (110-9-1-3), K. 82, G. 161 · A 1-1 / D 76 / F 125 · 230 iki-haneli grup

Earliest dated specimen of the post-1-Feb 2+3-digit hybrid system. Reports on Russian cavalry actions along the Istranca/Sinekli line after the armistice: **[refugees, from Christians (×4), encroaching…]**.

#40 · ATASE 79/2 (14 Mar 1878) & #41 · ATASE 79/6 (23 Mar 1878 · Yanya Command)

ATASE ORH (110-9-1-3), K. 79, G. 2 (199 kod) & G. 6 (201 kod + 16 üç-haneli)

Post-armistice security and operational dispatches to Yanya (Epirus): `79/2` reads **[escalation of audacity, severe suppression]**; `79/6` reads **[non-recovery, from their services, eight hundred seventy-six]**.

#42 · ATASE 79/3 (19 Mar 1878 · Shkodra, General Hüseyin Hüsnü Pasha — Independent Blind Test)

ATASE ORH (110-9-1-3), K. 79, G. 3 · 7 Mart 1294

Transcribed *after* the Period III key had already been frozen, this dispatch decoded directly with zero adjustments, serving as an independent blind validation: **[deputy to the governor Derviş, commission, government, with the seals of the mukhtars]**.

#43 · ATASE 79/15 (8 Apr 1878) & #44 · ATASE 79/38 (7 May 1878 · Bosnia Command)

ATASE ORH (110-9-1-3), K. 79, G. 15 (27 Mart 1294 · 146 kod) & G. 38 (25 Nisan 1294 · 268 kod + 14 üç-haneli)

Pre-Congress of Berlin Bosnia-Herzegovina crisis: `79/15` decodes **[Sarajevo and Travnik, in the Kal'a districts, seditionists]**; `79/38` decodes **[withdrawal of ⟨troops⟩ (`397`) from Bosnia, of the Montenegrins, newly organized, register of their ⟨deficits⟩ (`377`)]**.

4. 1877–1878 Active War Campaign: 8 New Full-Text Dispatches & Key A (`٢` ≠ `٣`) Breakthrough

High-resolution ink audits of `ATASE 48/35` (Gâzî Osman Pasha at Plevne) and `ATASE 45/26` (Süleyman Pasha) proved that — just like the 3-digit cipher — the Aug–Oct 1877 2-digit **Key A also distinguishes Ottoman `٢` (thin angular) from `٣` (thick hooked)** (`ا=32 ,م=32 ,پ=31 ,ك=34 ,ط=37 ,ت=23 ,ح=22 ,ش=24 ,غ=26 ,د=27=33`). Together with the 3-digit ink refinements, **8 landmark war dispatches** from Plevne to the Edirne Armistice are now completed in full:

ATASE 48/35 (Early Sept 1877 · To Gâzî Osman Pasha at Plevne) — Key A (٣ ≠ ٢ Breakthrough)

ATASE ORH, K. 48, G. 35 · A 1-1 / D 112 / F 18-9 · 28 satır · 2-haneli Anahtar A

On Gâzî Osman Pasha's proposed breakout with **[forty battalions]** leaving **[eighteen battalions]** in Plevne in coordination with **[Mehmed Ali Pasha]**; Mehmed Ali Pasha's advance from **[Hezargrad]** to hold the **[Yantra line and capture Biela]** to force a Russian withdrawal from **[Tırnova]**; reinforcing **[Loveç]** to protect the **[Plevne–Sofia supply line]** with demonstrations toward **[Selvi]** and offensive reconnaissance toward **[Sviştov]**.

ATASE 45/26 (30 July 1877 · Ahmed Vefîk Pasha in Edirne → Süleyman Pasha) — Key A (٢ ≠ ٣)

ATASE ORH, K. 45, G. 26 · A 1-1 / D 219 / F 1-12 · 18 Temmuz 1293 (Eski Zağra'dan 1 gün önce)

From **Ahmed Vefîk Pasha** in Edirne (1 day before Eski Zağra): dispatching Saffet Pasha by *special train* with **[3 regular + 3 reserve battalions and 2 batteries]** toward **[Yeni Zağra and Hain Pass]**, pressuring the railway director so troops and guns from Istanbul reach **[Edirne]** the next evening, and warning against leaving **[two reserve battalions with muzzle-loading rifles exposed without entrenchments]**.

ATASE 55/57 (12 Nov 1877 · Via Orhaniye to Gâzî Osman Pasha at Plevne) — 3-Digit + "New Key"

ATASE ORH, K. 55, G. 57 · A 1-39 / D 220-A / F 1-149 · 21 satır + Orhaniye Zeyli

Imperial decree placing the **[Eastern, Western, and Balkan Armies]** under the unified command of **[Süleyman Pasha]** over both Gâzî Osman Pasha and **[Rauf Pasha]** to achieve an **[effective relief of Plevne]**. Postscript to Orhaniye: "The above telegram is written in the **[new key (miftâh-ı cedîd)]**, and due to the **[blockade of the road]**..." — primary archival proof of the 3-digit cipher's introduction.

ATASE 85/108 (1 Dec 1877 · To Gâzî Ahmed Muhtar Pasha, Erzurum) — 17,000 Springfield Rifles

ATASE ORH, K. 85, G. 108 · A 1-1 / D 217 / F 1-120 · 19 Teşrîn-i Sânî 1293

"As Tophane currently holds **[about seventeen thousand small-caliber muzzle-loading Springfield rifles]**, please advise how many should be dispatched with **[their ammunition]** for the **[auxiliary troops assembling at Bayburt]**..."

ATASE 85/122 (13 Dec 1877 · 3 Days After the Fall of Plevne · Rauf Pasha → Süleyman Pasha)

ATASE ORH, K. 85, G. 122 · 1 Kânûn-ı Evvel 1293 · 25 satır · Gâyet Müsta'celdir

Cabinet and Imperial order 72 hours after Plevne fell: transferring the **[bulk of the Eastern Danube Army south of the Balkans]**, leaving **[Fazlı Pasha]** as acting Danube commander, and shifting **[no fewer than sixty battalions]** (and more if possible) to hold the **[İzladi–Sofia defense line]**.

ATASE 85/162 (7 Jan 1878 · 48 Hours Before the Fall of Shipka · Rauf Pasha → Veysel Pasha)

ATASE ORH, K. 85, G. 162 · A 1-1 / D 217 / F 1-179 · 26 Kânûn-ı Evvel 1293

"As **[an armistice is soon to be concluded between the belligerent states]**, I beseech you and all fellow soldiers in the name of state and nation not to let the **[position]** you hold slip **[from your hands]**, and I further urge you to keep **[your line of retreat]** open."

ATASE 81/97 (15 Jan 1878 · 5 Days Before the Fall of Edirne · Rauf Pasha → Osman Pasha)

ATASE ORH, K. 81, G. 97 · A 1-1 / D 76 / F 2-67 · 3 Kânûn-ı Sânî 1293

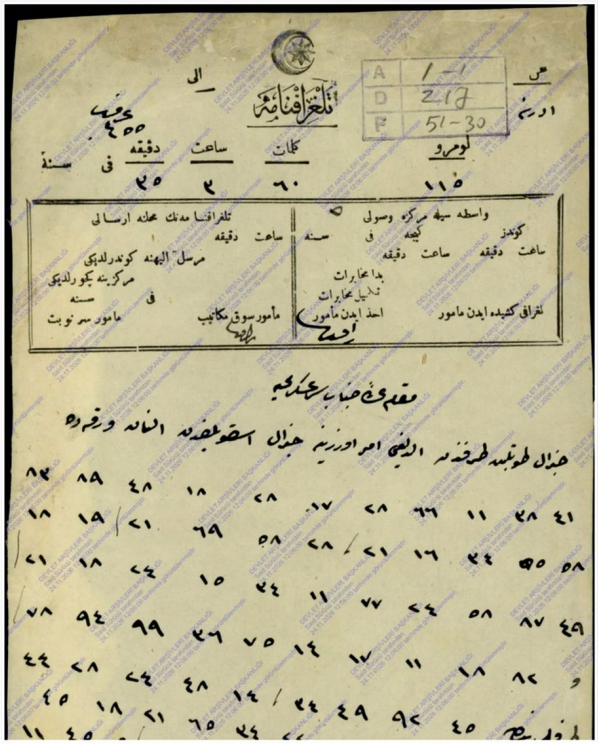
"As the **[plenipotentiary pashas]** *(Server & Nâmık Pashas)* have departed today, meet them tonight **[at the Edirne railway station together with Âgâh Bey]**, accompany them, and report to us all **[diplomatic notes received]** regarding every **[event and parley]**."

ATASE 86/19 (31 Jan 1878 · Edirne Armistice Day · Staff Brigadier → 4th Army Command)

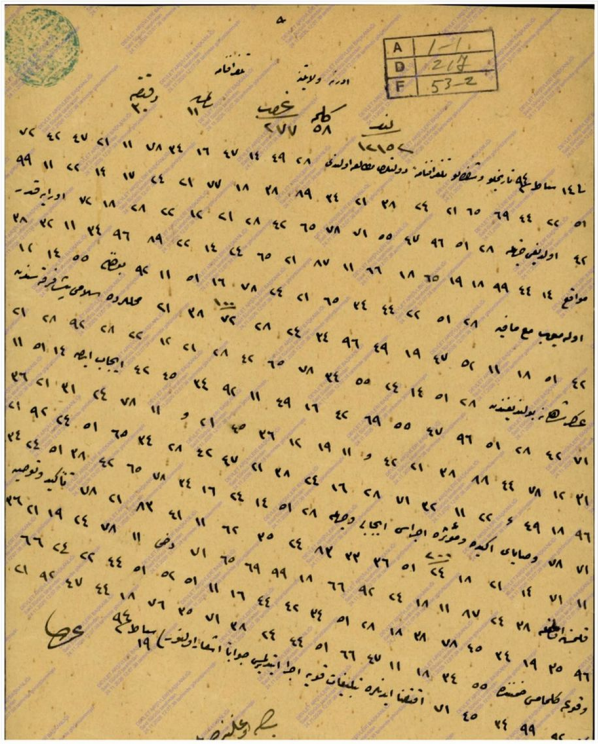
ATASE ORH, K. 86, G. 19 · A 1-1 / D 217 / F 1-209 · 19 Kânûn-ı Sânî 1293 · Erzincan derkenârlı

"It has been ten days since I reached Istanbul; having achieved no result yet, I did not trouble you. Efforts upon the **[present gravity and peril]** vanish into nothing; there is no **[ear left to listen]** … submitted lest my inability be attributed to infamy." *Postscript:* "Thus the compelling reasons necessitating my excusal are presented in full detail to Your Excellency."

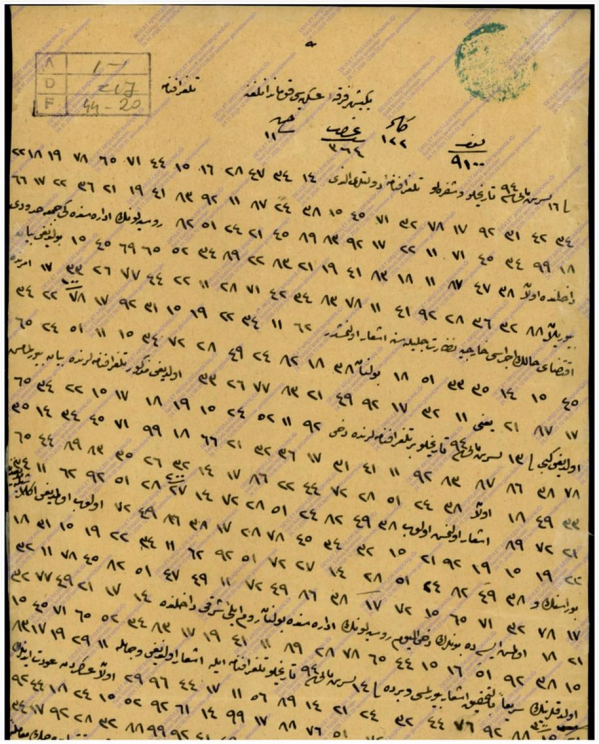
5. Archival Plates (10 Selected Documents — Periods I, III & IV)



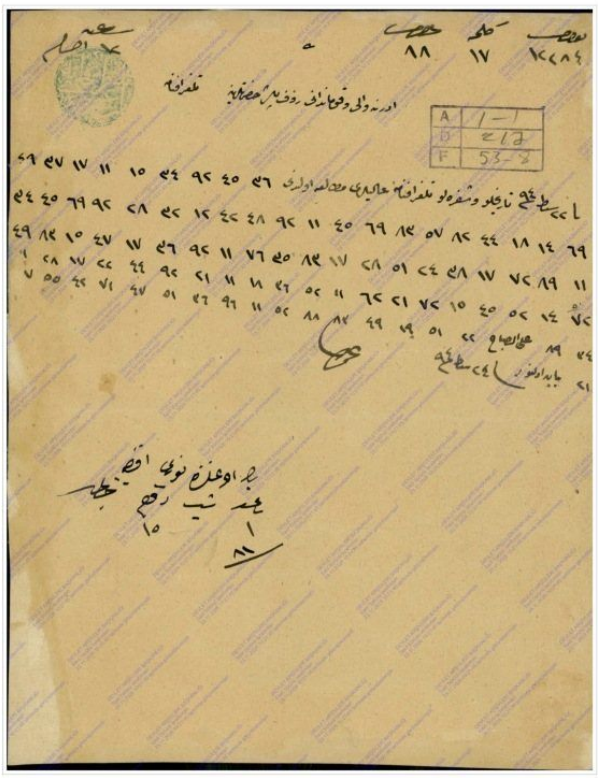
ATASE 80/49 (1 Mart 1879 · General Totleben & Skobelev): Period IV (0-Rosetta Blind Crack #35): Rauf Pasha's report on General Totleben & Skobelev's complete Russian evacuation of Edirne on 12 Mar 1879.



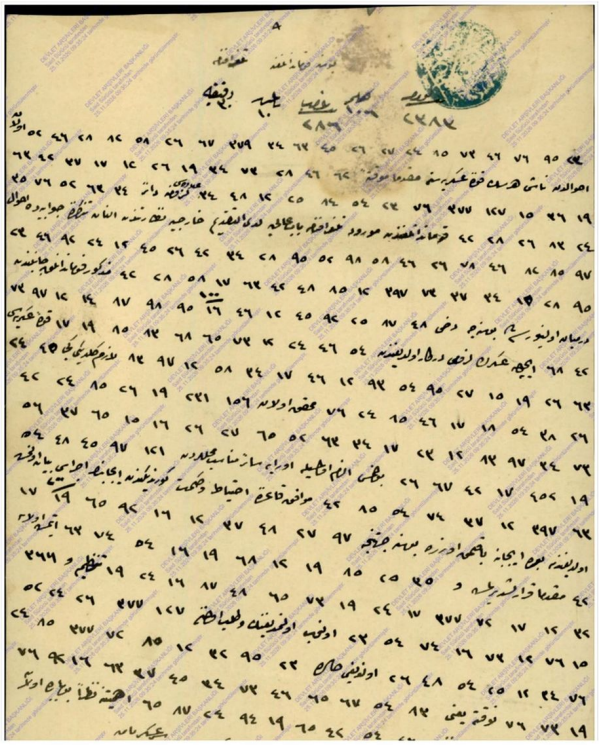
ATASE 80/56 (3 Mart 1879 · Edirne Valiliği · 277 Kod): Period IV (#34): Full-page dispatch (276/277 codes read) covering Gümülcine, Köstendil, Razlog, Menlik, Brig. Sâlih Pasha, and General Totleben.



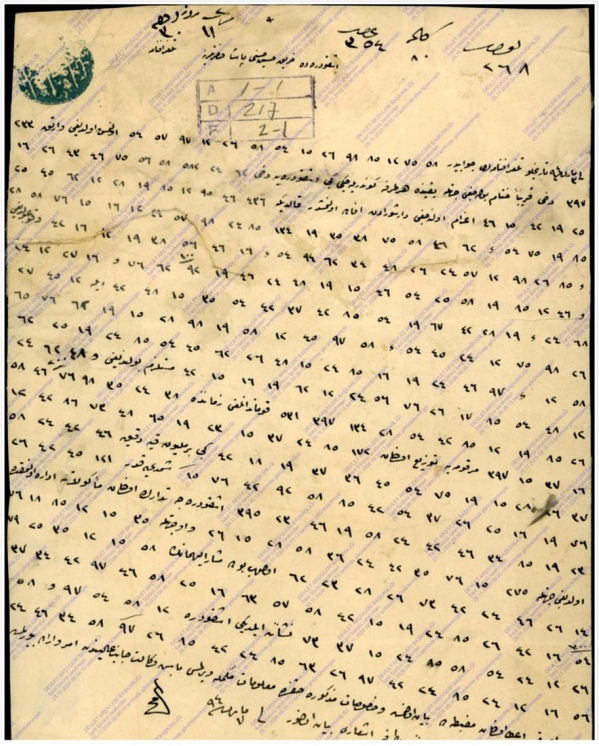
ATASE 80/3 (30 Kasım 1878 · Kresna–Razlog Ayaklanması): Period IV (#36): Spontaneously revealed Menlik, Kresna, Bansko, Razlog, and 'Bulgarian brigands' with zero prior historical cribs.



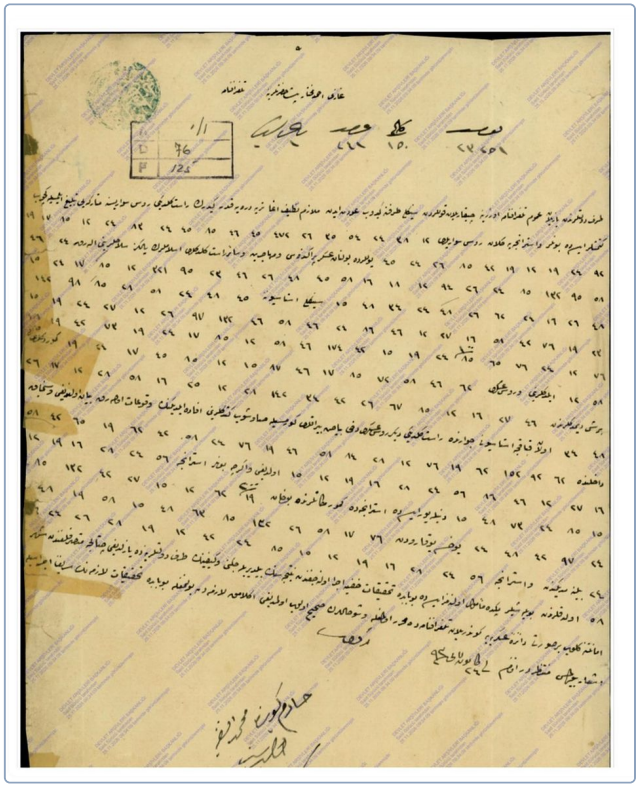
ATASE 80/62 (6 Mart 1879 · Edirne Vâlisi Rauf Paşa'ya): Period IV (#33): 'Two companies of gendarmerie designated for Edirne… to be dispatched at dawn.'



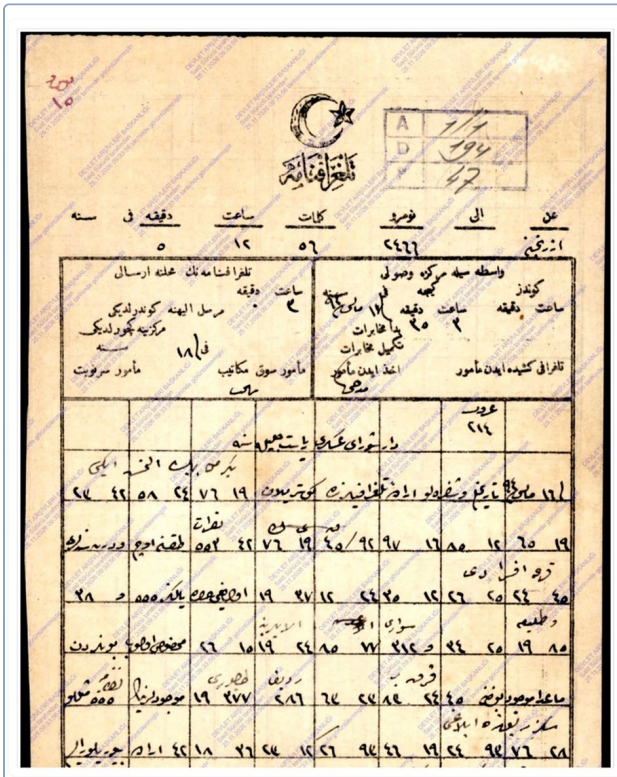
ATASE 79/38 (7 Mayıs 1878 · Bosna Kumandanlığı): Period III (#44): 268 2-digit + 14 3-digit codes — 'withdrawal of ⟨troops⟩ (397) from Bosnia', 'Montenegrins', 'register of ⟨deficits⟩ (377)'.



ATASE 79/3 (19 Mart 1878 · İşkodra — Bağımsız Blind-Test): Period III (#42): Decoded directly with zero changes after the Period III key was frozen: 'deputy to the governor Derviş', 'government', 'seals of mukhtars'.



ATASE 82/161 (5 Şubat 1878 · Gâzî Ahmed Muhtar Paşa): Period III (#39): Earliest specimen after the 1 Feb → 5 Feb re-keying — 'refugees', 'from Christians' (×4).



ATASE 71/124 (29 Mayıs 1878 · Erzincan · Dönem III Rosetta): İsmail Hakkı Pasha's interlinearly glossed dispatch verifying 377=قصور and candidate 3-digit lexicon entries.