

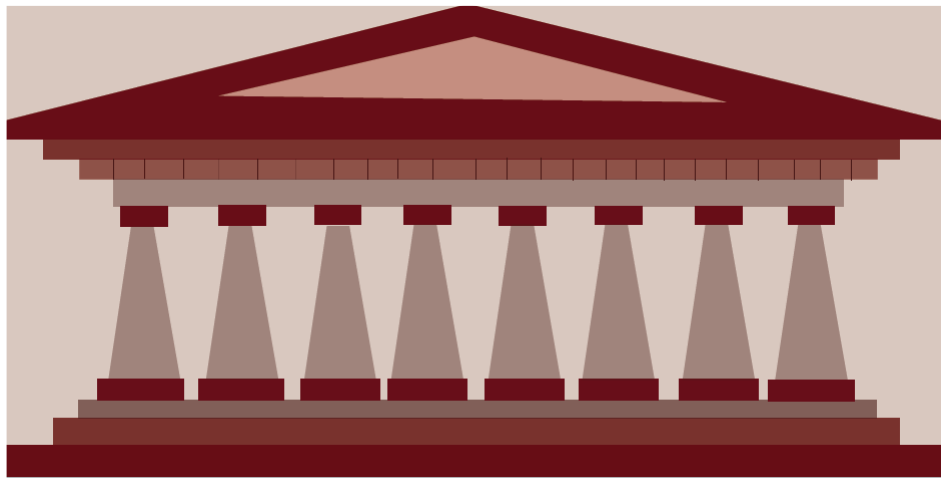
Athens Journal of History

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Athens Begins its Era “Under the Shade” - A Few Perspectives on the Opportunities, Traumas and Successes that Changed an Ancient (Authentic) *Polis* into an (Ancient) “Destination City”

*By David P. Wick**

The re-invention (sometimes the evolution or devolution) of the schools of Athens as it internationalized in the late Roman Republic assumed beneath it the story of the re-invention of the town – in the case of Athens the ‘definitive’ town in a culture where ‘town’ (polis) meant something far more radically independent and hyper-competitive (both inside and outside the walls) than anything we normally mean by such a term today. An authentic, aboriginal, organic “polis” should not have been able to contemplate, much less do, the “destination city” thing. Both the idea of a ‘service city’ for passers-through and that of a ‘destination city’ – an urban community aimed beyond its locals so it might survive in part by tourists, students, ‘satellite’ working groups and families of distant businesses, localized ex-patriates of other cultures, and simply as a seller of ‘culture’ in some way. These were foreign, even as yet un-invented ideas (though Alexandria, Pergamon, Antioch and even Naples would eventually compete in the same field). Some aspects of Athens’ re-invention I have pursued in the “schools” articles in the ATINER journals (see bibliography, and on ResearchGate), and in the article on the ‘leveraging’ of Philip V to pull the western power into the East (and hopefully, at the time, to tell it what to do).¹ The study here adds some notes, stories of focus, and some perspective to those works in this particular aspect. DPW, 2024.²

It was the year 45/44 of the old era. Julius Caesar was back in Rome, finishing off the last whirlwind of popular legislation in his career, his assassination looming. The Republic was poised to tear itself apart, permanently it must have seemed at the time. An ancient snapshot of the Roman students happening to study in Athens that year, if your imagination might allow one, could have included a great many

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1. This short study is a follow-on to, and was suggested by, some of the conclusions to the trio of studies I have published previously in The Athens Journal of History on the later stories of the famous Athenian schools during the years when the city and the fledgling business of education were re-inventing themselves to deal with the new worlds created by the cultural spray-painting of the nearer East by Alexander (the *koiné* Greek revolution) and by the spread of the Roman Republic in the west.

2. For the run-up to this episode (and the context in which the Athenian civic dilemma was of its own making) please see Wick, David P. It Seemed Like Such a Good Idea at the Time - Expected and Unexpected Consequences when Athens & Other Major Greek City States Leveraged Philip V to Draw Rome into the Eastern Mediterranean, *Athens Journal of History* - Volume 9, Issue 4, October 2023 – Pages 299-310

identifiable names penciled across it. Some of the faces would even have been famous. Think of urban, and collegiate-urban, photo essays of last moments before catastrophic wars in our own era – Oxford, Heidelberg, Vienna, Basel, Paris, Tokyo, Athens, Harvard, but far longer ago.³

Cicero's son Marcus was there, drinking and spending enough to make his father worried.⁴ He was twenty. The young Horace was also twenty, though he failed (as Marcus Cicero's father worried his son might) to finish his classes. The fond, embarrassed wistfulness of the quotations I'll close with (written many years later) suggest how much he missed the place. There were also in the student community there the last surviving grandson of Cato the Younger, as well as the future general Valerius Messalla Corvinus, who would serve Brutus, Antony, and Augustus, and die an ex-consular patron of the arts under the Principate. Among others we can only name were two of the Manlii – a Manlius Acidinus and Manlius Torquatus. Not one in this entire list would be there a year later.⁵ Marcus Brutus would arrive shortly. He is the classic example of one sort of Roman 'tourist' examined in this study, a political player or criminal (depending on one's momentary politics at the time) seeking refuge in the aftermath of the Ides of March by studying with celebrity professors, like the Stoic celebrity Cratippus or the windy, rhetorical courtroom dramatist Theomnestus.⁶ He was also readying himself quietly for war. When he at last left Athens for the showdown at Philippi, he took every Roman student and business-family son he could recruit with him, including all in the list above.

This was one of the last times the winds of political importance and danger would sweep briefly through Athens before the collapse of the classical Roman world several centuries later. Of Brutus's prominent recruits, none we know of returned to their studies, though some survived. Not long after Brutus, the headstrong triumvir Antony arrived. Athens did not again host a "safe" generation of students until that of Ovid and Pomponius Macer in the 20's, a decade after the Battle of Actium had cemented the new empire, and even then the city was still in jeopardy, awaiting the final verdict of Augustus for her enforced flirtation with his, and his adoptive father's, enemies.

So, to the setting of the 'civic re-boot,' and some reasons why the word may be fitting. Athens after its troubled misadventures in the Hellenistic era,⁷ experienced a

3. The caveat being that in each case it must come from that last late 'Indian summer' of quietness before the particular great war that changed, in each case, that city forever.

4. Cicero, *Ad Familiares*. xvi, 21 is the letter by his son disclaiming any trouble. J.P.V.D. Balsdon, *Life and Leisure in Ancient Rome* (London, 1969), p. 235, n. 51. Elizabeth Rawson, *Cicero: a Portrait* (London, 1975), pp. 250 ff.

5. Cicero, *Ad Atticus*. XII, xxxii, 3. Quintilian XII, vi, 6f. Cf. Plutarch, *Brutus*, 24 f.

6. Plutarch, *Brutus*, 24, 332. Quintilian X, vi, 4.

7. Simply for starting points the reader might keep a memory of the disastrous end of Demosthenes' career (in civic terms), the failed revolts against Alexander (and their reprisals), the dalliance with Demetrius Poliorketes (which involved a pictured

run of fairly quiet years in the last, increasingly Romanized, decades of the second century. It kept its old Hellenistic ties with Delphi, and profited from what today might be called the pilgrimage trade. A Roman grant making the city business manager of the international island port of Delos allowed it to reinvest much of the business and banking expertise learned there back into its own marketplaces,⁸ and allowed an increasingly internationalist crowd of young Romans (and Asians) into its schools and even its own city school, or *ephebeia*. It had for a long time educated the serious students and the royal children of the Hellenistic east. It now instructed whole generations of young aristocracy from the east, and especially from the west.⁹ They arrived, they complained about the oddity of "*graecia capta*," they studied, they contributed to the library, they drank, they visited the old sites, and they went home – some changed, and most at least marked by a fondness for the place they could not shake, and which they could not adequately explain.

So, awkward as it was for an ancient *polis*, in Athens the long-entrenched barriers facing foreigners (retirees, students, long-term resident tourists) who wished to become in some sense 'Athenian' grew more porous. Athenian citizenship, which had once been such an exclusive thing, and then had been used very briefly as a weapon of expansion during the post-classical era, was now reforged as one of the city's tools of survival. Roman officials and envoys had by the second century been eligible if they spent money in the city (as *euergetae*) for special treatment and receptions when passing through town.¹⁰ They, and a small host of other Romans – businessmen (*negotiatores*) intending to settle in the east and daunted by the shadow of Mithridates, Roman exiles, even the occasional Greek-loving retiree – found themselves offered the citizenship of Athens.¹¹ T. Albucius, who had "gone Greek" early in his career, retired here in this era (after being condemned for extortion as a provincial governor) producing an Epicurean poem

relationship of citizens to power that contradicted the teachings of near all the Athenians schools), and the attempts to draw Egypt into the central Mediterranean as a counterweight to the threat of the Seleukids. (And specifically see the article referenced in the frontnote).

8. This is the topic of an upcoming study I intend in this series, but the primary starting sources are Polybius, XXX, xx, and in Walbank's *Commentary on Polybius* (Oxford, 1957-79) p. 444, and Habicht, C. *Athens from Alexander to Antony*, (Cambridge, 1997), p. 249, with the entire discussion in chap. 10.

9. See my articles on the various Athenian schools in the bibliography – from a series in the *Athens Journal of History*. Only this, despite the irony of Socrates' fate, saved the city from bankruptcy and kept it a relevant and competitive *polis* after Alexander.

10. On divine honors for Roman visitors, *Inscriptiones Graecae* (vol. II), 551.94; 930.46. That any Roman visitor might address the people from the Stoa of Attalus seems likely, but not certain, from Athenaeus v, 212F and the case of Cato. The porticoed Romeion was available to lodge official guests if they wished it (*Inscriptiones Graecae* (vol. II), 446.29), though many (like Cicero in 51) will have preferred staying with a wealthy host; both parties might benefit from the association.

11. Cicero, *Pro Balb.* 30.

before he died.¹² C. Memmius accepted an exile here in 52 B.C., where a perfectly sound Epicurean interest in comfort nearly led him to demolish Epicurus' own house.¹³ The businessmen deserve an examination of their own case; but the citizenship enticed many of them, though Cicero thought those who accepted the gift of twinned-citizenship were making a dangerous legal mistake. The exiles and retirees also need consideration in detail in another study; but their importance to the economy of Athens' survival should not be ignored. They were in Athens in part because of the safety of banks in a *civitas libera*, and in a city that now made a great show of its sacred status. They gave a feel of refuge or neutral asylum to Athens which added to its aura of old, even antique intellect, and of verbal freedom.

The picture in Cicero's *Pro Balbo* (xii, 30) of Romans accepting Athenian citizenship seems at first sight very odd, both from a Roman and a Greek point of view. Some of these outsiders began to hold the civic chairs of Athens as well by this time. It may help one's sheer sense of the *seclusion*, the smallness and privateness of old Athenian things dwarfed by the size of the new world to picture foreigners holding the *prytaneis* regularly in the early first century, a good number of them Roman *equites* who had moved their banks and trading businesses to the shelter of the old Athenian inner town after Mithridates routed them out of Delos in 88.¹⁴ All these needed badly to be sold the idea of Athenian-ness if the city were to retain its character. For these, as for the newly arriving class of Roman tourists and students – who were after all customers after the same product in different forms – Athens seemed to be supporting and naturalizing her living (her living newcomers as well as her authentic or traditional citizens) by means of her "dead".¹⁵

Most of the new buildings and restorations which contributed to this

12. Lucilius 75-84 (Marx edtn). Cicero, *Brutus*, 131; *de Finibus* i, 8-10; *Orator* 149; *Tusculans* v, 108.

13. Catullus x, 9-13. Cicero, *Brutus* 247; *Ad Fam.* xiii, 1; *Ad Att.* V, xi, 6. Lucretius i, 24-27 and 42; v, 8.

14. E. van't Dack, *Riezen, expedities en emigratie uit Italie naar Ptolemaïsch Egypte* (Brussels, 1980), who argues that Delos until the sack by Mithridates in 88 B.C. was the center for Italian and Roman trade with Alexandria and that this, not the Aegean "hub," was its most important asset. The most vivid ancient account is Pausanias III, xxiii, 2-6. Though the Italian marketplace was rebuilt after the war, and Romans in declining numbers continued to try trading at Delos until about 50 B.C., the business community seems to have found in Athens the same sort of "Swiss" seclusion it had hoped for on the old Greek island of sanctuary. Cf. Rawson, *Intellectual Life*, pp. 12-13, 16; Gruen, *Hellenistic World*, pp. 299, 311-312, 737-738.

15. A reference to the dismissive comment of Sulla when he 'spared' (after largely destroying) the city from full extermination following his siege during the Mithridatic War. See Wick, "Students in the (Ancient) Streets," *Athens Journal of History*, and Plutarch, *Sulla*, 14.

atmosphere, and many of the dedicated statues, were now by Romans or foreign client-kings. The tax-farmers, restricted as they were by favored Greek legal status to a fraction of what they squeezed from Anatolians, still had made it very hard for Greeks to afford such things.¹⁶ Athens was in fact becoming something like Lausanne or Geneva: the libraries, classrooms and banks all owed something of their quiet and safety to the same “suburban” shade. Athens was a ‘suburb’ of Rome, in the same sense that the Swiss cities became protected suburbs of 20th Century Europe.

Athens continued most importantly to be ‘Athens’ in the sense useful to its Roman rulers: an “outward and visible sign” that Greekness could settle comfortably into the world of Rome. The ‘inward and spiritual grace’ (if one wishes to press the sacramental metaphor) was the sense that Roman-Hellenistic internationalism could find a quieter, deeper texture of life, one that helped the spirit ride out the chaos, to momentarily ignore the world that was convulsing itself to death in the public sphere. If Athens had not succeeded so well in becoming a very attractive ‘Roman Athens’ before the rise of Mithridates, the Pontic king would not have needed to abuse it so badly in the 80’s of that old era. Its docks were good, but hardly essential to a Black Sea king relying on the vagabond fleets of pirates. The eloquence of its existence as a definition of what it meant to be Greek was irreplaceable.

What were Romans doing in Athens then? Why were so many of them ‘going Greek [*graeculus*]’? A great many came to study, as we have seen, some of them carrying away until their deaths an almost heartbreaking fondness for the time and thought they had invested in the town, in the classrooms, cafes, shops and shade. But a careful study would also show that they were not the “serious” students. Only very rarely did the Roman moneyed classes produce what could be honestly called a professional philosopher. A young Quintus Sextius, who in this era makes one very solitary exception, refused a political appointment from Julius Caesar and embarked instead for some university town in the East (one story puts him in Athens) where he tried to develop a uniquely “Roman” philosophy.¹⁷ This was serious business to him, leading to near suicide when at first he thought he might fail as a philosopher, and one remembers that the depressing effect of constant political turmoil had helped create philosophers rather frequently in fourth-century Athens.¹⁸ But Sextius finally took his “Roman philosophy” – perhaps equal parts

16. See for example W.S. Meritt & J.S. Traill, *The Athenian Agora XV: Inscriptions: The Athenian Councilors*, (Princeton, 1974); also, Traill, “Greek Inscriptions from the Athenian Agora,” *Hesperia* (1978), pp. 213 ff. Cf. E. Rawson, *Intellectual Life in the Late Republic* (London, 1985), p. 17 f. See for examples of dedications by foreign monarchs Pausanias I, v, 5 f.; and I, xxv, 2. Herodes Atticus was, under the Empire, to become the most famous of the “expatriate” builders, though it is an understatement to add that the Emperor Hadrian also sponsored considerable work round the Agora.

17. I. Lana, *Rivista di Filologia e di Istruzione Classica*, vol. I (1953), p. 209.

18. Rawson, *Intellectual Life*, pp. 94-95.

Pythagorean and Stoic – back to Rome. There would be no "Roman School of Philosophy at Athens."

Nor, though they sometimes came to treasure the culture, did Romans head for the "defining" city of Hellas in hopes of replacing the local patrons and making brilliant "Greekling" reputations for themselves. For patrons of the old style Athens was dependent, as she had been in the fourth century, on wealthy "locals," but Romans were moving in, competing with them. We have already followed the one thread of political safety: Athens as a free city stood ready to welcome refugees from the Roman world, both exiles and those who had merely found themselves politically inconvenient. The mix of these is interesting; a moment ago here, it included both the philhellene ex-governor Albucius and Caius Memmius – anything but a philhellene, the culturally illiterate devotee of Cato the Elder who had bulldozed the city of Corinth – and both got the offer of a free home in Athens. We met Memmius, now an exile for political crimes but welcomed in Athens as a jab at its ruined commercial rival, attempting to build himself a modern townhouse by demolishing Epicurus' old home. Both, however different, were examples of this displacement or political diaspora as the Republic tore itself apart – Athens (though she got Cicero to stop Memmius) obviously did not require any extreme or authentic Greekness of her new immigrants.¹⁹

The economic changes this 'melting pot' project forced into the city's life were not obvious except to the arriving Roman merchant families, who were not the same sort of diaspora. I hope to follow both those families and the economic changes in a future set of studies, the point here is that a transformation to a travelers', students', tourists', cultural refugees' city was not something ancient *poleis* did. This was new ground in more ways than a modern is likely to realize. But immigrant *negotiatories* were not the only ones who felt and stamped in place forever the changed flavor of the city. It was instead the private and sheltered flavor of her civic life that mattered when giving haven to such of the lost or disillusioned men of the failing Republic, whether a Brutus seeking political asylum (and emotional anesthesia) or an Atticus taking a deep breath and relaxing into cultural asylum. That is likely why the socializing value of her Epicurean "school" was so important. Though Athens never trusted the Epicureans enough to let them loose among her *ephebeia* (they hired under-used faculty from the Aristotelian *Lykeion* to teach their civic 'high school'), the 'Garden' proved with its round of commemorative banquets and cult of the personal life to be an excellent quiet coterie into which exiled Romans might meld. C. Aurelius Cotta, convicted during the first heat of Rome's Social War (under the *quaestio Varia*) for over-liberal and activist "allied sympathies," settled when he reached Athens into the fellowship of the Garden and spent his time listening to Zeno of Sidon rather than stirring trouble, and this is remarkable, as it was an Athenian advertising mission by the *Akademe* head Carneades two generations earlier that had really inflamed the issue

19. Balsdon, *Romans and Aliens*, pp. 43, 51.

from recurring political headache to open war.²⁰

So, Athens worked to retain her “Swiss” neutrality with surprising success. Some key elements of city life dissolved under the Empire; this stayed. On his way eastward to his unauthorized but popular, and finally tragic, visit to Alexandria in 18 of the new era, Germanicus (the obvious heir of Tiberius, and a grandson of Mark Antony) stayed in Athens with an honor guard of only a single lictor.²¹ When Tiberius’s henchman Piso came through a few months afterward (on his way, as it turned out, toward the murder of Germanicus)²², he pressed the Athenians to overturn the conviction of one of his own cronies for forgery. They refused, and rode out his anger undeterred.²³ Piso left, furious and ineffectual, berating them openly as the “dregs of the earth.”²⁴

Athenians similarly maintained a reputation for freedom of speech (only a little tarnished by the flattering use they made of it during Antony’s heyday). This image was especially valuable for a university town. One might discuss anything, rambling as the later friends of Aulus Gellius did in the *Noctes Atticae* without fear of being taken too seriously; but one could do it now only *because* Athens had retired as a real political center.

Horace echoed the opinion of Cicero (and perhaps his tinge of wistfulness as well) when he said that Athenian verbal license (*parrhesia*) would never go across in Rome.²⁵ Dio Chrysostom and Lucian later drew out the contrast in sharp detail: whatever one said within the city limits of Rome was “unfair game,” one’s words swirling at once into the petty, vicious, back-biting world of social climbers that no one of any consequence could really avoid – especially at the morning *salutatio* and the dinner parties.²⁶ Lucian’s *Nigrinus* followed the imaginary flight of a Roman property-owner to Athens for just those reasons.²⁷ Such refugees could of course expect scant sympathy from players proud of remaining mired in the game of flattery and power-politics at Rome. Seneca smiled with an odd superiority at the

20. Scullard, *From the Gracchi to Nero*, pp. 90, 403 and materials on the *Quaestio Variarum* collected in n. 6. For the mission of Carneades (and the resulting chaos) see DP Wick, ‘[Plato’s Academy and the “Roman Market”: A Case Study in “Humanities Education” During Times of Crisis or Recession](#)’ Athens Journal of History - Volume 9, Issue 3, July 2023 – pp. 249-260.

21. Tacitus, *Annals* II, iv. Cf. Oliver, *Civic Tradition*, p. 101.

22. The context of his travels is the same in the ancient accounts whether (following authoritarian modern attempts to rehabilitate Tiberius and his entourage) one believes the murder did not involve Piso’s direct agency, or that it did.

23. Tacitus, *Annals* II, iv, 2.

24. Tacitus, *Annals* II, liii, 3; II, iv, 1 f.

25. Aulus Gellius, *Noctes Atticae* XIII, xii, 2. Seneca the Elder, *Controversies* II, iv, 13. Cf. Chester Starr, *Civilization and the Caesars: The Intellectual Revolution in the Roman Empire*, (New York, 1965), pp. 12, 86.

26. Dio Chrysostom, *Ath. Orat.* 13. Cf. Balsdon *ibid.*

27. Lucian, *Nigrinus* 3, 17, 26.

brief fashion for toleration of free speech Augustus had allowed, both in Rome and abroad in (the potentially more dangerous) university towns: why waste worry on those foolish enough to "prefer to lose their heads rather than lose a *bon mot*."²⁸

It was the ability to accept and love such refuge, and to give up a game so addictive and self-destructive, that separated Romans like Cicero (who could never more than rest in Athens) from those like his friend Atticus who could truly settle there. Cicero pronounced himself "delighted with the place and its buildings"²⁹ when he visited; his descriptions or reminiscences momentarily becoming soft and nostalgic though always chafing a little that the city was too quiet.³⁰ His letters to Atticus from Italian venues are, for instance, full of new fashions in architecture. Atticus replied to them (so far as we can tell) with an antiquarian and modestly-scaled taste – part inherited from an old-fashioned and scholarly equestrian family, and part the product of his settlement in the southeastern quarter of Athens.³¹ Atticus disliked extravagance, whether in building, collecting, or display. The statue he (and his business colleague Saufeius) dedicated to the Epicurean teacher Phaedrus was, according to Cicero, a matter of personal friendship.³² His tastes, if Cicero is worth anything as a guide, ran to the untechnical and private side of philosophy: their correspondence was (compared, say, to Cicero's with Cassius) very free of intellectual jargon, and Cicero dedicated to him only the simple and reflective essays on old age and friendship.³³ When Atticus tried to coax work out of Cicero, it was generally along the lines of history or geography.³⁴ His letters to Octavian give no hint of political ambition, or of that windy fondness for giving advice which inflates the correspondence of Cicero. Atticus, even when writing to a future emperor, tended toward personal reflections on poetry (and he never praised the poetry of Cicero).³⁵

He is thus very important to us, being one of the very few naturalized Roman-Athenians about whom we can discover many details, and he follows the pattern developed by earlier "Atheno-Romans" in this study very closely. When Athens found itself in financial trouble Atticus lent money to it at no interest, and seems to

28. Seneca the Elder, *Controversies* II, iv, 13.

29. Cicero, *Ad Att.* V, x, 5.

30. Cicero, *Ad Att.* V, x; V, ii, 3; V, xi, 1. Cf. Rawson, *Cicero*, p. 166 f.

31. Nepos, *Atticus* 1. Cicero, *Ad Att.* I, xvi, 15; IV, ix, 1; VI, i, 13.

32. Cicero, *De Finibus* v, 3; cf. i, 16; *Ad Fam.* XIII, i, 5; *Ad Att.* I, xiv, 3; *Brutus* 20, 99, 244, 252-261, 269, 293-297.

33. For the letters to Cassius, Cicero *Ad Fam.* XV, xvi-xviii. For Atticus' intellectual preferences, *Ad Att.* XV, ii, 4; XV, iv, 2-3; XIII, xxxix, 2; XII, xiv, 3. He did keep a bust of Aristotle in his study (*Ad Att.* IV, x, 1).

34. On Atticus as a scholar, Nepos, *Atticus* 18. Cicero *Ad Att.* XIII: xxx, 2; xxxiii, 3; vi, 4; iv, 1; v, 1; xii, 5b. On history, *De Legibus* I, ii, 8; *De Finibus* i, 11; *Ad Att.* XVI, xiii, 1. On geography, *Ad Att.* II: iv, 1; vi, 1; vii, 1. He dated his letters very carefully (III, xxiii, 1). I owe much of this information to Rawson, *Intellectual Life*, esp. pp. 101-103.

35. Nepos, *Atticus* xx, 2.

have accepted no honor from it except an unpretentious statue.³⁶ His library there seems to have been heavily historical, not philosophical or political. Varro (who may have benefited from it) dedicated two antiquarian works to him: a *De Vita Populi Romani*, and a “logistoricus” called *Atticus de Numeris*, which may have traced the roots either of poetic meter or music.³⁷ Nepos says that the Greek Atticus spoke, at least to Italian or Roman ears, sounded “Athenian.”

As with Atticus, the threads of modest and elegant life, of free and quiet speech, of a shade of privacy round all these, wove together and made the cord which drew Romans to Athens in dangerous or merely exhausting times. Cicero may have been unable himself to exist outside the limelight of power-politics for very long, but as we have seen he sent his son to study in the quiet of Attica as soon as he plausibly could. A Roman father might have thought Athens safely ‘away from the front’ (at least until he learned that Brutus was also in Athens, and beginning to recruit).

Augustus, after the war, trying to remake a working Roman world in the wake of Actium, was very careful about this. Athens had gone embarrassingly (if perhaps unavoidably) wrong by guessing in favor of Antony at first, its carefully garnered “cultural capital” flown away chasing the losing bet. Yet Augustus, rather than denouncing or ‘canceling’ that cultural capital, re-gathered it and used it; he laid the foundations of his famous “settlement” in Rome during the early 20’s, then arrived to do the same in Greece in 21. There, at some time in the next two years, he sent a message to Athens: until the city recognized for itself that he was the new “order” in the Mediterranean, and adopted a calm and traditional government in his preferred, conservative style, he would not set foot in it. His retinue stopped at Aegina, waiting. Athens submitted, placing in power families that had not been implicated in the euphoria over Antony, and awaiting (no doubt with great anxiety) any plans the Emperor might have for reorganizing her institutions. Augustus then arrived at the Piraeus, entered her gates, and announced his plans.³⁸

These were mercifully subtle (at least for those Greeks who could accept some compromise, some fading in the perception of their ancient autonomy). Candidates for Athenian office would be chosen from among a smaller pool of Attic property-owners, those whose families (if at all possible) could be traced back

36. Warde Fowler, W. *Social Life in the Age of Cicero*, (New York, 1915), pp. 62-64.

37. See note 55.

38. Oliver, James H. *The Civic Tradition and Roman Athens* (Baltimore, 1983) pp. 98-100, and notes 6 and 7. Christian Habicht recently noted what might perhaps have been a deciding element in Augustus’ hesitation over the tendencies in Athenian loyalty – a reputed request by the beaten Antony in the immediate aftermath of Actium to be allowed refuge in Athens as a private exile if Egypt turned against him. Though sometimes doubted (and not often remarked today), the appearance of this tale in Plutarch is at least evidence of its currency among the educated in Greece in later generations, and is relevant to the image of Athens as a place of retreat. Plutarch, *Antony*, lxxii, 1. C. Habicht, *Athens from Alexander to Antony* (Harvard, 1997), p. 365.

to the primeval legends of the city. They could co-opt into their number the most stable of the new Roman or Hellenistic settlers;³⁹ they would not, from then on, allow the ancient and defining prestige of the city to be bandied about at the whim of the public assembly.⁴⁰ Athens lost two of its last external holdings (Aegina and Eretria), but would retain, so long as it kept house quietly and in order, its status as a "free city."⁴¹

The pill went down, and Athens survived. She was now in precise and precarious truth tucked up under the "walls" of Rome – a sort of privileged experiment by the Augustan regime which thrived, and did so keeping much of its urban character (as the examples from the age of Tiberius a few pages earlier show), though our era this has called up significant abuse from historians. The re-invented *polis* educated emperors (as visitors traveling up Syggrou today are reminded when they pass the little 'Arch of Hadrian'), it gained an enormous new Augustan market north of the acropolis as the old trading Agora became a 'campus quad,' replete with cafes, groves, bookshops, a performance hall and a small forest of sculpted art. The countryside and shipping lanes became safer, food in lean years easier to acquire, civic unrest rarer...

Today, a historian's politics tend to decide whether all this was good or bad, but, as we are talking about 're-invention,' I suggest a Greek-friendly Roman voice for the finishing words here ...

"A genius chooses for his retreat quiet Athens,
There he devotes seven years to study,
And grows grey over his books and literary cares;
Usually, when forth he walks,
He is more mute than a statue,
And the people shake with laughter..."

(Horace, *Epist.* II, 2, 81-84)

"Kindly Athens gave me a little more learning ...
That I might be minded to distinguish right from wrong,
And to hunt for truth in Academus' groves.
But the hard times tore me from that pleasant spot ..."

(the same, 44-46)*

39. Oliver, *ibid.*, pp. 14-15.

40. Dio Cassius LIV, vii; LI, ii.

41. P. Graindor, *Athènes sous Auguste* (Cairo, 1927). John Day, *An Economic History of Athens under Roman Domination*, (New York, 1942), cap. 4. G.W. Bowersock, *Augustus and the Greek World*. (Oxford, 1965), p. 114

* Horace, transl. by Lonsdale and Lee, *The Works of Horace*, (New York, 1900).

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Seal Impressions on the 1689 and 1860 Sino-Russian Treaties: Material Culture in Diplomatic Culture¹

By Chia Ning*

This study underscores the crucial role of seal impressions on Sino-Russian treaties, viewing the indifference of seal-created visual information as a significant defect in current treaty scholarship. This research proposes that the analysis of material seals holds equal importance to the textual examination of written articles in comprehending Sino-Russian diplomatic culture. The mandatory use of official seals for signing bilateral treaties in both the Qing and Russian Empires is deeply rooted in their unique civilizations and traditions. From this background, the political culture of these empires guided the treaty negotiators to perceive the seal impressions on treaties not only as mutual commitments to fulfilling the treaty promises but also as a non-linguistic means to engage with their respective relationship positions. As a result, both written articles and visual sigillography are invaluable as primary sources in treaty research.

Introduction

The 1689 Treaty of Nerchinsk, signed between Qing China (1636-1911) and Romanov Russia (1613-1917) on September 7, 1689, was a pivotal moment in Eurasian diplomatic history. The plenipotentiaries from both sides affixed their seal impressions at the end of the treaty text, signifying the conclusion of a lengthy and challenging negotiation process, which Portuguese Jesuit Thomas Pereira witnessed.² While conventional sealing practices are evident in an overview of Sino-Russian treaties up to 1900 (the year the newly established Foreign Affairs Department took over the Qing treaty affairs), the specific function of these seals and visual messages delivered by these seals have been overlooked in the existing treaty scholarship. This study aims to delve into the role of seals in Sino-Russian treaty diplomacy, elucidate the mandatory sealing practice with its cultural and civilization roots, and illuminate the visual information they convey.

In the 17th century, both the Qing Empire and Russia had a seal culture as part of their political culture with roots from earlier traditions and civilizations. Like in

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2. Joseph Sebes, S. J., *The Jesuits and the Sino-Russian Treaty of Nerchinsk (1689): The Diary of Thomas Pereira*, S. J. (Rome: Institutum Historicum S. I. Via Dei Penitenzieri, 20, 1961), 150, 160, and 162.

many parts of the world, seals were seen “both as material and conceptual entities,”³ symbolizing “identity and authority.”⁴ The seal engraving was full of political considerations and seal application was under strict political and institutional guidance.⁵ In treaty affairs, they served as evidence of commitment to the treaty agreements and offered non-verbal signals for the communication between treaty partners apart from the written articles. Regardless of its owner's title rank, the chosen treaty seal finalized treaty terms on behalf of the Qing emperor and the Russian Tsar. Unlike written treaty articles, which detailed border demarcation, population settlement, trade agreements, etc., through readable words, deciphering the implications of seal impressions requires knowledge of seal culture. This study proposes that reading articles and visual sigillography are different primary sources. the visual analysis is as important as the textual analysis for understanding the treaty because the visual skills interpret the material signals embodied in seal impressions. This study contributes a new visual component to balance the text-based perception in the existing Sino-Russian treaty scholarship.

The 1689 Treaty of Nerchinsk and the 1860 Treaty of Beijing represented the evolution of treaty seals in two distinct historical periods. The former marked the first-ever treaty between a dynastic power in East Asia and a Europe-centered Eurasian power, signed as they confronted each other in the Amur River region of Northeast Asia. It included written articles, signatures of plenipotentiaries, and seal impressions from official seals below the state level. The Treaty of Beijing followed a similar pattern but with different contents, relationships, and impressions from significantly upgraded seals, setting the style for bilateral treaties thereafter. This illustrates a correlation between the material change, from a local-level official seal in 1689 to a grand state-level seal in 1860, and the relational change, from the Qing engaging Russia “on equal terms”⁶ to her decline under Russian dominance and signing unequal treaties. This study initiates the first exploration of this important but previously unnoticed correlation.

3. Brigitte Miriam Bedos-Rezak, “In Search of a Semiotic Paradigm: The Matter of Sealing in Medieval Thought and Praxis (1050-1400),” in *Good Impressions: Image and Authority in Medieval Seals*. Edited by Noël Adams, John Cherry and James Robinson (London: The British Museum Press, 2008), 1-7, here 1.

4. Dryburgh, Paul, *Royal Seals: The National Archives Images of Power and Majesty* (Philadelphia: Pen & Sword Books LTD, 2020), 8.

5. This study only explores the official seals, leaving the personal and leisure seals in the Qing and Russian societies as a separate topic to study.

6. John K. Fairbank, ed., *Cambridge of China*, Volume 10 Part I *Late Ch'ing, 1800-1911* (New York: Cambridge University Press, 1978), Chapter I Introduction: The Old Order, 2-34, here 33 and Chapter 7 “Sino-Russian Relations, 1800-62,” 318-350, here 318. Ma Changquan, “Kangxi, Yongzheng liangchao zhong'e huajie yuanze tanxi” [The analytical examination of the rules for the Sino-Russian border demarcation during the Kangxi and Yongzhen reigns], in *Zhongguo bianjiang shidi yanjiu* 25.2 (2015):140-148, here 142-3.

This study integrates material culture and visual expression into treaty analysis, connects material seals and diplomatic culture in the treaty research, and breaks new ground in the Sino-Russian treaty scholarship.

Treaty Seals, Their Impressions, and the Challenge to Study Them

Jesuit Thomas Pereira's diary recorded the importance of using seals in the Qing-Russian negotiation for the Treaty of Nerchinsk. By agreement, "The chief ambassadors of the respective crowns shall reciprocally give each other two copies of the aforesaid treaty, sealed with their seals."⁷ Among the three language versions: Manchu (as Qing was a Manchu-ruled empire), Russian, and Latin, the two delegations affixed their seals to the Latin, the recognized official, version.⁸

In his 1961 book, Joseph Sebes pointed out that "the official Latin copy written in behalf of the Chinese delegation and given to the Russians has been found in the Russian Archives and has been published in *Sbornik dogovorov Rossii s Kitaiem* [Сборникъ Договоровъ Россіи съ Китаемъ, Collection of treaties between Russia and China]. The official Latin copy written on behalf of the Russian delegation and given to the Chinese, however, has not yet been discovered in the Chinese Archives."⁹ The Russian sourcebook also collected the Manchu copy but the Russia-to-Qing copies in Latin and Russian remain undiscovered in China.¹⁰

The two images from the Russian sourcebook (below) show the stark contrast between the large, square-shaped Qing seal, which has an imprint on one side, and the smaller, round-shaped Russian seal, which has imprints on two faces (see the Latin image below). The disparity reflects the Chinese and Inner Asian seal traditions that the Qing inherited versus the European seal tradition that Romanov Russia carried forward.¹¹ On the Latin version, the clear and readable Chinese seal impression stands out against the blurred and unrecognizable Russian seal impressions.

7. Sebes, 285 and 287.

8. For treaty texts in three languages, see Sebes, Chapter VIII, "Text of the Treaty Contained in the Diary," 150-164.

9. Sebes, 151-152, 160, and 162.

10. This is the conclusion from the author's investigation over a decade in mainland China and Taiwan. This writing will not address the controversy about whether the Latin and Manchu copies in exchange by the two delegations are identical or not (see Sebes, Chapter VIII "Text of the Treaty Contained in the Diary," 150-164) but fully focuses on examining the same seal impressions in the Russia-stored Latin and Manchu copies.

11. The reference works for the Qing seal from the Chinese and Inner Asian tradition are *Ancient Seals: The Complete Collection of Treasures of the Palace Museum*. Edited by Zheng Mianzhong (Hong Kong: Shangwu yinshuguan and Shanghai: Kexue jishu chubanshe, 2008). Wei Jia and Meng Zhaobo, *Zhongguo yin* [Seals of China] (Beijing: Dangdai zhongguo chubanshe, 2008). Du Kuisheng, *Zhonghua baoxi tanmi* [Exploration of the Myth of the Chinese Imperial Seals] (Tianjin: Baihua wenyi chubanshe, 2003). Guo Fuxiang,

The last page of the Manchu text of the Treaty of Nerchinsk ¹²	The last page of the Latin text of the Treaty of Nerchinsk ¹³
	

The Qing seal impression features Manchu scripts on the left two vertical lines, reading from left to right, and Chinese characters on the right three vertical lines, reading from right to left. The Manchu script, *sahaliyan ula i jergi babe tuwakiyara jiyanggiyūn i doron*, translates to “The seal of the general who defends the Black River region.” The Chinese inscription *zhenshou heilongjiang dengchu defang jiangjun yin* means “The seal of the general who guards the Black Dragon River region and its surroundings.” Russians name the river *Sahaliyan ula* in Manchu and *Heilongjiang* in Chinese, as “Amur.” The seal of the Heilongjiang

Mingqing dihou xiying [State seals of the emperors and empresses of the Ming and Qing dynasties] (Beijing: Guoji wenhua chubanshe, 2002). The reference works for the European tradition of the Russian seal are *Good Impressions: Image and Authority in Medieval Seals*. Edited by Noël Adams, John Cherry and James Robinson (London: The British Museum Press, 2008). *Seals and their context in the Middle Ages*. Edited by Phillipp Schofield. (Havertown, PA: Oxbow Books, 2015). Paul Dryburgh, *Royal Seals: Images of Power and Majesty (Images of the National Archives)* (Philadelphia: Pen & Sword Books Ltd, 2020). *Seals and Society: Medieval Vales, the Welsh Marches and their English Border Region*. Edited by P R Schofield & E A New with S M Johns and J A McEwan. University of Wales Press, 2016.

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13. This image was posted for public use at <https://www.wikidata.org/wiki/Q696094>. Accessed on February 19, 2024. Ye Baichuan's 2010 book (page 190) quoted this image page from *The Collection of the Sino-Russian Correspondences of the Seventeenth Century*. Sebe's 1961 book (page 162) listed the reproduction of this treaty image in several treaty collections.

General, a frontier position of military administrator since 1683, attested to the treaty's validity on behalf of the Qing court.

The Chinese red-ink technique produced a clear seal impression on the treaty paper, while the Russian wax imprinting technique failed to do so. The blurred impressions from the Russian seal pose a significant obstacle to studying it. However, despite this challenge, the seal effectively finalized the treaty. Understanding the mindset behind the seal use in both Manchu and Russian cultures is crucial for comprehending the sealing demand for the bilateral treaty.

The small Russian seal impression on the Manchu text image presents additional challenges to this study. The impression, not clear enough to confirm its visual and written details, differentiates a pictorial design, seemingly the double-headed eagle, in the middle, from a written Russian inscription surrounding it. This design is typical of the Romanov seal and appeared in the 1861 Additional Article to the Convention of Peking between China and Russia,¹⁴ as well as the 1910 "Agreement Concerning the Provisional Sungari River Trade Regulations between China and Russia."¹⁵ In the 1861 treaty, this seal was affixed next to the Qing's Jilin General's seal,¹⁶ indicating that the two official seals could be on the local authority level. If the Manchu copy only needed the Qing seal and the Russian copy needed the Russian seal, as previously quoted sources suggested, this might be the Russian Archive's seal used to receive and store this treaty text. As the identity of this seal will be pending later research confirmation,

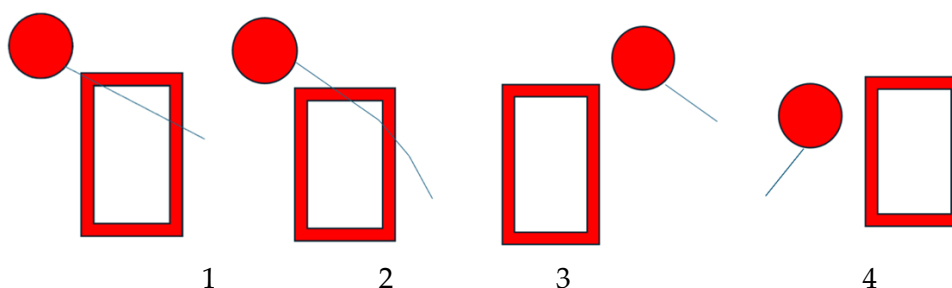
14. *Zhonghua minguo waijiaobu baocunzi qianqing ji minguo shiqi tiaoyue xieding – Yingxiang liulan* [The treaties and agreements during early Qing to Republican period which are stored at the Foreign Affairs Department of the Republic of China - Photo image browsing] at website <https://mofaarchiv.es.npm.gov.tw/index.php?act=Treaty/home> (TW in the rest of this paper which stands for *Tiaoyue*/ treaties of *Waijiaobu*/Foreign Affairs Department. No. 910000113, page 12 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjlxMCIsIjlxMyJdLCJwcWZpbHRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWSuOixkCjdfV0sInNvcnRieSI6eyJtb2RIIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9#910000113001>).

15. TW No. 910000154, page 8 at <https://mofaarchives.npm.gov.tw/index.php?Act=Treaty/search/1-20/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjlxMCIsIjlxMyJdLCJwcWZpbHRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWuo%2Be1sSJdfV0sInNvcnRieSI6eyJtb2RIIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfbGFuZ3VhZ2UiLCJ0cGZpbHRlciI6eyJwcV9sYW5ndWFnZSI6eyJ0ZXJtcyI6WyLkv4TmlociXX19fQ%3D%3D#910000154001>.

16. TW No. 910000113, page 6 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjlxMCIsIjlxMyJdLCJwcWZpbHRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWSuOixkCjdfV0sInNvcnRieSI6eyJtb2RIIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9#910000113001>.

this challenge does not undermine the fact that the Sino-Russian bilateral treaty required seals to authorize its finalization.

The digital treaty collection of the National Palace Museum in Taipei (TW) has three distinct seal images from different copies of the Treaty of Beijing. All these images display the seal impressions of the two empires in a striking red color, but the affixing positions vary. Additionally, the Russian sourcebook "Русско-китайские Договорно-правовые Акты (1689-1916)" [Russian-Chinese (as agreed-) Legal Acts] presents a fourth seal image on the same treaty text, with the seal positions of the two empires differing from any of the other three.¹⁷ The four affixing positions are clearly demonstrated below.¹⁸



The diagrammatic sketch of the seal design, developed by the author from treaty images, demonstrates the seal design on the printing face.

Chinese inscription in advanced artistic writing style 御製大臣關防
Manchu in regular writing style gubci (Only the first script is readable)
Manchu inscriptions in advanced artistic writing style(Unreadable)

The Qing seal for the Treaty of Beijing was a vertical rectangle, approximately twice the size of the 1689 Heilongjiang General's seal based on visual judgment from the document images. It is a bilingual Manchu-Chinese

17. Русско-китайские Договорно-правовые Акты (1689-1916) [Russian-Chinese (as agreed-) Legal Acts]. Пол общей редакцией [Edited by] академика В.С. Мясикова. (МОСКВА: ПАМЯТНИКИ ИСТОРИЧЕСКОЙ МЫСЛИ [Monuments of Historical Thought], 2004), one of the four colored images between page 448 and 449.

18. 1 and 2 from TW with archival number 10000112001 (the Chinese version), pages 18 and 19, 3 from Русско-китайские Договорно-правовые Акты (1689-1916), and 4 from TW archival number 10000112002 (the Russian version) page 27. The differences between these positions on different treaty copies need further investigation for explanation.

seal. The Manchu inscription is vertically engraved on the left. Although not clear enough to transliterate, it should mirror the Chinese inscriptions on the right, *Qinchai dachen guanfang* which means "The seal in term of guanfang for emperor-appointed Minister." The Chinese inscription was engraved using the nine-overlapping style,¹⁹ which is the highest-level writing style for a seal on the state level. A line of Manchu in regular script stands vertically between the two artistic writing parts, and only the script on top, "gubci" (universal), is readable.

The partially readable Qing seal impression was accompanied by a blurred Russian impression, with only the middle pictorial part and surrounding inscription being distinguishable. These two seals add a greater challenge to the study of treaty seals. They, however, still provide crucial visual elements for analyzing why both Qing and Russia elevated their treaty seals to the state level and subsequently became the standard treaty style. Furthermore, the affixing positions of the two seals, which no longer resembled those of the Treaty of Nerchinsk, reflect a shift in sealing practices in a different historical stage. Address these issues deepens the discussion of the treaty engagements between the two empires.

An Overview of the Seal Use in the Sino-Russian Treaties

Placing the 1689 and 1860 treaty seal use into the overall sealing practice of the Sino-Russian treaties will enhance the understanding of their representation. Among the numerous Sino-Russian treaties in the eighteenth and nineteenth centuries, four treaties do not have the available photo or digital images today. However, the use of seals was referenced within their texts. They are the Treaty of Kyakhta (Kiekhta) of 1727-1728,²⁰ the Kyakhta Supplementary Treaty amending

19. I am grateful to Mr. Stephen Tsai (Dai Xuewen) in Taiwan for his assistance in reading the Chinese inscription from the Russian sourcebook "Русско-китайские Договорно-правовые Акты (1689-1916)" and identifying it as the nice-overlapping style. For seal inscriptions' writing styles and the seal ranks, see Wu Yuanfeng and Li Jianmin, "Manwen zhuanzi yu guanyin guanshu shuyao" [A summary research of Manchu seal characters and official seals], in *Manyu yanjiu* 72. 1 (2021):23-32, here 27-30 and Kazutada Kataoka Cho, *Chûgoku kan'in seido kenkyû* [The study of the official seal system of China] (Tôkyô: TôhōShoten, 2008) (Tôkyô: TôhōShoten, 2008), 285-288.

20. See Сборникъ Договоровъ России съ Китаемъ. 1689-1881 гг.: Издание Министерства Иностранных Дел [Collection of Treaties between Russia and China. 1689-1881. Publication of the Ministry of Foreign Affairs] (Санктпетербургъ 1889, Reprint by New York: Bamboo Books, 2012), 72-3. On page 60, the Russian seal, marked "Печать" inside a circle, represented the Russian seal, but it didn't include the design details in this copied version of the treaty text. On page 83, the Qing seal was marked with a square shape, representing the Chinese seal. On p. 83, the Qing seal was marked out with a square shape, the shape symbol of the Chinese seal. Also see Die Vertäge Zwischen Russland und China 1689-1881: Faks. D. 1889 in Sankt Peterburg erschienenen Sammlung

Article X of the Treaty of Kyakhta of 1768,²¹ the Treaty of Kuldji of 1851,²² and the Treaty of Tarbagatai, also known as the Treaty of Chuguchak of 1864.²³ The Russian copy of the Treaty of Tianjin 1858, which is included in the TW image collection without a Chinese copy, does not display a seal impression but the treaty text did mention the seal used on them,²⁴ to which copied treaty text in Russian sourcebook confirms the presence of Qing and Russian seals.²⁵

The following treaty images, all bearing seal impressions, prove that all Sino-Russian treaties required the seal. These treaties are the Additional Article to the Convention of Peking between China and Russia of 1861,²⁶ Convention of Peking for Land Trade between China and Russia of 1862,²⁷ The Revised Convention of Peking for Land Trade between China and Russia of 1869,²⁸ Treaty of Khovd of 1869,²⁹ Treaty of Livadia or Treaty of Ili of 1879,³⁰ Treaty of St. Petersburg of 1881,³¹

mit d. Vertragstexten in russ., lat. U. franz. Sowie chines., mandschur. U. mongol. Sprache/ hrsg.u.eingel. von Michael Weiers. (Boon: Wehling, 1979), 17.

21. Сборникъ Договоровъ России съ Китаемъ, 84-86.

22. Сборникъ Договоровъ России съ Китаемъ, 96-102 and 103-109.

23. The Chinese version of the treaty at the website of The Russian Research Center of Beijing University <https://www.russiancenter.pku.edu.cn/yjcg/kywj/258053.html>.

24. TW No. 910000789001 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjxxMCIsljxxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWSuOixkCJdfV0sInNvcnRieSI6eyJtb2RlIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9#910000789001>. Also see Сборникъ Договоровъ России съ Китаемъ. 1689-1881 гг. pp. 153-158.

25. Сборникъ Договоровъ России съ Китаемъ. 1689-1881 гг., pp. 122-130, 131-141, and 153.

26. TW No. 910000113001 and No. 910000113002 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjxxMCIsljxxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWSuOixkCJdfV0sInNvcnRieSI6eyJtb2RlIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9>.

27. TW No. 910000114001, page 14 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjxxMCIsljxxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWQjOayuyJdfV0sInNvcnRieSI6eyJtb2RlIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9#910000114001>.

28. TW at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjxxMCIsljxxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWQjOayuyJdfV0sInNvcnRieSI6eyJtb2RlIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9#910000116001>, page 15.

29. TW at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltLCJkdGdyb3VwIjpbIjxxMCIsljxxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWQjOayuyJdfV0sInNvcnRieSI6eyJtb2RlIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHUuYXN0eSJ9#910000116001>.

Protocol of Gulimtu between China and Russia of 1882,³² Convention on Border Demarcation of Sary-Ulan-Chibar between China and Russia of 1883,³³ Li-Lobanov Treaty of 1896,³⁴ Notes extending the Telegraph Agreement between China and Russia of 1896,³⁵ Complementary Declaration of the telegraph Contract of 1892 Between China and Russia of 1897,³⁶ and Convention for the Lease of

0117001, No. 910000117001, page 14. This is the Russian version image, and it has only the Russian seal impression. The missing Chinese version should have the Qing seal impression on it.

30. TW at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltldLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6InBxX2NvdW50cnkifQ%3D%3D#910000118001>, No. 910000118001 page 15.

31. РУССКО-КИТАЙСКИЕ ПЕРЕГОВОРЫ О ВОЗВРАЩЕНИИ КУЛЬДЖИ. ЛИВАНОВСКИЙ (1879) и ПЕТЕРБУРГСКИЙ (1881) ДОГОВОРЫ Archived 2008-04-14 at the Wayback Machine \ \ в кн. Моисеев В.А. Россия и Китай в Центральной Азии (вторая половина XIX в. - 1917 г.). - Барнаул: АзБука, 2003. - 346 с. ISBN 5-93957-025-9 стр 199. And TW No. 910000119004, page 2 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltldLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6InBxX2NvdW50cnkifQ%3D%3D#910000119004>.

32. TW No. 910000120 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltldLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6InBxX2NvdW50cnkifQ%3D%3D>.

33. No. 9100001250001 the Russian version with the Russian seal and No. 910000125 0003 the Manchu version with the Qing seal.

34. TW No, 910000111003 page 3 and 14 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltldLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6InBxX2NvdW50cnkifQ%3D%3D#910000111003>.

35. TW No, 910000132001, 910000132002, and 910000132003 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiIiLCJzZWZyY2giOltldLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpbHRlcil6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6InBxX2NvdW50cnkifQ%3D%3D#910000132001>.

36. TW at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/21-40/eyJhY2NudW0iOiIiLCJzZWZyY2giOltldLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpbHRlcil6>

Liaotung Peninsula between China and Russia of 1898.³⁷ There were treaty texts only with the Qing seal, not the Russian seal, such as the Protocol of Kashgar between China and Russia of 1882³⁸ and the Contract for the Joint Venture on Gold Mines in Sinkiang between China and Russia of 1899.³⁹

A document supporting a treaty, in Chinese term of *ziyue* (child of a treaty), may not include the use of a seal, as seen in the 1894 Convention on Erection of Frontier Tables at Chuguchak between China and Russia.⁴⁰ In subsequent agreements related to major Sino-Russian treaties, local-level seals continued to be used. For example, the 1861 Additional Article to the Convention of Peking between China and Russia was signed by the Qing Minister of the Board of Revenue Chengchi and the Jilin General Jingchun. This document supported the 1860 Treaty of Beijing and followed the 1689 Nerchinsk pattern, where a frontier general in the negotiation team, under a court-appointed high-ranking official, used a local general's seal to finalize the agreement. The design of this seal was identical to that of the Treaty of Nerchinsk, with the only differences being that "Jilin" replaced "Heilongjiang" and the Manchu inscription was engraved in an

W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6HNieSI6InBxX2NvdW50cnkifQ%3D%3D#910000134001, No, 91 0000134.

37. TW at

38. TW No. 910000121 at [39. TW No, 910000139001 at \[40. TW No, 910000131 at \\[30\\]\\(https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/21-40/eyJhY2NudW0iOiIiLCJzZWZyY2giOltdLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpBhRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6HNieSI6InBxX2NvdW50cnkifQ%3D%3D#910000139001.</p>
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<div data-bbox=\\)\]\(https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/21-40/eyJhY2NudW0iOiIiLCJzZWZyY2giOltdLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpBhRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6HNieSI6InBxX2NvdW50cnkifQ%3D%3D#910000139001.</p>
</div>
<div data-bbox=\)](https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/1-20/eyJhY2NudW0iOiIiLCJzZWZyY2giOltdLCJkdGdyb3VwIjpbIjlxMCIsljlxMyJdLCJwcWZpBhRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIuWFiee3kiJdfSx7InBxZmllbGQiOiJwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOnsibW9kZSI6ImlkX2FzYyJ9LCJmYWNI6HNieSI6InBxX2NvdW50cnkifQ%3D%3D#910000121001. This Manchu and Russian combined text image file shows the Qing seal on the back side of page 1. It did not show the Russian seal.</p>
</div>
<div data-bbox=)

artistic script due to the Qianlong emperor's seal reform in the eighteenth century.⁴¹ Another example is the Treaty of Kazakhstan Jurisdiction between China and Russia of 1884. It was signed by the local military governor, *Canzan Dachen*, in Xinjiang (or Central Asia) on the Qing side. This governor's seal, styled and designed the same as the 1689 Nerchinsk seal, was affixed to the treaty text.⁴² These examples, whether supporting additional treaty agreements or local settlements, indicate a side reference that the Kangxi court considered the Treaty of Nerchinsk with Russia as a local matter.

The mandatory use of seals in the major Sino-Russian treaties signifies the importance of visual representation and communication through seal impressions. The distinct seal ranks and styles in the 1689 and 1860 treaties directly reflect the different stages in the history of the Sino-Russian relationship. This analysis introduces a new component to treaty scholarship.

Visual Representation of the Seal Impressions

Scholars in European seals studies have emphasized that material seals worked for "encounters between different entities," "enabled dialogue between myth and politics," "facilitated interchange in cases of enmeshed identities,"⁴³ transmitted "expressions of identity," and "provide[d] information about institutions and people in position of power."⁴⁴ These points suit the Sino-Russian treaty seals. The exchange of seal impressions was a distinct form of communication, separate from the written language used in treaty articles. Both the Qing and Russian seals bore a written language unit as a seal inscription to mark the political authority of a seal. The seal impressions facilitated a non-verbal sensation, symbolically confirming the agreed promise in written articles and declaring the mutual status between the two empires.

41. TW No. 910000113001 Page 6 at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/undefined/eyJhY2NudW0iOiLiLCJzZWZyY2giOltdLCJkdGdyb3VwIjpbIjlxMCIsIjlxMyJdLCJwcWZpbHRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIjlxWSuOixkCJdfV0sInNvcnRieSI6eyJtb2RlIjoiaWRfYXNjIn0sImZhY2V0c2J5IjoicHFfZHIuYXN0eSJ9#910000113001>.

42. TW at <https://mofaarchives.npm.gov.tw/index.php?act=Treaty/search/1-20/eyJhY2NudW0iOiLiLCJzZWZyY2giOltdLCJkdGdyb3VwIjpbIjlxMCIsIjlxMyJdLCJwcWZpbHRlciI6W3sicHFmaWVsZCI6InBxX2R5bmFzdHkiLCJwcXRlcm1zIjpbIjlxWFiee3kiJdfSx7InBxZmlldGQOIjIjwcV9jb3VudHJ5IiwicHF0ZXJtcyI6WyLkV4QiXX1dLCJzb3J0YnkiOmsibW9kZSI6ImkX2FzYyJ9LCJmYWNIbHNieSI6InBxX2NvdW50cnkiQ%3D%3D#910000126001>, No. 910000126001.

43. Bedos-Rezak, "Cultural Transactions," 3.

44. Elizabeth A. New and Philipp R. Schofield, "Introduction," in *Seals and Society: Medieval Vales, the Welsh Marches and their English Border Region*. Edited by P R Schofield & E A New with S M Johns and J A McEwan. (University of Wales Press, 2016), 1, 5-6, and 8.

The Qing and Russian seals, coming from different cultural backgrounds, varied in size, shape, artistic design, and inscription content. These differences served political purposes within their respective cultural contexts but did not diminish the common need for a treaty seal to establish bilateral relationships. The seal impressions on the treaty text conveyed signals rooted in the political culture and system of each empire, which present-day scholars must understand to interpret their significance.

The Chinese seal tradition started from the Western Zhou Dynasty (c. 1046-771 B. C.) and developed into a stabilized style and system during the Qin (221-206 B. C.) and the Han dynasties (202 B. C. - 9 A. D. and 25 - 220 A. D.).⁴⁵ Under the Mongol rulers of the Yuan dynasty, the Tibetan language appeared as the seal inscription for imperial seals, starting the non-Chinese inscription.⁴⁶ The Manchu at its power rising stage started the Manchu inscription for the seal of the Khan and Manchu-Chinese combined inscriptions during the Shunzhi reign (1643-1661).⁴⁷ By the late seventeenth century, The Qing in late seventeenth century had established an official system with seals hierarchically ranked from central to local for official business under the law.⁴⁸ Official seals in the Qing domestic governance were under the regulations of *Daqinghuidian* (Collection of official statutes of the Qing dynasty). The Board of Rites, one of the Six Boards in the Qing imperial administration, managed their designing, engraving, issuing, utilizing, restitution, storing, or destroying.⁴⁹ In Romanov Russia, *Pechatnyi prikaz* or Seal-keeper's Department "affixed the prince's (tsar's) seal to official documents ... as a means of authentication of a document." Defined by Code 1497 (a collection of laws introduced by Ivan III, r. 1462-1505) and *Ulozhenie* of 1649 (the law code under Tsar Alexei, r. 1645-1676), this Department was "an independent division of the Treasury. It acted as the depository for important state documents confirmed by the state's seal. As these also included foreign treaties, the seal-keeper (*pechatnik*) was often the same person as the head of the Ambassadorial Department (*the Poso'skii prikaz*), the ministry of foreign affairs."⁵⁰ Thus, the

45. Zhu Xiangxian, 243-6.

46. Zhu Xiangxian, 254-6 and Xue Lei, *Yuandai guanfang yinzhang yu zhidushi yanjiu* [The study of official seals and the history of its system in the Yuan dynasty] (Beijing: Renmin chubanshe, 2020), 11.

47. Guo Fuxiang, *Shouming yutian* [The heaven-granted fate] (Beijing: Zijincheng chubanshe, 2009), 18-19.

48. The non-official personal seals are not under discussion in this study.

49. *Daqinghuidian* (Collection of official statutes of the Qing dynasty), the Qianlong edition, juan 28 at the University of Michigan's <https://ctext.org/wiki.pl?if=gb&chapter=465300&remap=gb> lines 112-125, and *Libu zeli* (Regulations of the Board of Rites) (Changsha: Hainan chubanshe, 2000), juan 40-43.

50. Ferdinand Feldbrugge, *A History of Russian Law: From Ancient Times to the Council Code (Ulozhenie) of Tsar Aleksei Mikhailovich of 1649*. (Boston: Brill, 2017), Chapter 31 "The Tsar's Government," 809-810.

political operation of governing the empire, Qing and Russia alike, required official seals in the governing affairs, of which treaty relationship was kind.

From ancient history up to the Qing, an official seal functioned as an “item to show trust” *shixinzhiwu*” to build trust and reliance.⁵¹ From this seal culture and practice, when the seal use was extended to the treaty relationship, the Qing expectation from the seal was *yongzhao xinshou* (keeping the trusted promise forever),⁵² *yongchi weiping* (as the evidence for being reliable forever),⁵³ and *gaiyin weiping* (imprinting the seal impression as the evidence [of promise-keeping]),⁵⁴ all carrying the wish that Russia would fulfill the promise written in the treaty. The Russian plenipotentiary Fyodor Alexevich Golovin (Theodor Alexeyevich Golovan), on the other hand, also required that each side provide the other with a signed and sealed treaty copy in their native language,⁵⁵ reflecting the same expectation to have Qing keeping the treaty promise.

With such a background in the Qing and Russian empires, the treaty seal impressions bore each empire’s political culture and governing system. As sigillography elucidated “the political ambition of medieval rulers,”⁵⁶ the treaty negotiators with the same seal mindset sighted that “allusive and symbolic elements”⁵⁷ from the seal type, size, shape, inscription, and the artistic particulars in combination would pass the sensation of each empire’s “self” position to the “other.” Historical records hardly gave detailed written recounts about this sensation. Still, present research scholars should understand that in both Qing and Russia, a treaty seal was not a random pickup but an institutional choice for an important political event.

This study keys in a new Sino-Russian case to support the existing global “new diplomatic history.” This history embraces the material and visual culture

51. Zhu Xiangxian, 13, 151, and 173. Xue Lei’s *Yuandai guanfang yinzhang yu zhidushi yanjiu* shows the importance of the Yuan dynasty’s official seal system in Chinese history.

52. *Zhong’e bianjie tiaoyueji* [A collection of the Sino-Russian treaties] (Beijing: Shangwu yinshuguan, 1973), “Zhong’e kebuduo jieyue” [Treaty of Khovd] of 1869, 47-8, here 48.

53. *Zhong’e bianjie tiaoyueji*, “Zhong’e Woliyasutai jieyue” [Treaty of Uliyasutai] of 1869, 49-50, here 50.

54. *Zhong’e bianjie tiaoyueji*, “Zhong’e gaiding tiaoyue” [Treaty of Revision] of 1881 which was also called the Treaty of St. Petersburg in Russian and the Treaty of Ili in Chinese, 53-58, here both the treaty text and note 1 of page 58.

55. Bei Zhangheng, *1689 nian diyige e’zhong tiaoyue* [The first Russo-China treaty of 1689]. Translated from Прасковья Тихоновна Яквлева, *Первый русско-китайский договор 1689 года*. Москва, Изд-во Академии наук СССР, 1958, Beijing: Shangwu yinshuguan, 1973, 184 and 188-9.

56. Phillipp Schofield, “Introduction,” in *Seals and their context in the Middle Ages*. Edited by Phillipp Schofield. (Havertown, PA: Oxbow Books, 2015), vi.

57. Jessica Berenbeim, “Medieval Treaties and the Diplomatic Aesthetic,” in *Seals: Making and Marking Connections Across the Medieval World*. Edited by Brigitte M. Bedos-Rezak. (Amsterdam: Amsterdam University Press and AR Humanities Press, 2018), 213.

in medieval seal studies⁵⁸ while examining the “widespread, though differential, presence of seals and sealing practices between 400 and 1500 CE” in China, Southeast Asia, Arabia, Sasanian Persia, the Muslim empire, the Byzantine empire, and Western Europe. It has concluded that “seal operations” and “processes mediated by seals” led to “representation, authorization, identification, transmission, translation, negotiation.”⁵⁹ The Sino-Russian case of this study conduces the global comparison from medieval times into the early modern diplomatic world.

The Analysis of the Seals of The Treaty of Nerchinsk

The Qing Treaty Seal

Behind the visual seal impression on the treaty text, there is a package of knowledge of official seals in the Qing political system, which inherited heavily from the Chinese and Inner Asian seal traditions with Manchu input. This system determined why using a frontier general's, rather than an emperor-granted state, seal for this important treaty. Since China's Qin and the Western Han dynasties, a set of hierarchically organized terminology differentiated the seal levels of authority in the dynastic political system. *Xi* referred to emperor-monopolized state seals with an alternate term *bao* which the woman emperor Wu Zetian's reign (690 – 705) of the Tang dynasty (618 – 907) started. *Yin* was the seal for the governing boards at court and the upper-level local authorities. The emperor granted the *guanfang* (defending the border pass) seal, particularly for provincial governors (*xunfu*) and a governor-general (*zongdu*) who supervised more than one province. *Tuji* was for the lower-rank officials, and *tiaoji*, for with no official posts.⁶⁰ This hierarchically classified seal system was placed into the imperial *Li* (ritual) system, closely associated with the official bureaucracy, and practiced under direct court supervision and guidance.⁶¹ Thus, treaty seal selections had system-based “thoughts” behind them, institutional regulations to guide them, and practical reasons to choose them.

The seal of the Heilongjiang General was on the *yin* level for a Manchu court-created frontier position. As a regional seal, it did not match the status of the

58. Berenbeim, 213.

59. Bedos-Rezak, “Cultural Transitions,” 2-3.

60. *Qinding daqing huidian* [The imperial compiled statutory encyclopedias of the Qing], the 1899 edition through University of Michigan's HathiTrustDigital Library scanned by Keio University (Japan), juan 34 full text 15, #88 and juan 35 full text 15, #80-83 for *guanfang*, page numbers were not marked.

61. For a detailed discussion and key reading materials on the Chinese and Inner Asian seal traditions, see Chia Ning “Liangjin manwen tiben yu qingdai he zhongguo minzushi zhong de guanyin wenhua,” 2017, 9:39-56.

emperor-appointed plenipotentiaries of the treaty negotiation. Pursuing peace with the Russians so the Qing could focus on fighting against the threatening Jun Gar (Zunghar or Dzungar) under Galdan Boshugtu Khan (1644-1697), the Kangxi emperor (r. 1662-1722) appointed Songgotu (Ch. Suo E tu) - a prominent official of the Kangxi court and the emperor's uncle-in-law - and Tong Guwe Gang (Ch. Tong Guogang), Commander-in-chief of the Bordered Yellow Banner and Kangxi emperor's uncle on mother side - to lead the negotiation delegation. The mission and positions of these powerful officials should deserve a state-level seal from the court if following the cases of the Grand General, called *Dajiangjun* 大將軍 for a military campaign out of the Capital, to whom Manchu emperor granted a state seal with a grand ceremony.⁶² The high-ranking treaty delegation, however, did not receive such remuneration.

The seal selection related to Heilongjiang General's administration duty in the Amur River region. The Kangxi court established this military position in 1683 to deal with the Russian raids. Since then, Russian affairs, such as managing the military defense, offering supplies for the frontier garrisons, and arranging the Russian captures, fell under this General's responsibility.⁶³ The emperor also assigned this General as the first contact person when the Russians intended to communicate with the Manchu court⁶⁴ since the Khalkha-occupied Outer Mongolia and Zunghar-dominated Central Asia could not open such contact by then. Sabsu (1635-1705), the first Heilongjiang General, joined the delegation of treaty negotiation under the leadership of emperor-appointed plenipotentiaries. This General's seal as the treaty seal did have logical reasons but certainly unmatched the status of the negotiation mission and the delegation heads. It reflects the Kangxi emperor's mind of treating this first treaty with Russia as a matter on the local, rather than imperial, level of event.

Viewing Russia as a tribute country with no difference from other subordinate entities surrounding the Qing Empire, even though unrealistic,⁶⁵ affected the Qing seal selection. In the observation of Thomas Pereira, "From the beginning of the world, China had never received foreigners in its Empire except

62. *Qinding daqing huidian*, juan 3, University of Michigan full text 2 under *mingjiang chuzheng shou chiyin* [seal-granting to the emperor-appointed general for military mission]. The Statutory Encyclopedias' juan 35, <https://zh.wikisource.org/wiki/%E6%AC%BD%E5%AE%9A%E5%A4%A7%E6%B8%85%E6%9C%83%E5%85%B8/%E5%8D%B7%E4%B8%89%E5%8D%81%E4%BA%94>.

63. *Kangxi chao shilu* [The veritable records of the Kangxi reign], juan 113 <https://ctext.org/wiki.pl?if=gb&chapter=833954&remap=gb>, lines 298, 308, and 321.

64. *Lifanyuan gongdu zeli sanzhan* [Three documentary editions of the Regulations of the Lifanyuan] (Beijing: Quanguo tushuguan wenxian suowei fuzhi zhongxin, 2010), Volume 1, 171.

65. For a discussion of this issue, see Chia Ning, "Lifanyuan and Libu in the Qing Tribute System," in *Managing the Frontier in Qing China: Lifanyuan and Libu revisited*, eds. Dittmar Schorkowich and Chia Ning (Boston: Brill, 2016), Chapter 5, 144-184, here 163-165.

as tribute bearers. ... They thought everything was part of the China which they called proudly Tien hsia, that is to say 'all under heaven.'" The Europeans, like any other from Asia, would not be allowed to come to the Manchu court "unless they subjected themselves to the infamy of vassalage."⁶⁶ The 1655 letter of Shunzhi emperor (r. 1634-1661) to the Russian Tsar in 1655 stated this viewpoint,⁶⁷ and the later Qianlong court (16726-1795) claimed the Russians "came to pay tribute" (Ma. albabun jafajiha) to the Kangxi court from 1676 on.⁶⁸ The atlas-making of the Yongzheng reign (1723-1735) ideologically dictated, as Mario Cams' study shows, that "the Russian Empire could only enter the eighteenth-century Yongzheng imperial map as it had entered official Qing discourse in the seventeenth century, as a *waifan xiaoguo*, a 'little state among [our] outer vassals.'" ⁶⁹ The failure of the 1805 Russian embassy due to refusing the tribute ceremony to the Manchu emperor⁷⁰ and the 1842-compiled *Jiaqing chongxiu yitongzhi* (the Jiaqing edition of the comprehensive gazetteer of the Great Qing) saw the Qing strengthening rather than changing this viewpoint.⁷¹ The dynastic power of China had the tradition of using seals in relationship with the "tribute" entities. It was always granting a seal to the closest tribute entities⁷² rather than signing an agreement by using an official seal. For the first time, the Qing court signed a border and peace agreement in the early modern diplomatic manner called the "treaty" with a highly competitive power but still being identified as a tribute entity on the land called *Oros*, the Manchu term for Russia. For such an event, the Kangxi court selected the local seal.

66. Sebes, 207 and 209.

67. *Qingdai zhong'e guanxi dang'an shiliao xuanbian* [Selected (Manchu) archival records of Qing-Russian relations] (Beijing: Zhonghua shuju, 1981), Volume 1, 18.

68. Xie Sui, *Zhigongtu Manwen tushuo jiaozhu* [Annotated Manchu Version of Illustrations of Tributary Peoples]. Annotated by Zhuang Jifa (Taipei: Guoli gugong bowuyuan, 1989), 96. *Qing Imperial Illustrations of Tributary Peoples: A Cultural Cartography of Empire*. Edited and Translated by Laura Hostetler and Wu Xuemei. (Boston: Brill, 2022), 86.

69. Mario Cams, "Reimagining Qing Space: Yongzheng's Eurasian Atlas (1727-29)" *Late Imperial China* 42.1 (June 2021):93-129, here 97, 121-123.

70. Fairbank, *The Cambridge History of China*, Volume 10 Part I, Chapter 7 "Sino-Russian relations, 1800-62," 318-350, here 322-3.

71. *Jiaqing chongxiu yitongzhi* [the Jiaqing edition of the comprehensive gazetteer of the Great Qing] (1842, Beijing: Zhonghua shuju, 1986 reprint), Volume 34, 27233-27255, here 27236 and 27238.

72. Zhu Xiangxian, 156 recorded that Han Xuandi granted a seal to Xiongnu. Kataoka Cho, 287 recorded that Qing granted seals to tribute countries, Korea, Annan/Vietnam, and Xianluo. The Zhu annotated volume combined different editions from Kangxi, Yongzheng, Qianlong, and the Republican times. For a complete discussion, see He Xinhua, *Zuihou de tianchao*: Qingdai chaogong zhidu yuanjiu [The last heavenly dynasty: The study of the Qing tribute system] (Beijing: Renmin chubanshe, 2012-13), 334-350.

The Russian Treaty Seal

A high-standing official seal system in Russia was also well-established in Russia in the late seventeenth century. This system had its origin in the Byzantine Empire through the marriage between Grand Prince Ivan III (b. 1440, r. 1462-1505) and Byzantine princess Sophia Palaiologina (1449-1503) in 1472. By that marriage, according to Gustave Alef's study, the Muscovite State "adopted the two-headed eagle on a newly created state seal" from the Byzantine tradition. A 1497 seal, made of wax with two sides of printing surfaces, was "attached to a treaty by a thin cord." On one side of this seal was the two-headed eagle image with a circular inscription "Grand Prince Ivan by God's Grace Sovereign of All Rus." On the other side was a horseman wielding a downward pointed spear toward a winged dragon with a circular inscription "And Grand Prince of Valad[imir], and Mosc[ow] and Nov [gorod], and Psk[ov], and Tve[r] and Ugo[ra], and Viat[ka], and per[m], and Bol[gar]." This seal style continued through the Romanov dynasty until the Russian Revolution in the early twentieth century.⁷³ In John H. Lind's discussion of the Great State Seal of Russia used by Ivan IV (b. 1530, r. 1533-1547, Tsar 1547-1584) for a treaty, the seal, with a two-sided design centered at the double-headed eagle image, became "a source illuminating the imperial ideology of Ivan's Muscovite State." Ivan IV used this Great State Seal "in support of his claims of territorial expansion during the Livonian War [January 17, 1558-May 26, 1583]."⁷⁴ This seal practice was identical to the late medieval world of European diplomacy, in which sealed treaty documents "were exchanged between sovereigns engaged in the negotiation and ratification of treaties." "Through these documents, which formally conclude diplomatic negotiations, two chanceries exchange impressions of their seals of central government."⁷⁵ From this background, the Russian seal to authorize the Treaty of Nerchinsk was not an arbitrary selection.

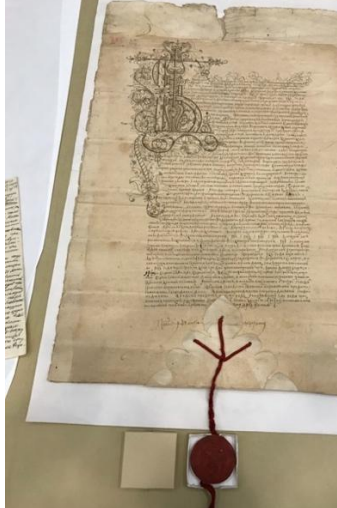
The following visual examples of the Tsar's seals attached to the seventeenth-century Charters to the nobles help to identify the level of the Russian treaty seal in 1689⁷⁶.

73. Gustave Alef, "The Adoption of the Muscovite Two-headed Eagle: A Discordant View," in *Speculum: A Journal of Medieval Studies* 41.1 (1966):1-21, here 1.

74. John H. Lind, "Ivan IV's Great State Seal and His Use of Some Heraldic Symbols During the Livonian War," *Jahrbücher für Geschichte Osteuropas*, Neue Folge, Bd. 33, H. 4 (1985): 481-494, here 481, 485-6.

75. Bedos-Rezak, "Cultural Transactions," 11 and Berenbeim, "Medieval Treaties and the Diplomatic Aesthetic," 213-4.

76. These Charters are from the Allen MSS collection of the Lilly Library, Indiana University. Photos were taken by the author in the summer of 2019.

Year of 1649 (#29-4) 3 August 1649 - 29-4: Alexei Mikhailovich, Tsar, 1645-1676. The charter granted lands to G.I. Byelkin for services to the Tsar's father in wars against Poles, Lithuanians, and Circassians.	Year of 1682 (#29-10) 9 December 1682: Peter the Great, Tsar. Charter on printed form granting lands to Semyon Ivanovich Lyubovnikov for his services in the wars against the Turkish Sultan and the Khan of the Crimea.	Year of 1690 (#29-17) Peter the Great, Tsar. Charter on vellum granting lands to Stepan Otrokhev of Chernigov.
		
Seal was attached on the back	Seal was attached on the back	Seal was attached on the back
		

These charters, as political documents, would not have legitimacy if a Tsar's seal was not attached, the same practice in Qing China that an official document would not have any applicable authority if no official seal was affixed to justify it. The Russian seal practice was also like the great seals in "England, Scotland, and later Great Britain, ... royal sealing practices have had a deep impact on all sections of society since the eleventh century." This impact "shaped visual culture in Britain and latterly around the world."⁷⁷ From the textual to the style of the seal, these Russian charters were similar in one way or another to the British seals

77. Paul Dryburgh, *Royal Seals: The National Archives Images of Power and Majesty*. (Philadelphia: Pen & Sword Books LTD, 2020), 114.

from the eleventh century to the early twentieth century.⁷⁸ They were comparable to several seal images of England's "Ratification of the Treaty of Windsor" with kingdoms of Portugal and France during the fourteenth and seventeenth centuries, in which "visual language often plays as central a role in encounters,"⁷⁹ demonstrating the European style of the Russian seal. From mindset to style and practice, the Russian seal system followed medieval Europe in that "a primary function [of] medieval seal impressions was to validate and authorize the contents of letters and documents."⁸⁰ The level of the seal for the Treaty of Nerchinsk, if judged by its size (since details on the seal face were blurred), was not likely the Tsar's seal on the level for the Charters.

Documents affixed with seal impressions had become a regular practice in pre-1689 Sino-Russian communication.⁸¹ When a Russian envoy visited the Qing court in 1676 under the Tsar's instruction, he informed the Kangxi court to use a seal to settle the mutual agreement.⁸² When the Russian local authorities in the Amur River region contacted the Qing local authority, seal use was also the routine for mutual communication. Nerchinsk, established in 1654 and gained an independent administrative status under its *Voevod* (general or governor) in 1658, had become the center of the surrounding Russian towns in the 1670s.⁸³ Arshinski (Аршински), *Voevod* of Nerchinsk, used his black wax seal whenever he communicated with Qing authorities in writing.⁸⁴ To respond to the Qing Commander-in-chief (*dutong*) of the Nen River, who went to Nerchinsk to deliver the Kangxi emperor's letter to the Russian Tsar in 1670, *Voevod* of Nerchinsk sent his envoy to Beijing by carrying a letter with his seal impression.⁸⁵ The letter from the Russian authority in Albazin (Albazino), north of Heilongjiang/Amur River, to the Solon commander-in-chief along the Nen River did the same in 1677 by

78. The image examples from the Western European countries during the medieval times can be found in Dryburgh, *Royal Seals*: 31-55, 72-73, and 83-106 and in Schofield's *Seals and their context in the Middle Ages*, 9, 12, 68-9, 90, 102, and 161.

79. Berenbeim, "Medieval Treaties and the Diplomatic Aesthetic," 218-230.

80. Andersen, "Archaeology and Sigillography in Northern Europe," 193.

81. Many cases are found in Nikolai Nikolaevich Bantysh-Kamenskii, *Diplomaticheskoe Sobranie Del' Mezhdu Rossiiskim i Kitaiskim Gasydarstvami s' 1619 po 1792-й God* [Дипломатическое Собрание Делъ Между Россійскимъ и Китайскимъ Государствами съ 1619 по 1792-й Годъ] [Diplomatic affairs meetings between the Russian and Chinese states from 1619 to 1792] (Казань: Типография Императорскаго Университета, 1882).

82. *Qingdai zhong'e guanxi dang'an shiliao xuanbian*, 26-30.

83. Bei Zhangheng, *1689 nian diyige e'zhong tiaoyue* [The first Russo-China treaty of 1689]. Translated from Прасковья Тихоновна Явлева, *Первый русско-китайский договор 1689 года*. (Москва, Изд-во Академии наук СССР, 1958), (Shangwu yinshuguan, 1973), 14.

84. *Voevod* Arshinski's black wax seal was mentioned in *Shiqi shiji e zhong guanxi* [Russian relations with China during the seventeenth century]. Translated from Русско-китайские отношения в XVIII веке Tome 1 [Russo-Chinese Relations in the 18th Century Volume 1] by Foreign Language Department, Xiamen University. (Beijing: Shangwu yinshuguan, 1981), 403.

85. Bei Zhangheng, 111.

following the instruction of the Tsar.⁸⁶ All these examples prove that the Russian seal used for diplomatic affairs with the Qing was institutionalized. Thus, it was the Russian institutionally required procedure that "After each delegation signed the treaty with signatures, they affixed seals on each language text."⁸⁷

On the ideological ground, the "Tributary system has been clearly of great importance"⁸⁸ in Russia's relationship with the Qing empire, as it did so from Qing to Russia. The Tsar instructed the Russian envoy to advise the Qing court in the 1670s that many rulers had already submitted their entities to the mighty Tsar, who should be the monarch of the world. The Manchu ruler should do the same to pay tribute to the Tsar and receive the Tsar's grace and protection.⁸⁹ Both the Qing and Russian courts tried to navigate each other into their desired status hierarchies in a tribute term. Such thinking about the seal affected the selection of the treaty seal.

The universal practice of using seals for relationship building in the larger Eurasian cultural environment further helps us understand the seal used for the Qing-Russian treaties. Noda Jin and Onuma Takahiro's *A Collection of Documents from the Kazakh Sultans to the Qing Dynasty* has revealed that the Central Asian Kazakhs adopted the format of the Oyrat Documents when they sent written correspondence to both Qing and Russian courts. In that format, the seal appeared on the right top of the front page of the documents.⁹⁰ The format of Turkic Documents to Russia, "highly influenced by official Russian documentation," also had "Signatures (Tu. *qol*) and seals (*muhr*) ... often required in documents submitted to the Russian authorities." When writing to the Qing authorities, either the Military Governor or *amban*, "seals were important components of this type of document," even details could differ from writing to the Russian authority.⁹¹ Seals for signing bilateral treaties between Qing and Russia naturally followed this sealing practice for the written correspondence between the Eurasian entities.

86. *Qingdai zhong'e guanxi dang'an shiliao xuanbian*, Volume 1, 24 and 44.

87. "Diary of Thomas Pereira" in *Shiqi shiji e zhong guanxi*. Volume 2, Part 2, 1075.

88. Ye Baichuan and Yuan Jian, "The Sino-Russian Trade and the Role of the Lifanyuan, 17th-18th Centuries." In Dittmar Schorkowitz and Chia Ning, eds., *Managing Frontiers in Qing China: The Lifanyuan and Libu Revisited* (Boston: Brill, 2017), pp. 254-289, here p. 261.

89. *Qingdai zhong'e guanxi dang'an shiliao xuanbian*, Volume 1, 22-23 and *Gugong e'wen shiliao: Kangqian jian e'guo laiwen yuandang* [Documents in Russian Preserved in the National Palace Museum of Peiping: Kanghsi-Chienlung Period] (Beiping: Guoli beeping gu gong bowuyuan, 1936), p. 267.

90. Noda Jin and Onuma Takahiro, *A Collection of Documents from the Kazakh Sultans to the Qing dynasty* (TIAS: Department of Islamic Area Studies Center for Evolving Humanities, Graduate School of Humanities and Sociology) (Tokyo: The University of Tokyo, 2012), 5-6. I developed the seal imitation based on Fig. 0.2 on page 6.

91. Noda and Onuma, 5-7, 11-12, 17, 22, 28, 43, 48, 58, 62, 75, and 84.

All this information explains why the completely blurred Russian seal impressions on the Latin version had to be there and worked for finalizing the Treaty of Nerchinsk. Before written sources or other evidence are discovered to clear up that seal's identity, there are several options to identify this treaty seal. When the Tsar appointed Golovin as the treaty plenipotentiary, he could grant Golovin a treaty seal. As a high-status nobleman intimate to the Tsar, Golovin could have a seal of his own and be instructed to use it for signing the treaty. In addition, when "the Russian Court had appointed Theodore Alexeevich Golovin as High Ambassador Plenipotentiary" in 1686, the Court named "Ivan Vlasov, simultaneously Governor of Nerchinsk and adviser to Golovin"⁹² an important member of the Russian treaty delegation. In Pereira's Diary, Vlasov was heavily involved in settling the Qing delegation in Nerchinsk before the treaty talks. Inside the Russian tent for peace negotiation, his seat was set next to Golovin's.⁹³ Such information brings Vlasov's Nerchinsk seal into the possibility of the treaty seal. If true, this seal would match the seal level of the Heilongjiang General who was the designated contact official for the Russians to communicate with when arriving at the Qing border. These three inferences, however, do not exclude the three other possibilities: the seal from the *Voevod* of Yenisei, to whom all the information from Nerchinsk and Albazin would report;⁹⁴ the seal from the *Voevod* of Yakutsk, where resided the most important Russian official in the region who directed expansion to the east and south;⁹⁵ and the seal from the *Voevod* of Tobolsk, whose resident city was the historic capital of the Siberian region and the base for the Russian Eastward exploration, and, importantly, his seal was used for the later Treaty of Kyakhta in 1727.⁹⁶

With mysteries about the Russian seal for the Treaty of Nerchinsk, the blurred visual impressions have still sparked valuable specifics to this Russian treaty seal in the background of culture and seal system. Such knowledge greatly helps our understanding of the Treaty of Nerchinsk and the Sino-Russian treaty relations.

The Analysis of Seals of The Treaty of Beijing

The Qing Treaty Seal

A key part of this treaty seal is its ranking terminology, *guanfang*. A specific seal that the Ming dynasty (1368-1644) issued to the emperor-appointed high

92. Sebes, 71 and 73. Bei Zhangheng, 128.

93. Sebes, 199, 217-9, and 227.

94. Bei Zhangheng, 132.

95. Bei Zhangheng, 12-13.

96. *Qingdai zhong'e guanxi dang'an shiliao xuanbian*, Volume 2, 519.

posts, both civilian and military,⁹⁷ the Qing court granted it broadly to banner officers, Grand Ministers or Grand Generals in frontier regions, officials on security-related positions, and appointees on special missions.⁹⁸ High officials above the third pin or rank (Qing had nine ranks with the first on top), especially on defending and frontier posts, were qualified to receive this rank of seal,⁹⁹ The increased importance of this seal reflected in facts that the emperor-appointed diplomatic ambassadors used *gangfang* seal for signing treaties with the Western countries in the nineteenth century, and it became the seal for the Foreign Affairs Department established in 1901.¹⁰⁰

The writing style of the seal inscription serves as an indicator of the seal's rank. Qianlong emperor's Manchu writing reform in the middle of the eighteenth century created thirty-two new writing styles and re-engraved all official seals matching the official seal hierarchy with the writing style hierarchy in 1753, for both the Manchu and Chinese seal inscriptions.¹⁰¹ The upper-level *guanfang* seal could be as high as just next to the emperor and the prince of the first rank, who share the style at the very top of the style hierarchy for official seals.¹⁰² For the 1860 treaty seal, the Manchu writing style on the seal should match the Chinese

97. Zhu Xiangxian, 143 and 171.

98. *Qinding daqing huidian*, University of Michigan's HathiTrustDigital Library, juan 35 full text 15, #80-83 for *guanfang*, page numbers were not marked. *Qinding daqing huidian shili* [Imperially Authorized Collected Institutes and Precedents of the Great Qing], 1886 edition through University of Michigan's HathiTrustDigital Library scanned by Keio University (Japan), juan 321, full text 119, under Libu zhuyin, #13-14, #19-23, #28, and #38, the page number is not marked. Also see Du Jiaji, "Qingdai guanyin de tedian jiqi suo fanying de zhiguan zhidu bianhua" [The characteristics of the Qing official seals and its reflection of the official system under the change], *Lishi jiaoxue* 587, No. 22 (2009):5-16, here 5.

99. Fuge, *Tingyu congtao* [Talks collected while listening to the rain] (Beijing: Zhonghua shuju, 1984), juan 5, the section of *Shuaiyin guanfang* [the military general's seal which is called *guangfang*] <http://www.guoxue123.com/biji/qing/tyct/006.htm>.

100. Kazutada Kataoka Cho, the list of the Qing official seals 432-436, and the list of the seal images 458-475. Among the list, seal images 318-321 represent the seals for the emperor-appointed ambassadors and the Department of Foreign Affairs.

101. *Qinding daqing huidian shili*, juan 321, full text 119, #36 under Qianlong thirteenth and fourteenth year, the page number was not marked. For the seal re-engraving, see *Qinding daqing huidian shili*, juan 321, full text 119, #31 and #36 under Qianlong fourteenth to seventeenth year. For the 1743-1748 discussion, see Wu Yuanfeng and Li Jianmin, "Manwen zhuanzi yu guanyin guanshu shuyao." Wu Yuanfeng, "Manzhouwen yu manzhouwen guji wenxiang zongshu" [A summative introduction of Manchu language and the historical works written in Manchu language], *Manzu yanjiu* 1 (2008):99-128, here 100-101. Ren Wanping, "Qingdai guanyin zhidu zonglun" [Comprehensive study of the official seal system of the Qing dynasty], in Yan Chongnian edited *Manxue yanjiu* 5 (2000):419-451.

102. For the Manchu writings styles and for the *gangfang* seal in particular, see Kazutada Kataoka Cho, 285.

inscriptions with the most advanced artistical writing style (according to Stephen Tsai). This confirmed that the Qing court greatly upgraded this treaty seal when comparing it with the 1689 local-level seal for the Treaty of Nerchinsk.

The size of the 1860 *gangfang* seal offers another important reference to study this treaty seal. By the Ming dynasty, the size of an official seal had been firmly established as a marker of official status and rank.¹⁰³ Phillipp Schofield stated in his study of seals in Western Europe that a seal was “an important indicator of social status.” Rulers “could use the size of their seal to challenge, symbolically at least, the authority of those deemed otherwise their superiors.”¹⁰⁴ The large 1860 treaty seal visually alluded to a sense of might of the Qing Empire. However, the Treaty itself dealt with the Qing failure in the Second Opium War (1856-1860). By then Russia, together with Great Britain and France, signed another round of unequal treaties with the Manchu court. The Qing lost huge territory to Russia by this treaty. In this humiliating reality, the Qing still struggled to sustain the past “superiority” and a large and artistically advanced seal was meant a competing signal to the aggressive Russia, even only symbolically. In the severe but ineffective strive of the Qing rulers for their ritual supremacy over the Western powers, ritual superiority, to which the seal belonged, was at the center.¹⁰⁵ The Manchu rulers’ mindset to the seal application opens a window to peek at their seal arrangement.

The time of this seal to be engraved offers further information to learn about the change of treaty seals in a different historical stage. According to Ren Wanpin and Kazutada Kataoka Cho, the seal with an added line of inscription between the Manchu inscription on the left and the Chinese inscription on the right emerged at the beginning of the Xianfeng reign (1850-1861), reflecting a declined seal system after 1840.¹⁰⁶ In a changed international environment, the Manchu court engraved this upgraded seal for the new diplomatic needs. When the Treaty of Beijing was one of the biggest hits of Western humiliation on China, the Qing-Russia relationship, like it was in the overall international diplomacy, no longer allowed the Manchu court keeping a seal that graded the Western powers, with Russia among them, as China’s tributaries. A side reference to the past negotiation for the Treaty of Kyakhta in 1727 helps us understand the Russian thinking for the treaty seals of this time. In 1727, the Russian officials in the Far East did not have the Tsar-issued state seal with the imperial symbol but only used their local seals to stamp on official papers or letters. They presented their request to the court of

103. Zhu Xiangxian, 259.

104. Schofield, “Introduction,” vi.

105. The representative reference for the Qing ritual struggle to maintain “superiority” over the Western countries is Wang Kaixi, *Qingdai waijiao liyi de jiaoshe yu zhenglun* [The Discussion and controversy on the Qing diplomatic protocols] (Beijing: Renmin chubanshe, 2009).

106. Ren Wanping “Qingdai guanyin zhidu zonglun,” 429 and Kazutada Kataoka Cho, 337-8.

the Tsar that an official seal impression with the double-headed eagle – the Russian imperial symbol – would help improve their official management in Selenginsk and Nerchinsk because the highest level of seal symbol would raise local people's respect upon them.¹⁰⁷ This reference offers clues that the seal level would impact both the user and receiver. The local-level seal as that of the Treaty of Nerchinsk would insult the imperialist Russia in 1860.

In sum, the high-ranking *gangfang* seal would satisfy Qing and Russia for different reasons in 1860. Details of the seals, as discussed above, serve as the primary source for historians to scrutinize the treaty seals, examine the relationship impact on seal selection, grasp the political thinking behind the visually seen seal impressions, and understand the seal change in the given historical circumstance.

The Russian Treaty Seal

The 1860 Russian treaty seal was, like that of the Qing seal, much upgraded above the 1689 seal for the Treaty of Nerchinsk. The four images on the original treaty texts show its size (still much smaller than the Qing seal but much larger than the 1689 treaty seal), style (with a pictorial large part in the center and surrounded by Russian words along the round edge), color (roughly matching the red-ink impression of the Qing seal from printed image), and the long tassel all visually become cognate to the Tsar's Charter seals and also similar to the state seal of Ivan IV, which is exhibited at the Museum of History and Reconstruction of Moscow.¹⁰⁸ All these Russian seals have shown the visual characteristics of the Western European seals, "the largest space on a seal was occupied by its motif. It conveyed the seal's central message." And they "were made of wax."¹⁰⁹

To be an unequal treaty to the declining Xianfeng court (1851-1861), the Treaty of Beijing confirmed the 1858 Treaty of Aihui/Aigun by which Russia took over the Outer Khingan Range – a part of Qing Manchuria – and further snatched away another part of the Qing Manchuria – the present-day Russian Maritime Province Primorskii Krai with Vladivostok as the major city of the Russian Far

107. *E'zhong liangguo waijiao wenxian huibian, 1619-1792* [Collection of the diplomatic documents between Russia and China, 1619-1792]. Translated by The Russian Studies Department, the People's University of China from Nikolaï Nikolaevich Bantysh-Kamenskii, *Дипломатическое собрание дѣл между Россійским и Китайским, 1882* (Beijing: Shangwu yinshuguan, 1982), 173.

108. The image of this seal was posted on web at <https://sputnikmediabank.com/media/730514.html>. Further reference can be found at website <https://picryl.com/amp/topics/seals+of+ivan+iv> for the seal images from the book *Great Seal of Moscow*.

109. Jörg Peltzer, "Making an impression: Seals as signifiers of individual and collective rank in the upper aristocracy in England and the Empire in the thirteenth and fourteenth centuries," in Schofield edited *Seals and their context in the Middle Ages*, 63-76, here 63-4.

East. Russia was able to become a Pacific power.¹¹⁰ Qing tribute ideology and the idea of Qing-centered superiority over all under the heaven had no ground to continue in such reality. The upgraded Russian seal with a full show of the imperial style was affixed in position to the Qing seal in four different ways, as demonstrated previously. When comparing these affixing positions with that on the Treaty of Nerchinsk which appeared on the same horizontal line (even the seals were in different sizes and shapes) with a sense of equal relationship, the Russian arrogancy over the Qing is visually obvious, fitting the reality of the Sino-Russian reality in 1860. From selecting the seal to affixing the seal positions, “competitive symbolism” between the medieval European entities by using their seals in the mutual relationship¹¹¹ involved. As the written communication created a readable dialogue in which Russia forced the Qing to accept the articles to Russia’s advantage, the visual communication, in a perceivable way, visualized the Russian superiority and domination over Qing China.

Conclusion

Seal impressions would not have appeared in Sino-Russian treaties without representation and purpose. Changes in treaty seals over time were not arbitrary, but rather intentional. Scholarship is obligated to explore the non-verbal cues embedded in these treaty seals and present academic insights into the human impulse to seal documents, the associated historical practices, and their significance in human culture. It is time not to leave the sealing practice in Sino-Russian treaty diplomacy without an explanation for its mandatory existence.

The visual information on treaty seals is far from being meaningless symbols. These symbols embodied profound knowledge of history, culture, intellectual heritage, institutional intention, and political pursuits from each empire. This knowledge clarifies the reasons for the effectiveness of treaties when the seals were applied and for understanding the motives behind the evolution of treaty seals across historical periods. Utilizing both written and visual primary sources of treaties and comprehending the treaty content expressed in words and visual symbols advances the treaty scholarship. The unsolved challenges from the unreadable key seal impressions do not impede the development of visual studies in treaty scholarship.

This exploration will pave the way for scholars in the realms of Qing history, Russian history, international treaty history, and material culture in treaty diplomacy to work collectively and conquer the challenges posed by this study of the treaty seals.

110. See map at https://en.wikipedia.org/wiki/Treaty_of_Aigun.

111. Nicolas Vincent, “The seals of King Henry II and his court,” in Schofield edited *Seals and their context in the Middle Ages*, 7-34, here 23.

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Exploring the Intersection of Science and Music through Ancient Civilizations to the Present

By Hamed A. Ead*

“Life without playing music is inconceivable for me.” – Albert Einstein

Music and science have been interconnected throughout history, with both disciplines inspiring and informing each other. This article explores the theoretical and experimental connections between music and science, addressing the research question: What historical connections exist between music and scientific inquiry, and how have these relationships evolved from ancient civilizations to the present day? We delve into the profound interest of ancient Egyptian civilization in music and its significance within their culture. From ancient times to today, scientists and scholars have found inspiration, relaxation, and cognitive benefits through their involvement in music. By examining the acoustics of sound, the cognitive processes involved in music perception, and the therapeutic applications of music, this work highlights the profound impact of music on scientific inquiry and the broader human experience. We also consider how the principles of music theory have influenced scientific developments, particularly in acoustics and cognitive science, raising further questions about the cognitive and therapeutic benefits of music and their implications for contemporary research. The integration of music and science has deepened our understanding of both fields and enriched scientific endeavors, leading to advancements that shape cultures and inspire interdisciplinary collaborations. This article celebrates the harmonies of discovery that resonate through time, exploring the profound connections between music and science, and how these interactions continue to influence human experience.

Introduction

The harmonious interplay between music and science has captivated the minds of brilliant individuals across centuries. From ancient civilizations to the modern era, countless scientists have recognized the profound connections between these seemingly distinct domains. This exploration embarks on a journey through time, unraveling the stories of scientists who found solace, inspiration, and intellectual stimulation in the world of music.

Music, with its mesmerizing melodies and intricate harmonies, has long been a source of wonder and artistic expression. Beneath its surface lies a rich tapestry of scientific principles waiting to be unraveled. The vibrations of strings, the resonance of instruments, and the mathematical relationships governing musical intervals have intrigued scientists throughout history. The study of acoustics, born

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from this intersection, has revealed fundamental principles underlying the production and perception of sound.

Table 1. Research Questions

Research Question	Hypothesis
What historical connections exist between music and scientific inquiry, and how have these relationships evolved from ancient civilizations to the present day? .1	Historical interactions between music and scientific inquiry have consistently influenced each other, leading to advancements in both fields across different eras.
What are the cognitive and therapeutic benefits of music, and how do these findings reflect the intersection of music and science in contemporary research? .2	Music therapy and cognitive science reveal that engagement with music enhances cognitive functions and emotional well-being, demonstrating a significant intersection between the two fields.
How have advancements in computational methods changed our understanding of the relationship between music and science, and what implications does this have for future interdisciplinary studies? .3	Computational methods have provided new analytical frameworks that reveal complex patterns in music and its relationship with scientific principles, fostering interdisciplinary collaborations.

Beyond acoustics, scientists have delved into the cognitive aspects of music, prompting questions such as: How have the principles of music theory influenced scientific developments, particularly in acoustics and cognitive science? Advances in neuroimaging and experimental research have unveiled the intricate mechanisms underlying music perception and cognition. The impact of music on human development, language acquisition, and emotional well-being has further deepened our understanding of its cognitive and psychological dimensions.

The integration of music and science extends beyond theoretical exploration into practical applications. Music therapy, an emerging field, harnesses the therapeutic potential of music to improve the lives of individuals with various neurological and mental health conditions. This leads us to another research question: What are the cognitive and therapeutic benefits of music, and how do these findings reflect the intersection of music and science in contemporary research? Through carefully designed interventions, music therapists have witnessed the transformative power of music, offering solace, fostering communication, and enhancing overall well-being.

Furthermore, computational methods have embraced the marriage of science and music, enabling the analysis of vast musical datasets. This computational musicology revolutionizes the field, providing new insights into music history, composition techniques, and the evolution of musical genres. How have advancements in computational methods changed our understanding of the relationship between music and science, and what implications does this have for future interdisciplinary studies?

The Intersection of Science and Music: A Historical Overview

Table 2. Historical Evolution of the Relationship Between Music and Science

Period	Time	Action
Ancient Egypt	3100 BCE - 30 BCE	Role of music in religious, cultural, and daily life. Influence on ancient Greek music and European traditions. Archaeological evidence of musical practices (e.g., tomb inscriptions).
Ancient Greece	8th century BCE - 146 BCE	Pythagoras and the mathematical principles of music.
Ancient China	2070 BCE - 220 CE	Feng Youlan's exploration of musical mathematics and its scientific applications. Reference: "Musical Mathematics: Harmonic Analysis in Ancient Chinese Science" (1949).
Islamic Scholars	7th century CE - 13th century CE	Contributions of scholars like Al-Farabi and Ibn Sina to music theory and science.
Renaissance Revival	14th century - 17th century	Integration of music with other scientific disciplines (e.g., astronomy and mathematics). B. Renaissance Revival of Pythagorean Concepts Impact of Pythagorean insights on music theory and composition.
Science of Sound	17th century onwards	Examination of acoustics and its historical evolution.
Computational Musicology	20th century onwards	Advances in technology and their impact on music analysis. Trends in understanding cultural influences through musical data.
Music Therapy and Cognitive Science	20th century onwards	The role of music in cognitive development and mental health.
Historical Relevance of Music in Science	Ongoing	Continued exploration of the cognitive benefits of music and its implications for scientific inquiry

Science and music have been intertwined throughout history, with both disciplines inspiring and informing each other. This article explores the history of this intersection, tracing its evolution from ancient civilizations to the present day.

In ancient Egypt, music was held in high regard, associated with divine harmony and used in religious rituals, healing practices, and cultural celebrations. Ancient Egyptian scientists and musicians embraced the study of sound vibrations,

employing basic acoustical principles in the design of their temples and musical instruments.

In ancient Greece, Pythagoras and his followers believed in the mathematical underpinnings of music, discovering the mathematical relationships governing musical intervals and laying the foundation for music theory. The Pythagorean insights into the harmony of the spheres and the mathematical ratios of musical intervals shaped ancient Greek philosophy and science.

During the Roman Empire, Roman scientists explored the acoustics of amphitheatres and theatres, creating spaces that enhanced the auditory experience. Advancements were made in the understanding of sound propagation and architectural acoustics during this era.

The Islamic Golden Age witnessed a flourishing period of scientific and musical advancements. Islamic scholars, such as Al-Farabi and Ibn Sina (Avicenna), explored the relationship between science, mathematics, and music. Music played a vital role in Islamic culture, with its influence extending into scientific disciplines such as astronomy and optics.

In the Coptic era, the Coptic Christians in Egypt developed distinctive hymns and chants, blending their rich religious heritage with Egyptian and Greek musical influences. Coptic scholars contributed to the preservation and development of music theory and notation during this era.

In the present day, the integration of science and music continues to evolve. Contemporary scientific research explores music perception, cognitive neuroscience, and music therapy. Advancements in computational musicology employ sophisticated algorithms to analyze vast musical datasets, uncovering hidden patterns and cultural influences.

Throughout history, science and music have been bound together by a harmonious relationship. From the ancient civilizations that laid the groundwork to present-day explorations, the harmonies of discovery continue to resonate, inspiring new scientific insights, artistic expressions, and transformative experiences. Science and music have been intertwined throughout history, with both disciplines inspiring and informing each other. This article traces the evolution of this intersection from ancient civilizations to the present day, highlighting key figures, advancements, and cultural influences. The enduring connection between science and music continues to shape our understanding of the world and enrich our lives.

Intersection of Science and Music in 17th and 18th Centuries

With its ancient roots in the sciences, music was viewed as a kind of arithmetic in the 17th and 18th centuries, rather than art. Pythagoras, who realized that string sounds could be used to create musical intervals, is credited with originating this concept. These intervals were beautiful in terms of both sound and mathematical accuracy. Throughout human history, intelligent people have typically believed

that the study of music belonged in the sciences, as opposed to today, when it is typically seen as a form of art.

Ideas concerning science and music started to shift in the 17th century when Galileo's discovery of the planetary revolution caused people to reevaluate their views on science in general. This prompted a reconsideration of art, suggesting that taste could be more important than previously thought. This was a gradual shift in thinking, and it could still be happening now.

In the contemporary music industry, the capacity to listen to something online indicates that someone has converted sound into binary code information, demonstrating the continued existence of the junction of science and music. Color spectrums have also been used more and more to symbolize music copyright. The notion that music is some kind of equation persists, especially in the field of music production, even if the idea of music as a lyrical art and creative expression has gained ground in today's culture.

Literature

Music and ancient Greek science share a close relationship, as evidenced by various scholarly works. One such work is "The Music of Pythagoras and Ancient Greek Science" by Andrew Barker (2005), which explores Pythagoras' influence on music and the mathematical principles underlying its harmonies. Barker delves into the Pythagorean tuning system and its connections to understanding the fundamental harmonies of the universe.

Feng Youlan's essay from 1949, titled "Musical Mathematics: Harmonic Analysis in Ancient Chinese Science," sheds light on ancient Chinese perspectives on the link between music and science. It discusses the mathematical concepts behind Chinese music theory, including the pentatonic scale, and their applications in scientific contexts.

In the book "The Science of Sound: From Pythagoras to Modern Acoustics" (2014) by Rossing and Fletcher, the complex relationship between science and music is thoroughly explored. The authors cover a wide range of topics, including the mechanics of sound, musical instruments, and the use of music in scientific study, offering a comprehensive introduction to the science of sound throughout history.

The historical concept of the "music of the spheres" holds significance in many civilizations. Jamie James' book, "The Harmonic Structure of the Universe: The Music of the Spheres" (1993), delves into how ancient societies, such as the Pythagoreans and Babylonians, perceived the celestial bodies' motions as producing a harmonious cosmic symphony. This idea has shaped scientific and philosophical thought throughout history.

During the Renaissance, Pythagoras' insights on musical harmonies influenced music theory and composition. Mary Houle's paper, "Harmony of the Spheres:

Pythagoras and Renaissance Music Theory" (2017), explores how Pythagorean concepts influenced the creation of new musical scales and tuning systems, leaving a lasting impact on the musical output of that era.

The book "Music and Mathematics: From Pythagoras to Fractals" (2006) by John Fauvel et al. examines the historical connection between mathematics and music. It explores the mathematical foundations of musical scales, the ancient Greeks' understanding of musical intervals, and the contemporary applications of mathematics in music analysis and creation.

In "The Role of Music in Scientific Research: A Review" (2001) by Hickey and Halpern, the authors investigate the role of music in cognition and scientific inquiry. They explore how music affects the mind and body, emphasizing its potential to improve focus, creativity, and problem-solving skills, all of which have implications for scientific pursuits.

Henry George Farmer's work on Arab music provides in-depth analysis and insights. His books, such as "Arabic Music and Its Instruments," "The Arab Influence on Music Theory," and "A History of Arab Music" (1929), offer comprehensive examinations of the singers, instruments, and cultural influences that have shaped Arab music over the years. Farmer highlights the significant contributions of Arab scholars who had a solid foundation in mathematics and the natural sciences, which greatly influenced the development of music in Arab civilization.

The intellectual and scholarly contributions of luminaries such as the Ikhwan al-Safa, Banu Musa, al-Kindi, Abu Bakr al-Razi, al-Farabi, Ibn Sina, al-Armawi, al-Maraghi, Yusuf ibn Nizam al-Din, Yusuf al-Rumi al-Mawlawi, and Ziryab have furthered our understanding of music through their philosophical viewpoints. Their works, along with the abundance of manuscripts left by authors, historians, philosophers, academics, and jurists, attest to the enduring legacy of music within Arab civilization and the cultural and intellectual significance placed upon it.

Old Egypt: Music has been an integral part of Egyptian culture since antiquity in Egypt. Egyptian music had a significant impact on the development of ancient Greek music, and via the Greeks it was important to early European music well into the Middle Ages. Due to the thousands of years long dominance of Egypt over its neighbors, Egyptian culture, including music and musical instruments, was very influential in the surrounding regions; for instance, the instruments claimed in the Bible to have been played by the ancient Hebrews are all Egyptian instruments as established by Egyptian archaeology. Egyptian modern music is considered as a main core of Middle Eastern and Oriental music as it has a huge influence on the region due to the popularity and huge influence of Egyptian cinema and music industries, owing to the political influence Egypt has on its neighboring countries, as well as Egypt producing the most accomplished musicians and composers in the region, specially in the 20th century, a lot of them are of international stature. The tonal structure music in the East is defined by the maqamat, loosely similar to the Western modes, while the rhythm in the East is governed by the iqa'at, standard

rhythmic modes formed by combinations of accented and unaccented beats and rests. The ancient Egyptians knew music in the Pharaonic era at a very early time, and this is clear from the inscriptions and pictures engraved on the walls of the tombs of the kings of the Old Kingdom. It was used in various aspects of life, although it was somewhat more religious (in temples) and funerary in orphanages and funeral ceremonies for the deceased. But he also used it in his daily life for entertainment and mirth, and to play on agricultural heads with instruments that still exist today, such as the flute, for example, and perhaps with melodies close to the sad melodies that the flute plays in our time.. He also used it at weddings and announcing marriage ceremonies, and it was accompanied by dancing, singing, and instruments. There is a lot of music in its different types (string/wind/percussion), which is necessary to gather the chanters and entertain them on happy occasions, and to give a kind of joy and pleasure.

Old Kingdom: In the era of the Old Kingdom, the inscriptions also indicate the prevalence of hand signs for singing among singers, which we still know until the present time, and this was at the beginning of the Fifth Dynasty.

Ancient inscriptions also appeared on the walls of the tombs bearing the names of some musicians and singers who used to give parties and nights in Pharaoh's palace. This, of course, indicates their high status in the palace. They used to sing religious hymns, so hymns were sung inside the temples during religious and funeral prayers. Singing accompanying dancing also spread in Religious and secular occasions in various royal occasions within the court and in the social life of the groups of the people.

The musical band consisted of a flute player, a harp player, a harp player, and a player of one or more percussive instruments such as the tambourine or the shakhlā. They were also known as the maestro or leader of the musical band, and his task was not limited to leading the band only, but also singing, enthusing the band, and controlling its rhythm and movement.

Discoveries from the Old Kingdom era indicate that ancient music had a special, somewhat primitive scale, which consisted of 5 degrees and was devoid of semitones. This confirms the number of holes in the flute discovered in ancient times, or the number of strings found in the harp and other things, but in the era of The New Kingdom, and due to the openness of the ancient Egyptian to the cultures of other nations, such as the Phoenicians, the Hittites, and the sea peoples of Cyprus and Crete, the musical scale developed and was increased by two degrees, reaching the seven degrees known to this day. Additional movements were also added to it, such as semitones, which are present in the musical instruments discovered during the era. The New Kingdom and other eras.

Melodies of the Egyptian Coptic Church: Just as the Coptic language was the key that helped Champollion decipher the ancient Egyptian language, it was also the melodies of the Egyptian Coptic Church that preserved for us the ancient Egyptian melodies, their maqams and musical degrees, and for this reason the scholars of the French campaign studied the music of Coptic hymns in churches in

their interesting book (*Description of Egypt*). And the monasteries spread throughout Egypt. Although the melodies are limited to religious music in churches, many melodies have a fun, sad, or funereal character, and this is what made archaeologists think that most of the church melodies were ancient melodies that were reused in formulating hymns. When they studied the maqamat of singing (the entrances) in the Coptic Church, they found that there were ten maqamat, with the hymn containing one maqam or two compound maqams at most. Although the ancient Egyptians did not have access to musical notation (note), the synagogues and monasteries played this role in preserving the melodies until our present time. What is the impact of musical notation in the form of sheet music in the modern era?

Music in Greek-Roman Times: A Rich Tapestry of Influences

During the Greco-Roman era spanning from 323 BCE to 476 CE, the Hellenistic (Greek) culture undeniably left a significant imprint on various aspects of society, including music. However, a closer examination reveals a more nuanced picture, particularly in the case of Egypt. While Greek influence undoubtedly reached many areas, Egypt's Delta region and Upper Egypt, geographically distant from core Greek settlements, maintained a stronger connection to their musical traditions.

Unveiling this rich musical heritage, fragments of ancient Egyptian melodies have been partially preserved through the melodies used by the Coptic Church [1]. Fascinatingly, these melodies bear the names of ancient Egyptian cities, such as "the Sinjari melody" referencing Sinjar in Gharbia Governorate and "the Etribi melody" referencing Itrib near modern-day Akhmim [2]. The preservation of these names suggests an enduring link to Egypt's ancient past, even amidst the evolving cultural landscape of the time.

The separation of the Coptic Church from the Eastern Orthodox Church further contributed to the preservation of these unique musical traditions [3]. This separation acted as a shield, safeguarding the melodies from later influences that reached other regions under Western influence. As a result, Egypt emerged from centuries of Roman rule, spanning from 30 BCE to 641 CE, with a remarkable degree of cultural continuity, evident not only in its language and customs but also in its distinct musical identity [4].

This relative isolation allowed for an intriguing blend of influences in Egypt's musical landscape during Greek-Roman times. While Greek cultural elements left their mark, the preservation of ancient Egyptian melodies demonstrates the resilience and vitality of Egypt's indigenous musical traditions. This interplay of diverse influences highlights the complex and fascinating intersection between science, music, and ancient civilizations.

By delving into the historical context and cultural dynamics of music during Greek-Roman times, we gain a deeper understanding of the diverse tapestry of influences that shaped musical expression. This exploration sets the stage for an exciting journey through the centuries, tracing the evolution and interplay of scientific and musical advancements across different civilizations up to the present day.

Music in Islamic Civilization: A Celebration of the Genius of Arab Musicians and Philosophers...!

Some researchers, including some Muslims, believe that a few Islamic ceremonies have musical significance. The mu'ethn, or prayer caller, is the one who makes the first of these calls to prayer. The right mu'ethn should be chosen based on his musical voice and its emotional impact, according to scholars. The second musical performance is reading from the Quran, where the musical voice has become increasingly popular, particularly with the growth of the "science of the recitation" known as "ilm al-qir'aa". The preponderance of readers with the calibre of voice, pronunciation, and song found in Abdel Bassit Abdel Samad, Khalil Al-Hussary, and Al-Manshawi is a good illustration of this. The chanting can be heard at rituals like Tasbeeh during Eid prayers and Talbiya during the "Hajj" pilgrimage. It is also well-known and documented that the Sufis use music for religious purposes, including chanting.

Arabic music has a rich history dating back centuries. Intellectuals and scholars invented its sciences and established its rules and principles. Music is a mirror of the progress or backwardness of nations, and musical renaissance can only be achieved in nations with cultural value. The rich manuscripts left behind by writers, historians, philosophers, scholars, and jurists in musical research are evidence of this. However, most of these manuscripts are still waiting to be published. Studying musical manuscripts requires special knowledge and a broad culture related to history, language, music, and physics to correct copyist errors and conduct scientific studies. This rich cultural heritage of music in Arab thought is essential to understanding and preserving Arab culture.

Eminent Scholars of Islamic Civilization in Music

Many scholars of Islamic civilization excelled in music and had a great reputation. One of the most notable is Abu Nasr Muhammad Al-Farabi (c.870-950), whose musical genius is well-known. In his book *The Great Book of Music*, Al-Farabi classified melodies into three types: Pleasurable melodies: These melodies give the soul pleasure and an audible horizon without having any other effect on

the soul, Imaginative melodies: These melodies benefit the soul through fantasies and contemplations and in which perceptions of various colors are projected and shadows. The same applies to ornaments and statues that are felt by sight and Emotional melodies: These melodies cause psychological emotions to increase or decrease, in other words, calm them or arouse them.

Another eminent scholar and skilled physician, Abu 'Ali al-Husayn ibn Sina, Avicenna (Ibn Sina) (c. 980—1037) recorded his own opinion on music in his book *Healing*. He linked music to the theory of evolution as a means of preserving the species. He said: "Nature has given living organisms a voice with which to call each other, due to their need for closeness, or as a call for help. As for man, he uses the voice to express what is going on within himself, then he makes the voice a conventional language to match its different symptoms and dresses it in different forms, such as lowering the voice when weak and pleading. And who raises it and exaggerates it when threatening, showing strength, etc., so that the intended expression is more complete, more complete, and more influential on the soul. As for composing sounds, it is a simulation of these different emotional bodies. If this composition of sounds is adorned with a musical system, pleasure will be confined to the soul because the reason for pleasure is the feeling of order."

Abu Bakr Al-Razi (أبو بكر الرازي CE 865-925), whose name shone in the world of medicine and chemistry, was also an excellent musician and oud player in his early days, with a good voice and singing. However, he later gave up singing and began studying books on medicine, chemistry, and philosophy, and he excelled in all of them. This did not prevent him from using music for therapeutic purposes, as he studied the effect of music in healing diseases and relieving pain. He reached this conclusion after many experiments that he carried out. He used to play music with a friend of his who was a pharmacist at the hospital in the city of Al-Ray, where Al-Razi was born, and the playing was taking place inside the hospital.

In addition to these three greats, we also mention Safi al-Din al-Armawi al-Baghdadi, De Safi al-Din al-Urmawi (Persian: صفی‌الدین ارموی) or Safi ad-Din Abd al-Mu'min bin Yusuf bin Fachir al-Urmawi al-Baghdadi (op Arabic: صفی‌الدین عبدالمؤمن بن یوسف بن فخر الأرموی البغدادي), born around 1216 in Urmia or Baghdad and died on January 28, 1294 in Baghdad who wrote about music and made significant efforts and left us two books, *Bahhat al-Uyoun* and *The Roles in Music*.

The scholars of Islamic civilization made significant contributions to the field of music. Their work not only enriched the musical heritage of the Arab world but also influenced subsequent generations of musicians and scientists across the globe. By studying their achievements, we can gain a deeper understanding of the profound connection between music and scientific thought in Islamic civilization and appreciate the enduring legacy they left behind. he had a strong passion for playing the piano.

Nobel Scientists and the Symphony of Science

Table 3. Nobel Laureates and Their Musical Pursuits

Laureate	Field	Musical Instrument	Interesting Fact
Albert Einstein	Physics	Violin	Owned 10 violins and believed music helped him brainstorm scientific theories.
Werner Heisenberg	Physics	-	Initially aspired to be a concert pianist but later pursued science.
Max Planck	Physics	Piano, Organ	Played music with Einstein, showcasing their shared love for science and music.
Thomas Südhof	Physiology or Medicine	Bassoon	Credited his musical education for his discipline, hard work, and creativity in science.
Frances Arnold	Chemistry	Piano, Guitar	Compared the code of life to Beethoven's symphony, highlighting its beauty and complexity.
Barbara McClintock	Physiology or Medicine	Tenor Banjo	Played in a jazz band, and some believe this experience helped her discover "jumping genes."
Roald Hoffmann	Chemistry	Piano	Composed music inspired by chemistry and frequently performs piano recitals.
Brian Josephson	Physics	Piano	Skilled pianist with a passion for Bach's music, has written about connections between music and physics.
Dudley R. Herschbach	Chemistry	Clarinet	Composed a piece called "Collision Theory" inspired by his scientific research.
Werner Arber	Physiology or Medicine	Cello	Believed scientific research shared similarities with music in terms of discipline, precision, and creativity.

I'd like to include a passage from "The Symphony of Science" (<https://www.nobelprize.org/symphony-of-science/>) on the Nobel Prize winners' website in today's post. A key question is posed at the beginning of the page: What does music mean to you? Do you use it to help you fall asleep and ease stress and anxiety? The reason is that many individuals, including scientists and Nobel laureates, find immense value in music. These notable people have benefited from music in many ways, including how it may offer fresh insights into issues, promote self-control, allow for the expression of creativity, and highlight the value of cooperation. For many Nobel Prize recipients, music has been an integral part of their lives and careers.

Albert Einstein once said, "Life without playing music is inconceivable for me." Music often assisted Nobel laureates in thinking and processing scientific information in a novel manner. For instance, Albert Einstein, a Physics laureate, was influenced by his mother, who taught him to play the violin at a very young

age. He had a particular fondness for Mozart, Bach, and Schubert. Einstein frequently emphasized the importance of music in his life. He owned approximately ten violins, all of which he affectionately named 'Lina.' For Einstein, music served as a technique for brainstorming, helping him reflect on his theories and overcome difficulties. He often remarked that if he hadn't pursued a career in science, he would have become a musician. Einstein's scientific ideas often initially took shape as images and intuitions, which were later translated into mathematics, logic, and words. Music aided Einstein in this thought process, facilitating the transformation of images into logical concepts.

Another Physics laureate, **Werner Heisenberg**, also had a deep interest in music and occasionally played music together with Albert Einstein. Heisenberg seemed destined to become a musician and concert pianist from an early age. It is said that he began reading sheet music at the age of four. However, as he grew older, his passion for science surpassed his love for music, leading him to pursue a career in science. Nevertheless, music remained a lifelong passion for him. Max Planck, another esteemed Physics laureate, was both a gifted physicist and musician. He had a talent for singing and played the piano and organ. Einstein and Planck supposedly played music together, sharing not only a love for science but also for music.

Thomas Südhof, in his autobiography, stated, "I credit my musical education with my dual appreciation for discipline and hard work, as well as creativity." He believed that his pursuit of learning music and becoming a marginally successful musician taught him how to be a scholar. He emphasized the importance of mastering the subject matter and paying attention to detail while also transcending the details and common interpretations to develop new ideas. Südhof, the recipient of the 2013 Nobel Prize in Physiology or Medicine, found that music provided him with valuable insights and ideas. Like the previously mentioned laureates, Südhof had a preference for classical music. He played the bassoon and acknowledged the profound influence of classical music and his music teacher on his life. Classical music requires a creative mind and tremendous discipline, which significantly contributed to Südhof's development as a scientist. The repetitive and disciplined task of practicing the same symphony repeatedly became ingrained in Südhof's personality. Through repetition, he acquired knowledge and laid the foundation for his scientific endeavors. However, he also recognized that a creative mind was essential to utilize that knowledge and generate something new. Südhof drew parallels between music and science, highlighting the necessity of both extensive practice and a creative mind to achieve extraordinary results.

In her 2018 Nobel Lecture, **Frances Arnold** stated, "The code of life is like Beethoven's Symphony – intricate and beautiful. But we don't know how to write like that." Apart from sparking creativity and teaching scientists discipline, music also encourages Nobel laureates to draw comparisons and see similarities between science and music. Frances Arnold, a Chemistry laureate, mentioned the resemblance between Beethoven's symphony and her work with the code of life.

Both are beautiful and complex, yet we still need practice to write the code of life as beautifully and intricately as Beethoven composed his symphony. Frances Arnold, who played the piano and guitar as a teenager, continues to hold a deep affection for music.

Barbara McClintock, a Medicine laureate, played the tenor banjo in a New York jazz band during her final year at Cornell University. However, like many other scientists, McClintock realized that her passion for music was great. What happens when a scientist is also a musician? For Barbara McClintock, the combination may have led the way to a Nobel Prize in genetics. Science historian Jocelyn Bosley tells us the story of Barbara's remarkable life, and how her experience playing banjo in a jazz band (yes) helped her discover "jumping genes."

Roald Hoffmann: Hoffmann, a chemist and Nobel laureate in Chemistry (1981), is known for his contributions to the field of theoretical chemistry. Apart from his scientific achievements, he is also an accomplished pianist. Hoffmann frequently performs piano recitals and has even composed music inspired by chemistry.

Brian Josephson: Josephson, a physicist and Nobel laureate in Physics (1973), has an affinity for music. He is a skilled pianist and has a particular interest in the music of Johann Sebastian Bach. Josephson has given public performances of Bach's compositions and has written about the connections between music and physics.

Dudley R. Herschbach: Herschbach, a chemist and Nobel laureate in Chemistry (1986), is not only known for his contributions to molecular dynamics but also for his musical talents. He plays the clarinet and has performed in numerous chamber music concerts. Herschbach has even combined his scientific and musical interests by composing a piece called "Collision Theory" inspired by his research.

Werner Arber: Arber, a microbiologist and Nobel laureate in Physiology or Medicine (1978), has a strong passion for music. He is an accomplished cellist and has performed in various orchestras and chamber music ensembles. Arber has often highlighted the similarities between scientific research and music in terms of discipline, precision, and creativity.

Overview of other Scientists have integrated Music into their Scientific Work

Table 4. Scientists Who Integrated Music into Their Scientific Work

Scientist	Field	Contribution
Alexander Graham Bell	Acoustics, Speech Science	Developed visible speech apparatus and melophone to study speech and teach deaf people to speak.
Carl Sagan	Astronomy, Popular Science	Used music in his work to communicate complex ideas to a general audience.
Oliver Sacks	Neurology	Explored the therapeutic potential of music for patients with neurological conditions.
Richard Feynman	Physics	Saw music as a way to explore new ideas and perspectives.
Ernst Chladni	Acoustics	Researched patterns formed by vibrating plates, laying the foundation for experimental acoustics.
Diana Deutsch	Cognitive Psychology	Studied auditory illusions and perception of music, shedding light on how the brain processes musical information.
Mark Ballora	Computer Science, Music	Used computer algorithms and data visualization for music analysis and composition.
Daniel Levitin	Cognitive Neuroscience	Researched the neural basis of music perception, memory, and emotion.
Eduardo Reck Miranda	Artificial Intelligence, Music	Used AI to generate music, aiming to understand the principles of musical creativity.

1. Alexander Graham Bell: Bell was interested in the relationship between music and speech, and he developed a machine called the "visible speech apparatus" to study the formation of speech sounds. He also invented the "melophone," a musical instrument that could be used to teach deaf people to speak.
2. Carl Sagan: Sagan used music in his scientific work to communicate complex ideas to a general audience. His Cosmos television series featured music by composers such as Vangelis and Alan Hovhaness, and his book Cosmos included a chapter on the relationship between music and science.
3. Oliver Sacks: Sacks wrote extensively about the therapeutic potential of music for patients with neurological conditions. His book Musicophilia explores the many ways in which music can affect the brain and mind.
4. Richard Feynman: Feynman believed that music and science were both creative endeavors. He enjoyed playing the bongo drums and saw it as a way to explore new ideas and perspectives.
5. Ernst Chladni: Chladni's research on the patterns formed by vibrating plates laid the foundation for the field of experimental acoustics. His work also helped to bridge the gap between music and science.

6. Diana Deutsch: Deutsch's research on auditory illusions and the perception of music has shed light on how our brain processes musical information. Her work has also implications for understanding the neural basis of musical creativity.
7. Mark Ballora: Ballora's research on the use of computer algorithms and data visualization techniques to analyze and interpret musical compositions demonstrates how scientific methods can be applied to music analysis and composition.
8. Daniel Levitin: Levitin's research on the neural basis of music perception, memory, and emotion has helped to deepen our understanding of how music affects the brain. His work has also been featured in popular media outlets, such as the New York Times and NPR.
9. Eduardo Reck Miranda: Miranda's research on the use of artificial intelligence to generate music aims to understand the underlying principles of musical creativity. His work demonstrates the potential for integrating scientific methods and technology to create new musical compositions.

These are just a few examples of the many ways in which scientists have integrated music into their scientific work. The intersection of music and science is a rich and growing field, and there are many exciting new discoveries being made all the time. The integration of music and science.

The Multifaceted Tapestry of Arabic Music

The rich tapestry of Arabic music is intricately woven with the diverse influences of ancient civilizations, spanning from the pre-Islamic era to the present day. This section delves into the origins of Arabic music, its evolution through the ages, and its profound connection with the scientific endeavors of its time.

Arabic Music: A Melodic Journey through Time: Arabic music, as explored in the book "The Arab Music Conference," published in 1933, unveils a mesmerizing chronicle of musical expressions deeply rooted in the cultural fabric of the Arab world. Under the supervision of Dr. Mahmoud Ahmed Al-Hafni, the book elucidates the historical interplay between music and science, shedding light on the evolution of Arabic music and its influences.

Origins in the Pre-Islamic Era: The roots of Arabic music can be traced back to the pre-Islamic era, where it flourished amidst the desert life and the nomadic traditions of the Arab Bedouins. Singing, dancing, and the use of musical instruments, including the tambourine and flute, were prevalent. Poets, who often embodied the role of musicians, played a vital part in this musical landscape. Arab women, renowned for their elegies and lamentations, added a distinctive touch to the musical heritage.

Influences of Persian and Greek Cultures: Arabic music bore the imprint of Persian and Greek cultures, which greatly influenced its development. Stringed instruments such as the oud, jinn, harp, flute, and reed, along with percussion instruments like the drum and tambourine, gained widespread popularity, enriching the musical landscape of the Arab world.

Shifts with the Advent of Islam: The advent of Islam brought about a shift in attitudes toward music. While early Muslim companions held reservations about it, the Umayyad dynasty witnessed the flourishing of music alongside poetry, becoming an integral part of noble gatherings. Initially, professional singing was predominantly performed by female singers known as "Qayyan," but male singers emerged later. Al-Tawais, the first famous singer, introduced rhythm into Arabic singing, drawing inspiration from Persian prisoners. The Umayyad era marked the expansion of the Islamic state and the flourishing of Arab civilization, which, influenced by ancient Persian, Greek, and Egyptian cultures, witnessed significant musical developments. Notable musicians like Saeb Khair, who played the oud, played a pivotal role in this musical renaissance. Singers such as "Azzat al-Milaa," "Jamila," "Ibn Saree'," and "Ma'bad" rose to fame, and musicians found their way into the palaces of the caliphs.

The Golden Age of Abbasid Era: The Abbasid era witnessed the pinnacle of Arabic music, highly influenced by Greek music theories. Strides were made in maqamat (musical styles), rhythm methods, and instruments. Caliphs such as Al-Mansur and Al-Mahdi ibn Al-Mansur actively encouraged music and became its patrons. Baghdad, the Abbasid capital, emerged as a thriving center for arts and sciences. Eminent musicians like Ibn Jami' and noble figures like Ibrahim ibn Al-Mahdi and Al-Caliph Al-Wathiq mastered the art of music, embracing the Persian names for strings. Arab musicians retained their distinct Arab character, and the first Arabic classifications in music and singing emerged. Works like "Nagham" by Yunus and "Al-Qayyan" laid the foundation for the monumental book of songs by Al Imran Al-Isfahani.

The Flourishing of Arabic Music in Andalusia: In Andalusia, a strong passion for culture, particularly science, emanated from its successors. The infusion of Arab knowledge of musical instruments, including the oud, the tanbur, the harp, the flute, the qanun, the nazha, and various wind instruments, set the stage for the prosperity and popularity of Arabic music. Musical forms such as the zajal and the muwashahat emerged and spread across the Berber lands, Egypt, and other Arab regions. Ziryab, a renowned disciple of Ishaq al-Mawsili, became one of the most celebrated musicians in Andalusia. Notable figures like Alon, Zarqoun, Fadl, and Muta further enriched the musical landscape, inspiring European scholars to delve into the study of music. Their contributions paved the way for the dissemination of Arabic songs throughout Europe.

Ancient Egyptian Influence and the Arab Conquest: Ancient Egyptian civilization boasted a rich musical heritage with advanced instruments and organized musical groups. Greek philosophers, including Arpheus, Pythagoras,

and Plato, drew inspiration from Egyptian music, contributing to the establishment of Greek music. Following the Arab conquest of Egypt, Arabic music assimilated elements of ancient Egyptian music, resulting in a fusion of musical traditions. The Arab conquest also facilitated the spread of Arabic music across North Africa and the Middle East, where it continued to evolve and adapt to local cultures.

Scientific Contributions and Musical Theories: Arabic scholars played a significant role in advancing the scientific understanding of music. Prominent figures like Al-Farabi, Ibn Sina (Avicenna), and Al-Kindi made significant contributions to music theory, exploring topics such as acoustics, scales, and the nature of sound. They developed intricate systems of musical notation and classification, laying the foundation for modern music theory.

Maqamat: The Soul of Arabic Music: The maqamat, or musical modes, form the essence of Arabic music. These melodic modes are characterized by specific scales, melodic patterns, and emotional characteristics. The maqamat provide a framework for improvisation and artistic expression within Arabic music, allowing musicians to evoke a wide range of emotions and moods.

The Arab Music Renaissance: In the 20th century, a renaissance of Arab music took place, with artists and scholars rekindling interest in traditional Arabic music while also embracing modern musical influences. Renowned musicians like Umm Kulthum, Fairuz, and Abdel Halim Hafez captivated audiences with their powerful voices and poetic lyrics, becoming iconic figures in the Arab music world.

Contemporary Arabic Music: Contemporary Arabic music continues to evolve, embracing various genres and styles. Artists experiment with fusion, blending traditional Arabic music with elements of Western music, jazz, rock, and electronic music. This exploration of new sounds and genres reflects the dynamic nature of Arabic music and its ability to adapt to changing times.

So, Arabic music stands as a testament to the rich cultural heritage of the Arab world. Its journey through time reflects the interplay between art, science, and the diverse civilizations that shaped its development. From the pre-Islamic era to the present day, Arabic music has captivated audiences, carrying with it the echoes of ancient melodies and the innovations of scientific minds. It continues to evolve, finding new avenues of expression while preserving its deep-rooted traditions. Through its harmonies, Arabic music remains an enduring bridge between the past, present, and future, enriching the cultural mosaic of our world.

Music and Science: Great Egyptian Scholars of the 20th Century

Table 6. Egyptian Scholars Who Combined Music and Science

Scholar	Field	Musical Expertise	Contributions
Prof. Ali Mustafa Mosharafa	Mathematics	Piano	Pioneered comparative study of Eastern and Western musical maqams, wrote "Styles of Modern Egyptian Music."
Prof. Abu Shadi Al-Roubi	Medicine, Scientific History	Oud, Piano	Wrote extensively on music history, documented ancient Egyptian and Arab musical heritage.
Prof. Ahmed Medhat Islam	Chemistry	-	Played music in college, conducted research on music and science, contributed to understanding musical maqams.
Prof. Mahmoud Mukhtar	Physics	-	Conducted research on "Maqamat in Modern Egyptian Music," presented at an international conference.
Prof. Youssef Shawky	Music, Science	Oud	Expert in composition, criticism, analysis, and musical history. Contributed to Omani music documentation.

These great Egyptian scholars of the 20th century shone in the fields of both science and music. They were not satisfied with being mere musicians, but also composed music and wrote research about it.

Dr. Ali Mustafa Mosharafa, a famous mathematician, was interested in music and approached it not only as a hobby but in a serious scientific way. He wrote a research paper entitled "Styles of Modern Egyptian Music" in 1939. In its summary, he stated: "We were busy determining the frequency ratios in the main musical maqams or patterns currently used in Egypt today." Dr. Mosharafa was a musician and played the piano. He was also the first to conduct a comparative study of the use of the octave and explain its meaning in music theory and maqam. He compared the Western musical maqam to the Eastern musical maqam. He headed the first Egyptian Association for Amateur Music and World Songs and was a member of the Supreme Council for Music Affairs and the Egyptian Chopin Celebration Committee. He also linked the movement of the atom to the arts and philosophy of music.

Dr. Abu Shadi Al-Roubi, a doctor, university professor, and scientific historian, was very fond of music. He had a passion for music since he was young and studied playing the oud and piano at the Schultz Institute of Music in Cairo. He wrote many articles and books on music and its history, including his book "A History of Music in Egypt." He also gave historical lectures and seminars on Egyptian and Arab music. Dr. Al-Roubi was famous for his documentation of the

ancient Egyptian and Arab musical heritage, and his analysis of musical maqams and rhythm systems, which contributed to enriching our understanding of traditional music.

Professor Dr. Ahmed Medhat Islam, an eminent scholar and pioneer of chemistry sciences, also had a strong passion for music. He grew up in the Shubra district of Cairo in the 1920s, which was full of gardens. The fragrance of the flowers stimulated his senses and conscience, and it is not surprising that he loved music and became a great musician later in life. He used to play his music in the College of Sciences' College of Hearts during the days when he was a student there, and he still keeps a collection of the works of the most important players and musicians in his scientific and cultural library.

Dr. Mahmoud Mukhtar, a physicist and professor at the Faculty of Science at Cairo University, wrote and composed music as well as conducting research on the science of music. His research on "Maqamat in Modern Egyptian Music," which he published with Dr. Mosharafa in 1939, aimed to record measurements of the frequency ratios used in musical modes or musical scales actually used in Egypt at the present time. This research was presented at an international conference held in Cairo in 1932 and helped to resolve many disagreements and issues related to this topic. Dr. Mosharafa believed that his research with Dr. Mukhtar could serve as an experimental basis for the study of modern Egyptian music.

Dr. Youssef Shawky, a professor at the Faculty of Science, Cairo University, was a professional in composition, criticism, analysis, and musical history. He excelled at playing the oud and presented many achievements that confirmed his genius. Many great singers sang his melodies, and he was also an academic and scientific researcher. In the field of Arabic music, he wrote "Al-Kindi's Treatise on the News of the Composition Industry," "Measurement of the Arab Musical Scale," and "The Peaceful Theory of Arabic Music." He also wrote the book "The Great Music" by Al-Farabi. In 1983, he immigrated to the Sultanate of Oman to work there and contributed to a huge project to collect and document everything related to traditional Omani music. The Oman Center for Traditional Music was established in 1984.

These great Egyptian scholars are only a few examples of the many scholars and musicians whose skills in science and music combined. They are not only pioneers in their fields but also active contributors to the development and deeper understanding of music. As the interaction of science and music reflects a rich and multifaceted heritage, each can inspire and enrich the other.

So our understanding of music has greatly benefited from the fusion of music and science in a number of ways, including:

1. **Acoustics and Physics:** The study of the characteristics and behaviour of sound in the science of acoustics has shed light on the basic ideas behind music. Researchers have looked at the physics of musical instruments, the structure of sound waves, and how pitch and harmony are perceived. We

now have a better understanding of the processes involved in making music as well as the elements that influence the variety and complexity of musical sounds.

2. **Music Perception and Cognition:** Research on these topics has provided insight into how our brains interpret and comprehend musical sounds. Researchers have discovered how we recognise melodies, interpret rhythm, and feel emotions through music through trials and neuroimaging methods. Our knowledge of the cognitive processes behind musical perception has increased as a result of this research, which has also provided new insights on the cultural universality of music.
3. **Developmental psychology:** Research into how music affects human development has produced several useful findings. Researchers have looked at how music instruction affects children's cognitive skills, language development, and emotional health. This study has emphasised the value of music education and has offered proof of the cognitive and emotional advantages of early musical exposure.
4. **Therapeutic Applications:** The marriage of music and science has also resulted in the establishment of music therapy as a legitimate profession. Researchers have looked into the potential benefits of music for enhancing wellbeing, lowering stress, and enhancing mental health. In a variety of clinical contexts, including the treatment of neurological disorders like Parkinson's disease and stroke rehabilitation as well as mental health disorders, music therapy has demonstrated encouraging effects.
5. **Computational Musicology:** The study of musicology has undergone a revolution thanks to the application of computational techniques and algorithms. Large collections of musical compositions may now be analysed by scientists to spot patterns and trends and learn more about musical genres, influences, and cultural settings. These computational methods have increased our understanding of musical genre development, compositional methods, and musical history.

Generally, the integration of music and science has enriched our understanding of music by providing empirical evidence, uncovering underlying mechanisms, and exploring the diverse aspects of music perception, cognition, development, and therapy. It has deepened our appreciation for music as a universal human experience and has expanded our knowledge of its cultural, emotional, and cognitive dimensions.

Conclusion

The intersection of science and music is a rich and fascinating tapestry, woven from the threads of human curiosity, creativity, and ingenuity. From the ancient Egyptians' understanding of the acoustics of sound to the modern-day use of music therapy, the harmonious interplay of these two disciplines has left an indelible mark on human culture and society.

By exploring the theoretical and experimental connections between music and science, this article has highlighted the profound impact of music on scientific inquiry and the broader human experience. From the acoustics of sound waves to the cognitive processes involved in music perception, the study of music has shed light on the inner workings of the human mind and body.

In addition, music has played a vital role in scientific discovery, inspiring scientists and scholars throughout history. From Pythagoras's exploration of the mathematical basis of music to Isaac Newton's interest in the relationship between sound waves and light, music has served as a muse for scientific breakthroughs.

The integration of music and science has not only deepened our understanding of music itself but has also enriched scientific endeavors, leading to advancements in both disciplines. For example, research on music perception has helped us to better understand the neural basis of language and cognition. Similarly, studies on the therapeutic applications of music have led to the development of new treatments for a variety of conditions, including autism, Alzheimer's disease, and chronic pain.

As we continue to explore the harmonies of discovery that resonate through time, the intersection of science and music promises to yield even greater insights into the mysteries of the human mind, body, and universe. I encourage readers to continue learning about the intersection of science and music. There are many resources available online and in libraries. You can also find many opportunities to experience the power of music firsthand through concerts, recitals, and other events.

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Irrigation System in Ancient Mesopotamia

By Dilman Mohammed Sabir*

Hunter-gatherer groups first began agriculture in Mesopotamia more than 12000 years ago. Over time, these groups learned how to plant crops in Mesopotamia to produce their own food. Each year, the floods of the rivers Tigris and Euphrates brought silt to the land, a mixture of rich soil and tiny rocks. The fertile silt has made the region ideal for farming. Though there was fertile soil in Mesopotamia, farming was not easy there. There was little rain in the area. This meant that the levels of water in the rivers Tigris and Euphrates depended on how much rain fell in the east, where the two rivers fell. Water levels were very high after a significant amount of rain fell there. The floods damaged crops, killed animals, and washed away houses, and the crops dried up when the water levels became too low. The farmers realized that they needed a way to regulate the flow of the rivers. Thus, in both the rainy and dry seasons, early farmers faced the difficulties of learning how to regulate the flow of river water to their fields, and early settlements in Mesopotamia were situated near rivers. They could not regulate the water, and flooding was a big issue. Later, people constructed canals to safeguard houses from floods and pass water to their fields. Mesopotamians used irrigation, a method of providing water to a region of land, to solve their problems. They dug out large storage basins to carry water sources to irrigate their property. Then they dug canals, rivers created by humans, linking these basins to a network of ditches. These ditches supplied the fields with water. The farmers constructed the banks of the Tigris and Euphrates in order to protect their fields from flooding. Even when river levels were heavily irrigated, these built-up banks held back flood waters, raising the amount of food farmers were able to produce. Farmers may potentially generate a food surplus, or more than they need. Farmers have also used irrigation for cattle and sheep to water grazing areas. Mesopotamians consumed a number of foods as a result. There was abundant fish, meat, wheat, barley, and dates since irrigation made farmers more productive, farming required fewer individuals. Some individuals have been free to do other work. As a consequence, new occupations have grown. People became crafters, religious figures, and government employees for the first time. A division of labor is called the type of arrangement in which each worker specializes in a specific assignment or task.

Introduction

The control of irrigation has been of classical interest to historians and archaeologist in early complex societies Large-scale irrigation (construction/operation, water distribution, dispute resolution) management requirements were considered to be necessary for state development, as most early civilizations in the Old World were located in river valleys. This study assumes that for the

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management of large-scale irrigation systems, centralized control is needed, as claimed.

Irrigation was of great economic significance to many early states, as it played a key role in agricultural intensification and surplus production.

Agricultural surpluses were the main source of wealth in early state societies, and political power was largely based on the exploitation of these surpluses by a small centralized party. In addition, agricultural surpluses were required to maintain the very features of statehood, such as urbanism, full-time labor specialization, state institutions, and status hierarchy.

Scholarly interest in the cross-cultural study of ancient irrigation has declined considerably over the last few decades. As a result, several critical questions were only partly answered. The study of ancient irrigation presents great opportunities to understand the early states' socio-political and economic organization. We do not know how states can presume or abstain from assuming control over irrigation management, and even more importantly, why. Furthermore, in a cross-cultural contrast, the implications of either option were not systematically explored.

Therefore, the object of this paper is to create an early Mesopotamian irrigation system. The research is organized into certain parts, each discussing one of the key elements of irrigation. The climate under which they occur, the source of water they regulate, the kinds of crops they irrigate, the length of their use, and how they are handled. The case studies discussed in this paper discuss the relationships between water flow, the atmosphere and the agency of humans.

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Geography of Mesopotamia

Mesopotamia is a triangle that occupies an area of around 240,000 square kilometers, so our study area is limited by arbitrary lines drawn between Aleppo, Lake Urmiah and Shatt-el-Arab mouth. Cities such as Ur, Uruk, Nippur, Agade, Babylon, Assur and Nineveh, all situated on or near the Tigris or the Euphrates, within the boundaries of modern Iraq, are called Chaldaean, Assyria-Babylonia, Summero-Akkadian or Mesopotamian civilization, according to the system of the day, a culture that flourished within our triangle that was only equal to the civilization of Egypt in quality and meaning.¹

Babylonia, the area between the Persian Gulf and modern-day Bagdad seems an area with little diversity that relied on irrigation by the Euphrates and Tigris rivers for its survival. The north was a desert plateau where agriculture was only possible in the narrow river valleys, and downstream the rivers entered flat alluvium, still had clearly defined channels, allowing for irrigation agriculture in square.²

Mesopotamia is the southwestern Asian region where the earliest known civilization in the world developed. The term 'Mesopotamia' derives from the Greek word meaning between rivers that refer to the land between the Tigris and Euphrates rivers, but the area can be broadly defined to include eastern Syria, southeast Turkey, and much of the region that is now eastern Syria, Around Iraq. This region was the center of culture in the Indian subcontinent, Egypt, and the Mediterranean as the Indus Valley.³

With hills and undulating plains in the north where wheat growing and cattle-rearing could be practiced, the area is very diverse. The rivers are abundant in fish further south, and the river banks, full of wild animals and birds, were once forests of vegetation where lions roamed and wild boars could be caught. The rich biodiversity may have drawn humans first to the Mesopotamian plain, the southern plain is beyond the zone of rain-fed agriculture, but over the centuries, the rivers have laid dense deposits of very fertile silt, and once this soil is brought into ditches and canals, it proves to be a very desirable place for farmers for materials including wood, stone, and metals. As far as archaeologists can say, farmers and

1. Roux G., (1992) *ancient Iraq, third edition, penguin books, London, p.4.*

2. Van De Mieroop, M. (2024). *A history of the ancient Near East ca. 3000-323 BC.* John Wiley & Sons., p49.

3. Kuiper, K. (Ed.). (2010). *Mesopotamia: the world's earliest civilization.* Britannica Educational Publishing, p18

fishermen began to settle the southern Mesopotamian plain around 5500 B.C. However, people have to look north and east, to the mountains. Over time, some of their tiny villages have grown into large settlements. The cornerstone of these classes was the temple of the town's patron god or goddess in menu-mental buildings such as those found at Erode, Uric and Ur, the rich farmland provided an extra amount of agricultural property and some of the wealth produced was invested. Using the reeds and mud that line the river banks, temples and regular households have been constructed. Centuries of renewal using sun-dried mud bricks culminated in the high mounds, or the arenas and canals rising overhead. It was ancient Greek explorers and historians who first gave the land the name by which we It's known. Mesopotamia there was no name for the entire land for the early Mesopotamians; instead, their conceptual horizons were limited to the names of the towns and kingdoms where they lived. Today, much of the earliest Mesopotamia lies within the boundaries of modern Iraq, with some parts of Syrian and Turkish territories to the west and north.⁴

There were many floods in Mesopotamia every year, Mud and clay deposited by two great rivers, the Tigris and the Euphrates, made up the land. These twin rivers descend from the northern mountains, cut through hilly grasslands to the southeast, and finally cross the plain they formed to enter the Persian Gulf.⁵

The Tigris and Euphrates both have their bases in mountains of eastern Turkey and when they appear from the Taurus Mountains, the two rivers are separated by some 400 kilometers of open plain from each other.⁶

There were two primary rivers in Ancient Mesopotamia. These were the Tigris and the Rivers of the Euphrates. In that part of the world, much of the land was very dry. There, plants could not grow. But the land was fertile and rich between these two rivers. It had brilliant soil for plant growth. People settled down and founded towns there. For travel, rivers were also important. The inhabitants of ancient Mesopotamia were able to get to other parts of the land using vessels. They could buy and sell food with other people from other cities.⁷

Tigris River

The watercourses that joint to form the Tigris River arise in high mountains that rim Lake Van in northern Kurdistan. Separation Turkey, the Tigris touches the northeastern border of Syria and then streams southeastward across Iraq. In Iraq it is joined by branches from the east—principally the Great Zab, Little Zab, and Diyala.

4. Bertman, S. (2003) *Handbook to life in ancient Mesopotamia*. Infobase Publishing, P4.

5. Loria, L. (2016) *Ancient Mesopotamian Religion and Beliefs*, the Rosen Publishing Group, Inc, p11.

6. Roux, G. *op. ct.* p5.

7. Klingel, C. F., & Noyed, R. B. (2003), *Ancient Mesopotamia*, Capstone, P.16.

The Euphrates, west of the Tigris, runs in the same overall direction. In ancient times the two rivers had distinct mouths. Now they meet in a swamp in southern Iraq and form a single stream, the Shatt al 'Arab, which flows into the head of the Persian Gulf. The Tigris, 1,180 miles (1,900 kilometers) long, is shorter than the Euphrates, but it is more important commercially because its channel is deeper. The Tigris was the great river of the kingdom of Assyria. The earliest city of Assur, which gave its name to Assyria, stood on its banks, as did Nineveh, Assyria's splendid capital.⁸

Euphrates River

Maps of the 3rd millennium B.C. channels show some Euphrates branches, with the main channel probably passing through the Mesopotamia region during the 3rd and 2nd millennia B.C., these channels formed the Irnina and Zubi branches to the north and the Kish branch to the south. Although the history of these channels is not known in detail, their presence is recorded from Akkadian place names on clay tablets. It has, therefore, been possible to relate these place names and their associated named channels to ancient levees evident on large-scale topographic maps beginning about the first half of the 2nd millennium and ending about 900 B.C., a gradual of these multiple channel networks took place. during the Isin-Larsa and Old Babylonian periods in the earlier half of the 2nd millennium B.C. a previously insignificant Babylonian branch became the most important of the Euphrates courses, indicating further westward shift in flow Beginning in the 3rd millennium B.C., repetitive avulsions took place near Sippar/Fallujah, where the Euphrates, called Purattum in Sumerian and Akkadian vocabularies, emerges from its incised valley. From the beginning of the 1st millennium B.C., another branch of the Euphrates, called Pallukkatu existed west of the Babylonian branch, its position closely approximating that of the Hindiya branch of the modern Euphrates.⁹

The 1700-mile (2,700-kilometer) Euphrates is Western Asia's longest river. It starts in eastern Turkey's high mountains, crosses eastern Syria, and then flows through Iraq to the southeast. Much of the river's water is lost by evaporation and use for irrigation due to Iraq's hot, dry climate. From the winter rains and snowfall, the river gets most of its water. Only flat bottom edriverboats can navigate it. The Tigris runs almost parallel to the Euphrates and together they form a broad, agriculturally fertile alluvial plain, a plain made of rivers deposited silt, sand, clay, and gravel. Each year, there are two flood cycles.¹⁰

8. Ali, A. A., Al-Ansari, N. A., & Knutsson, S. (2012), morphology of Tigris River within Baghdad city *Hydrology and Earth System Sciences*, 16(10), P379.

9. Morozoya, G. (2005), A review Holocene Avulsions of the Tigris and Euphrates and possible effects on the evolution of civilizations in lower Mesopotamia, Article in *Geoarchaeology* pp402-423. April 2005, <https://www.researchgate.net/publication/230035623>

10. Sherman Holer, op.ct, 11.

The rivers of the Tigris and Euphrates begin in the Kurdistan Mountains and flow southeast across the plains of Iraq. They joined together to build the Shatt-al-Arab River there. Through the Persian Gulf, this channel stands on the banks of the Tigris often referred to as "a civilization cradle." Civilization originated in the valleys of the Tigris and Euphrates rivers because this region offered abundant resources, such as plants that grew well there and game to hunt. These rivers would flood their banks in spring, and, as the floodwaters receded, the soil left behind was rich in many nutrients required by plants to grow as more permanent settlements were developed for religious and social reasons, changes in farming methods and the growth of settlements were encouraged by rich soil and water supply. The floodwaters enriched the soil often, but whether they were too high or too low, they often disrupted agriculture. Over time, farmers have learned to construct drainage ditches to direct the river's water to the fields, as well as dikes to hold back the floodwaters and channel them to reservoirs for later use. This was very important because year after year the floods varied, so farmers learned to monitor the unpredictable flooding and store food for potential use. It is necessary to structure dikes, reservoirs, and irrigation ditches that individuals work together, not only inside villages, but from village to village. This was the start of centralized power.¹¹

Mesopotamia region bounded by mountains in the north and east and desert in the west and restricted in the south by the Persian Gulf. These provided water for agriculture and daily life and were the main highways for communication. Major environmental differences divided Mesopotamia into two diverse regions, the northern plains of Assyria and the southern Babylonian alluvium. Further differences split Babylonia into a northern river plain (Akkad) and southerly delta plain. These geographical contrasts were mirrored by cultural, political, and economic differences. Marshes separated Babylonia from Elam, the eastern alluvial plain and head-to-head Zagros Mountains, a land whose history regularly intertwined with that of Mesopotamia. At times, cities and states beyond the desert and the mountains were also involved with Mesopotamia, while mountain and desert fringes were home to tribal groups who regularly raided their settled neighbors.¹²

Temperate and Climate Change

One of the clear parallels is the atmosphere of the Mesopotamian plains. While the winters are cold, often even freezing, with strong winds and rain, the summers are so warm and dry. In order to explain these contrasts, the monthly mean

11. E.D Hirsch E.D. (2019), *Mesopotamia History and Geography*, core Knowledge programs, London, p.18.

12. McIntosh, J. R. (2005). *Ancient Mesopotamia: new perspectives*. Bloomsbury Publishing USA, p9.

temperature in summer is about 95p and the temperature can rise to 50°C (120°F) in July. The temperature can drop as low as -5°C in December and January, with a monthly average of around 10°C (50°F). Monthly mean temperature in the north in the summer is not quite as high as south, but the winters are not as high. Since November, frosts have been common and small falls of snow occur very regularly in the northern plains. Every winter, the Kurdish and Zagros mountains are covered in snow. As of November, frosts are common and small falls of snow occur very frequently in the northern plains.¹³

As far as the climate of Mesopotamia is concerned, it should be noted that there has been no significant shift since very early times, according to geologists' findings. When the melting snows in the mountains of Taurus and Zagros feed their tributaries. Paradoxically, this also occurs between April and June, which is also late for watering the main crop, normally harvested in April from an agricultural point of view. This was the climate regime and seasonal variations with which, at the wrong time, the ancient farmers of southern Mesopotamia encountered rain in insufficient quantities; river water, even at the wrong time, accumulated in almost unmanageable quantities along the river beds. In the end, water had to be supplied to the nation, simply through the objects of human ingenuity: a complicated system of canals, reservoirs, dykes and regulator-sluiques.¹⁴

Water Resources

The Tigris and Euphrates Rivers would fill the mountains with water from melting snow, so that the rivers would overflow. The floods have brought fertile land to the province. However, the weather in the region was very hot and dry. The ancient Greek historian Herodotus considered the gift of the Nile to Egypt, the gift of the Tigris and the Euphrates to Mesopotamia; this was particularly true of the alluvial plain to the south, where such staples of the human diet as barley, sesame, and dates were nurtured by the well-watered fertility of the soil. Southern Mesopotamia's alluvial and deltaic plains occupy part of the Mesopotamian depression, a foreland basin confined to the northeast by the Zagros Mountains, and a fine-grained alluvium underlies the Arabian platform to the southwest plain, up to 200 km wide. Of the Rivers Euphrates and Tigris, Active channels, natural levees, crevasse splays, and flood basins compose the latest flood plain, as well as regions now removed by avulsion or channel migration from active fluvial deposition. Elial landforms, including sand dunes and deflation basins, often show such areas and undergo intense salinization. The southern portion of the plain, called "Ahwar," consists of fresh- and salt-water lakes surrounded by reed marshes

13. Ibid.

14. Lloyd, S. (1978). *The archaeology of Mesopotamia from the old stone age to the Persian conquest* Thames and Hudson, P, 17.

along with large levees and inland delta lobes. Natural levees stand up to 3-4 m above the surrounding flood basins, these marshlands currently occupy only about one tenth of their former territory, drastically reduced in response to irrigation practices, global warming, and different petroleum-related and other industrial practices activities.¹⁵

In the mountains of southern Turkey, the Euphrates and Tigris rise, flow along the Mesopotamian depression, and join near its southeastern end, where they form the Shatt al-Arab estuary of the Persian Gulf, together with the Karun River. The Euphrates is an exotic, lower land Mesopotamia stream, while four major tributaries are accepted by the Tigris. The Euphrates divides between Hindiya and Samawah into two branches: Hindiya, the main channel, and Hill The desert area in the western part of the lower Mesopotamian plain is characterized by relict alluvial fans produced during a wetter climate mid-Holocene period.

In general, several ephemeral streams are perpendicular to the flow of the Euphrates.¹⁶ Fan piedmont stretches along the front of the Zagros Mountains along the northeast edge of the plains. The climate is arid, with about 100-150 mm of average annual rainfall. In January, temperatures range from 10 to 12.5°C to 34-35.5°C in July. Winds blow from the north and northwest much of the year, with some southeasterly winds from April to mid-June and from September to November. Low-pressure areas and cold fronts are migrating carrying.

Most of the rainfall falls in winter and spring. Lower Mesopotamia was primarily irrigated by water from the Euphrates rather than the Tigris the annual rainfall numbers above provide a rough indication of the variation that can be expected between locations. In order to give a picture of the rainfall settings in their region at the present time, the conditions of important excavated archaeological sites nearest to these rainfall stations were involved. The reliability of the rain and the time of year in which it falls is much more significant, although the amount of rainfall per year is imperative. A region in Mesopotamia may have heavy rain for one year, but the next may be very slight.¹⁷

Agricultural Revolution

By the end of the Pal Neolithic, around 12,000 years ago, after hundreds of thousands of biological and cultural advances, human communities were able to build increasingly complex, sophisticated and specialized instruments by which

15. Morozoya, G. op. ct. pp402-423

16. Ellison, E. R. (1978) A study of diet in Mesopotamia 3000-600 BC and associated agricultural techniques and methods of food preparation, University of London, P.7.

17. Ibid.

they evolved distinct modes of hunting, fishing, gathering, and improving predation to the most diverse environments.¹⁸

Was no coincidence that the first major civilizations in the world grew up along broad river banks, The vital waterways were the Tigris and Euphrates Rivers in ancient Mesopotamia, what is now Iraq. The culture that emerged more than six thousand years ago in the huge Tigris-Euphrates valley was more than just one of the four great ancient river civilizations. It was also the first to spring into being among them. In the valley, farms and villages appeared as early as 75 hundred years ago. The inhabitants of Mesopotamia depended on the local rivers for life-giving water, including the Chinese, Egyptians, and Harappans. Agriculture first started about 9000 BC, or around eleven thousand years ago, in the northern reaches of this region. Residents discover how maize, barley, lentils, cucumbers, cabbage, grapes, and other crops can be produced. Livestock, sheep, goats, pigs, and other livestock are also raised and bred. Together, these crops and animals established such a broad and stable food system.

The source is that the Fertile Crescent people abandoned the lifestyle of hunter-gatherers, they settled and founded tiny villages alongside their fields. A few dozen huts made of thatch and other natural materials were present in each of these tiny villages. the new agricultural lifestyle has proven so successful that the number and size of the small villages in the northern sector of the Fertile Crescent has gradually increased this population increase, in turn, encouraged society's more restless members to migrate southward onto the plains of the great rivers. They became the first of many waves of colonists who remained permanently in the Tigris-Euphrates valley around 5500 BC.¹⁹

Agricultural Techniques

For their many inventions, or new ways of doing things, the people of Mesopotamia, especially the Sumerians, are remembered. For instance, new agricultural techniques, such as irrigation, were created by early farmers, leading to economic surpluses. The Mesopotamians used only basic farming technologies at first. Early instruments were made of clay and copper, such as sickles and hoes. Metalworkers began combining copper and tin over time to create bronze, which is much stronger than copper alone, by 2500 B.C.E., bronze instruments such as bronze-tipped plows were used by many farmers. Farmers could transform the soil more quickly with stronger plows, which led to larger fields that yielded larger crops. Next, by adding a funnel filled with seeds to the plow, farmers found a way

18. Griffon, M. (2008), Marcel Mazoyer and Laurence Roudart: A History of World Agriculture from the Neolithic Age to the Current Crisis: London: Earthscan, 2007. P71.

19. Nardo, D., (2014) Life in ancient Mesopotamia, reference point press, San diago, p.10.

to plow and plant at the same time. The seeds were freed from the funnel as the plow moved along each row. This agricultural technique has allowed more crops to be planted by fewer farmers. The Sumerians also wrote farmers' advice.²⁰

Mesopotamia is in the Near East sub-desert region, with low rainfall and low precipitation. High temperatures mean that irrigation is a must for farming to take place on a reliable basis. Base the region we are concerned with is far beyond the dry land cultivation limits proposed.²¹ Irrigation can be described by all average dictionaries as "the artificial application of water to land to assist in crop production." That is exactly how it was used by the Mesopotamians, 7000 years ago. It is still used in the majority of the world today, in a similar way. The techniques did not really need to be improved by humans, since the irrigation method was effective and simple from the beginning. Basically, it was necessary for large-scale farming, especially in the middle of the desert. The only drawback was that, at least when the Mesopotamians used it, it had to be used close to a water source. Irrigation, in fact, was the first engineering spectacle that the Pulled off by the Mesopotamians.²²

Mesopotamian developed irrigation to make agriculture. The earliest settlers of the region drained the swampy land and constructed canals through the dry areas in order to irrigate the land. This was achieved in other areas before the time of Mesopotamia. What made Mesopotamia the home of the first culture of irrigation is that the irrigation systems were constructed according to a schedule, and to sustain the system, an organized workforce was required. The irrigation system started on a small-scale basis and grew into a large-scale project that gained more control from the government. Originally, Mesopotamia was swampy in some places and dry in others the climate in most areas was too hot and dry to grow crops without any assistance. Archaeologists have discovered 3,300-year-old plow furrows lying near Ur in southern Iraq with water jars still lying by small feeder canals. To keep it maintained, it also required a large amount of labor Water distribution was developed by government and legislation to ensure that the process was run smoothly.²³

As far as the climate of Mesopotamia is concerned, it should be noted that, according to the findings of geologists, since very early times, there has been no perceptible change. The country has summer temperatures ranging from 130 degrees Celsius in the shade, and eight months without precipitation in the year. Rivers are reduced to stagnant brown meanders in the waste of dried mud by the

20. Woolley, C. L. (1962) *Mesopotamian Achievements, The Sumerians*. W.W. Norton & Company, P2.

21. Postgate, J. N., & Powell, M. A, (1988) *Irrigation and cultivation in Mesopotamia*, Sumerian Agriculture Group, p1.

22. Mays, L. W., *Irrigation Systems*, Ancient Water Encyclopedia, JRank, www.waterencyclopedia.com/Hy-La/Irrigation-System-Ancient.html.

23. Merle, S. (1991) *Agriculture, crops, irrigation and livestock in Mesopotamia*, Geographica, Smithsonian Magazine, <http://factsanddetails.com/world/cat56/sub363/item1513.html>

end of the dry season. Then winter arrives, with pale midday sunshine and freezing nights, bringing with it occasional rainstorms. But until spring, when the melting snows of the Taurus and Zagros Mountains feed their tributaries, the rivers do not obtain their maximum volume of water then came the spring floods that were considered virtually uncontrollable a century earlier, and posed an ominous danger to the inhabitants of the lower plain throughout history. Paradoxically, this often occurs between April and June, which is too late to water the main crop, normally harvested in April, from an agricultural point of view. This was the climate and seasonal variations faced by the ancient farmers of southern Mesopotamia: rain at the wrong time in insufficient amounts; river water, even at the wrong time, concentrated in almost unmanageable quantities along the river beds. So, in the end, water had to be supplied to the country, simply through the architecture of human ingenuity: a complex system of canals, reservoirs, dykes and regulator-sluiques. This required a great deal of organization and a lot of patience as well. The canals themselves filled their beds very quickly with silt, and required repeated dredging as a result. And, as this process went on, the banks were too large to throw the spoil out, and a new canal had to be excavated parallel to the first one.²⁴

The first to build canals between two rivers that enclosed Mesopotamia, the Tigris and the Euphrates, was the Sumer. The canals brought water out of one river and separated it into several agricultural fields, leading to another river. By digging a trench, these canals were built, then piling up soil on both sides, creating breaks in it when necessary to water lands. Later on, their own levees were made by the Sumer, essentially a larger canal that could hold even more water. Natural levees are an embankment formed by floods, built up over time. They are perpendicular to the surface of the sea, but then backwards arc to land. The Sumer repeated this by creating tiny walls with fir-hardening reeds, tying them together and packing mud around them.²⁵

On the use of mathematics in the irrigation systems of the early civilizations in Mesopotamia, Kazuo Muroi wrote that digging and maintaining canals was an important activity for the rulers of Mesopotamia, as canals were not only necessary for irrigation, but also useful for transporting goods and armies. Babylonian mathematicians may have been instructed by the rulers or high government officials to measure the gross workers' salary expenses.²⁶

24. Lloyd, S., op.ct., p11.

25. Maria, K. (2017), Ancient Sumerian Levees & Canals. Sciencing, Sciencing.com, 25 Apr. 2017, sciencing.com/ancient-sumerian-levees-canals-168741. <http://factsanddetails.com/world/cat56/sub363/item1513.html>

26. Ibid.

Difficulties in Building and Maintaining a Complex Irrigation

There were many problems facing the farmers who migrated to Sumer. The unregulated availability of water was one of the main concerns. The rain and melted snow poured from the mountains into the Tigris and Euphrates Rivers during the spring, causing them to flood across the plains. But no one could be sure when the floods would arrive, exactly. If it happened after farmers planted their crops, it would wash away their young plants. The sunbaked soil was dry and hard as stone for most of the remainder of the year. Thick clouds of dust drifted across the field from the heavy, powerful winds. Faced with these drastic seasonal shifts, farmers had to work constantly to grow crops. They either had too little water, or had too much water. They needed a way to regulate the water to succeed in growing food, so that they would have a stable water source all year round.²⁷

Irrigation systems gave Sumerian farmers ample water to produce plenty of food. But now a new issue has arisen: how to sustain the irrigation system outside the limits of the village. As it brought water from the river to the fields, the irrigation system went through several villages. It was important to continually manage the system. The canals had to be frequently washed as they were clogged with silt (very fine mud). The whole system could be spoiled by one clogged canal. Farmers could not live separately, even in small groups, anymore. They were connected by canals for miles around them they had to work together for the common good. Steadily, to develop and sustain their complex irrigation system, villagers began to rely on each other. Staff were potentially coming together from various villages. To keep them from clogging, they cleared the silt off the canals. To ensure the water levels were balanced, they scooped water from one reservoir into another.²⁸

Conclusions

Mesopotamia, without an irrigation scheme, was not a suitable land for living and farming. The northern portion was hilly, with rain coming in. There were small plains in the southern portion, or flat ground. On the plains between the Tigris River and the Euphrates River, the sun beat down brutally there was slight rain, So the Mesopotamians were farmers, demanding water from farms. When the rivers flooded, they carried water to the plains, but the soil remained strong and dry for much of the year.

27. Nicholas R. Magliocca & Erle C. Ellis (2016) Evolving human landscapes: a virtual laboratory approach, *Journal of Land Use Science*, pp643-671, 11:6, 642-671, DOI: 10.1080/1747423X.2016.1241314.

28. Ibid.

As the full weather have become heater, these rivers furnished the lifeline for growing and adorning civilizations which includes Mesopotamia as they presented get admission to transportation, smooth and health, crop irrigation, food, and defense. As early human beings have been skilled to conform and adapt to their environments, mainly with the aid of using the use of water to serve a community, they made social and technical traits which can be acknowledged together because the Neolithic Revolution.

Irrigation system that water turned into delivered to great stretches of territory thru a wide-branching canal network. Although the soil may be very fertile and could produce in abundance with irrigation and the considered necessary drainage, southern Mesopotamia has end up a land of lots that would maintain a vast population. When the humans there reacted to the project in their situation, the cultural hegemony of northern Mesopotamia, which may also have lasted till round 4000 BC, turned into in the end overtaken through the south.

The development of irrigation, especially was economic development, attempts to assess the technological performance and impact of ancient Mesopotamian water technologies reveal that the task is very complex.

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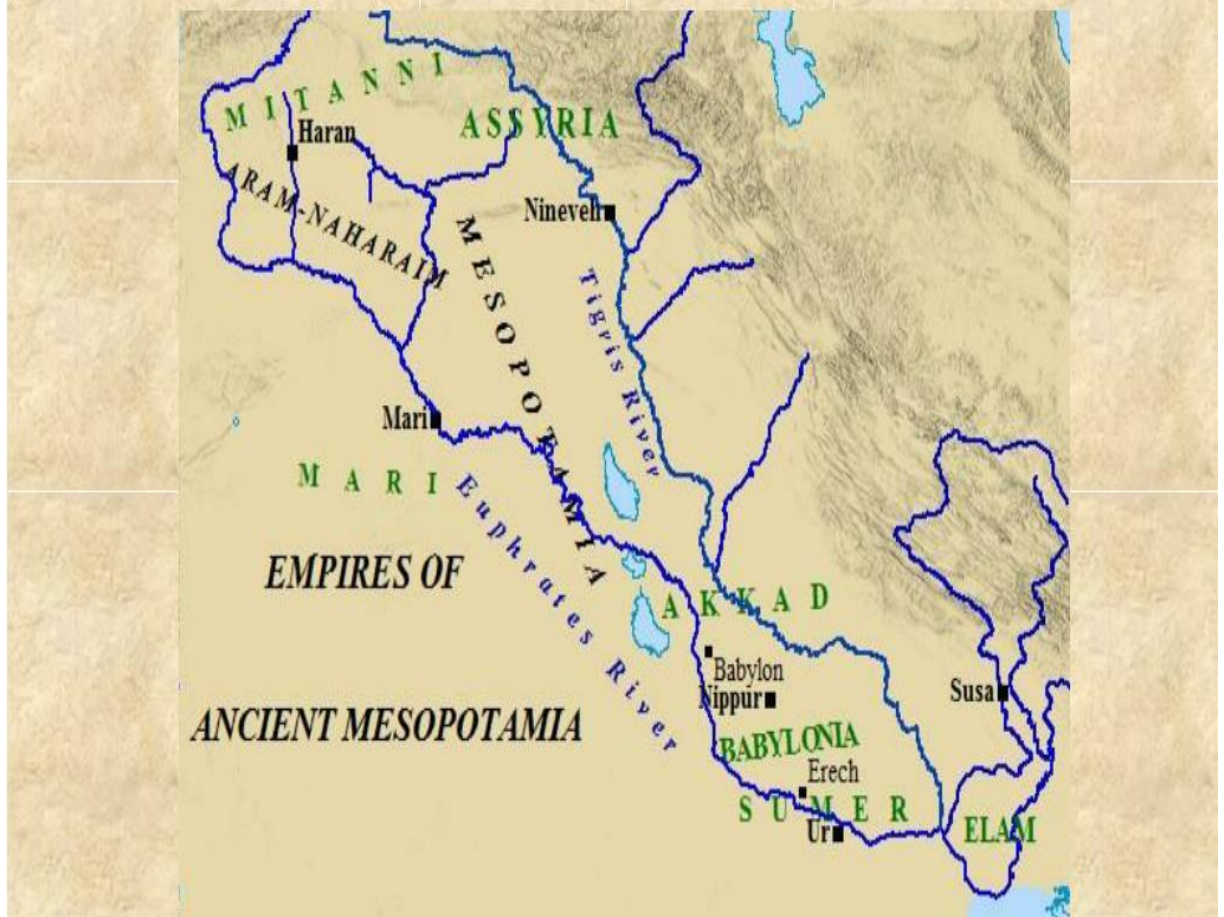
Appendix. Mesopotamia Rivers



Mesopotamia

Cradle of Civilization

Tigris and Euphrates River Valley



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