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ABSTRACT

By critically reviewing theoretical, methodological and practical approaches to the restoration of Islamic architecture in Soviet Central Asia, this dissertation reveals the mechanisms of transmitting ideologically predicated vision of the past into the physical fabric of historic monuments. It proceeds from unpacking the Marxist-Leninist concept of "progressive" heritage formulated within the discipline of historical materialism; in Soviet historiography of Central Asian architecture the category of progressive heritage was linked to the mathematics of proportioning and harmonization derived from Neoclassical architectural theory. Thus the progressiveness of architectural monuments was measured against the rises and falls of scientific rationalism in the history of the region while the Soviet stage of historic development was postulated as its ultimate triumph.

The dissertation locates the "proportionalist" school of architectural historiography in Soviet Central Asia led by Mitkhat Bulatov, which united most of the practicing restorers in the region. It traces the history of proportionalist discourse from purely speculative schemes to efforts in grounding the mathematical relationships extracted from schematized measured drawing of architectural monuments in mediaeval geometric treatises. The careful textual analysis of Soviet scholarship (its key texts are translated and included in the appendix to the dissertation) testifies to the apparent anachronism of the proportinalist speculations, which in the Soviet Union were accepted as the successful reconstruction of medieval Islamic architectural theory and highly praised a triumph of Communist science by cultural authorities.

Using Central Asian archives and published records of major restoration projects the dissertation documents the functioning of a mechanism that generated lost or never built parts of architectural monuments by treating them as mathematical equations of complex proportioning and harmonization. The scientific certainty achieved by Soviet restorers is reviewed in the context of international historic preservation standards to which they consciously resisted. Finally the materialization of Marxist-Leninist ideology in the medieval Islamic heritage of Central Asia is interpreted as an instance of de-conceptualization, which made ideology immediately accessible to the masses through non-reflective visual and corporal experience.
To the memory of my grandfather Nikolai Petrovich Kobylenko,

you knew I would become a scholar; it just took me too long.

I dedicate my dissertation to Alla, Vladimir, and Stanislav

for their love and patience.
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Introduction
In 1975 Konstantin Kriukov at that time a mastermind of architectural restoration in Soviet Uzbekistan and a chief heritage preservation authority in the whole of Central Asia said in his interview for Zvezda Vostoka, a Tashkent literary magazine:¹

When we conducted the pre-project study of Tilla Kari madrasah, the triangular arch of the main portal started to seem out of place to us. We knew that the portal suffered from an earthquake in the 19th century and was rebuilt. But what was the original arch? To figure this out, we did a comparative analysis of other buildings also preserved from the 17th century as well as the courtyard façades of Tilla Kari itself. Everywhere the arches were pointed [strel’chataia].

Which means… But we did not hurry with conclusions. What could the written sources tell us? We turned to the Treatise on the Circumference of Ghiyath al-Din al-Kashi, a mathematician of Ulugh-beg era. For the vault of the span similar to Tilla Kari, he proposed the so-called three-centered system that produced exactly the pointed arch. All last doubts were removed, and the arch of Tilla Kari portal was returned to its original pointed form. It is interesting to note that while rebuilding the portal the excavations revealed a part of a pylon that supported the [original] arch. The majolica facing, preserved on the pylon, confirmed our assumptions.²

This outline of a single case of architectural restoration reflects the Soviet approach to the preservation of pre-modern monuments in Central Asia. The approach is very different from

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¹ A Russian title translated as Star of the Orient; the parallel Uzbek title is Sharq yulduzi; the interview was published in Russian.
international consensus position reflected in the 1964 Venice Charter\(^3\) never signed but acknowledged by Soviet restorers including Kriukov himself.\(^4\) First and foremost Kriukov did not value monuments “as historical evidence.”\(^5\) For him the goal of restoration consisted in consolidating the monument as a work of art par excellence.

Let us look closely at the main portal of Tilla Kari madrasah discussed by Kriukov:

![Diagram of Tilla Kari madrasah](image)


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\(^3\) The Venice Charter for the Conservation and Restoration of Monuments and Sites.


\(^5\) Venice Charter, article 3: “The intention in conserving and restoring monuments is to safeguard them no less as works of art than as historical evidence.”
Tilla Kari madrasah in 1871-2 (Source: Turkestan Album) and after Konstantin Kriukov’s restoration in 1990 (Source: Archnet).

Tilla Kari is a 17th century mosque or madrasah, most probably combining both functions, preserved in the city of Samarkand as a part of Registan Square together with Ulugh Beg and Shir Dor madrasahs. However, the history of the monument – beyond the fact of its antiquity – was irrelevant to Kriukov. As a restorer of architecture he perceived it as a harmonic combination of forms distorted by the course of time. The arched portal was of particular concern for him because it was the most representative part of the structure first seen by every visitor of Registan Square:
Registan Square after K. S. Kriukov’s restoration with Tilla Kari madrasah along its main axis.

Going back to the set of photographs comparing the pre- and post-restoration images of Tilla Kari, the difference between the forms of arches might seem miniscule – at least to an untrained eye. But for Kriukov the ability to distinguish between the two was a pièce de résistance of professional competence: “the triangular arch of the main portal started to seem foreign to us.” Simultaneously this professionally informed judgment of taste (“we did a comparative analysis of other buildings preserved from the same 17th century as well as the courtyard façades of Tilla Kari itself[...]; everywhere the arches were pointed”) was a starting point for building an aesthetic model of the monument. And this model was grounded in mathematics,
as evident from the reference to al-Kashi. It wouldn’t be an exaggeration to say that the strongest
demand of the Venice Charter consists in a prescription to stop the process of restoration “at the
point where conjecture begins.” But for Kriukov and his team restoration only started at that
point.

The obsession with aesthetic integrity, the restoration of architectural monuments as
works of art were supported by a very particular interpretation of the past, which privileged
certain periods at the expense of others. I will return to the Soviet theory of history below in the
first chapter of the dissertation; here it is suffice to point out that in historical materialism historic
periods were broadly classified as progressive and retrograde or stagnant. This classification
covered all aspects of cultural production of each historic period, including architectural design
and building. Therefore the presumed 19th century alteration of the forms of the main ıvan or, as
Kriukov called it, the arch of the main portal belonged to a period of regress when Central Asia
was economically and politically weaker than the European countries or the Russian Empire. On
the opposite, in the 17th century the region was still in the center of international overland trade,
which however was in the process of shifting south to the maritime roots.

In Kriukov’s mind, the progressive nature of the 17th century Samarkand culture was
reflected in high professional capacities of its builders who, according to him, were able to
construct arches of regular shapes and mastered the mathematical methods codified in Ghiyath
al-Din al-Kashi’s *Treatise on the Circumference*.

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6 Venice Charter, article 9.
Two methods of constructing a three-centered pointed arch from Ghiyath al-Din al-Kashi’s *Key to Arithmetic*. 7

Setting aside the fact that Kriukov was actually referring to a different treatise of al-Kashi, namely the *Key to Arithmetic*, which indeed contains a special section on the geometrical forms of arches – the imprecise citation should probably be attributed to the popular genre of the magazine interview – the idea of pre-modern builders applying complex formal mathematics is pregnant with a number of assumptions about the transmission and accessibility of knowledge within historically progressive cultures. These assumptions constituted a self-evident truth for the Soviet readers of *Zvezda Vostoka*, but are very far from obvious to anyone who did not grow up learning the Marxist science of historical materialism from elementary school to the graduate program.

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In fact, Kriukov implied that during the progressive periods of history the formalized scientific knowledge became immediately accessible to the society as a whole, thus pushing its development forward which was reflected in the increased complexity and perfection of architectural production. When Kriukov mentioned that the form of Tilla Kari arches could be reconstructed from al-Kashi’s treatise, he was making a double statement: on the one hand he implied that al-Kashi’s book might have been accessible to the architectural milieu and on the other hand he insisted that pre-modern Central Asian arches were so geometrically perfect that al-Kashi could just have mathematically formalized the enlightened practices of the builders. In Soviet science of history, this double circulation of knowledge constituted the very nature of progressive culture and, according to historical materialism, tended to increase with a progressive development of society:

General sociological laws exist only in their concrete manifestations. Therefore, historical materialism studies those laws by researching their particular features revealed in different [societal] formations. Thus, it studies the specific relationships between social being and social consciousness, the basis and the superstructure under the conditions of growing and development of the communist formation; in this study it discovered the following pattern: the increase in the role of conscious [soznatel’noi, i.e. rational, scientific – I.D.] activity in the historic process. 8

There are many predicaments to this sort of assumptions when applied to the historic realities of Shaybanid, Timurid or earlier Central Asia, i.e. the period between the 10th and the 17th century, on which I will specifically dwell in the second chapter of this dissertation. Here it

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would be enough to mention that al-Kashi’s is not a prescriptive treatise or, in other words, it is not written to teach the builders how to draw arches in plan to later construct them in brick or stone. Neither does al-Kashi express any interest in practical methods of contemporary builders. Instead his treatise, written in 1427, is a purely mathematical exercise in calculating the square of complex surfaces, which was a particularly tricky procedure before the invention of modern calculus in the 17th century Europe.

Thus, constructing a mathematical model of Tilla Kari, Kriukov projected an ideologically charged vision of history onto the 17th century monument, but this projection was not a purely theoretical exercise. Kriukov had enough administrative power to demolish and rebuild, and he proceeded with it. The question arises: what was the nature of this power or, to put it in a different way, what was the status of Tilla Kari madrasah in Soviet Uzbekistan? This question has a rather simple answer: Tilla Kari was listed as an architectural monument and confiscated from the Muslim community of Samarkand to the state domain; Konstantin Stepanovich Kriukov was at different points of his career affiliated with a number of heritage preservation organizations, which functioned under the aegis of the Uzbekistan Ministry of Culture. The institutional power of the Ministry of Culture and administrative positions which Kriukov held within its daughter organizations allowed him and his team to do whatever they found appropriate in terms of restoration and destruction. Neither the Muslim community nor the fictitious non-governmental organizations, of which will be reviewed in the conclusion to this dissertation, had any say in what the professional restorers did.

Yet Kriukov gives an interested reader of Zvezda Vostoka a very brief snapshot of research method used by his team. It is a method of experimental science. The theoretical model
is checked against the facts on the ground discovered by the archeological cleaning of Tilla Kari madrasah. However, the theoretical model itself has a hierarchically higher status above the results of the excavations. In other words, even if the pylon with the traces of tiles that according to Kriukov supported his conjecture was not discovered, the combination of stylistic analysis and the reference to mathematical model extracted from al-Kashi's treatise was a sufficient justification for the demolition of the 19th century ivan and the (re-)building of mathematically perfect three-centered arch. “All last doubts were removed, and the arch of Tilla Kari portal was returned to its original pointed form,” said Kriukov before even mentioning the excavations. This precedence of theoretical model over the archeological study of the monument might seem to contradict the materialist predisposition of Marxist philosophy that must have dominated the Soviet mind. And in fact it does, but by the 1970s, when Kriukov was giving his interview to Zvezda Vostoka, the whole nature of Marxism in the Soviet Union changed dramatically from the critical philosophy of Karl Marx to the universal rationalist system in many ways similar to Hegel’s Absolute Idealism.\footnote{See: “The concept of ideology from the Second International to ‘Marxism-Leninism’” in Jan Rehmann’s Theories of Ideology: the Powers of Alienation and Subjection (Leiden, Boston: Brill, 2013), pp. 61-76.} I will specifically discuss the impact of this transformation on architectural history and on the state policy towards Central Asian architectural heritage in the first and second chapters of this dissertation.
Kriukov presented the actual rebuilding of the arch as the triumph of Soviet restoration science. And it was a science indeed: with its theoretical and experimental method of reconstruction briefly outlined above, and its system of professional techniques too specific to be mentioned in a popular interview. Still a reader could feel the technocratic power accumulated by Kriukov in the confidence with which the Soviet restorer presented his case, and it would be worth mentioning these techniques here before exploring them in detail in the third chapter of the dissertation. Above all Soviet restorers were trained to see the basic rational scheme of a building behind the decorum and historic alterations. The schematization was a professional device.
employed at the first step of any analysis; it was supplemented by the ability to divide the scheme into meaningful elements mathematically related to each other. Thus, for example, Kriukov knew what to look for when he commissioned the archeological study – or properly speaking selective destruction – of Tilla Kari: the element that they discovered was (or at least seemed to him) as fitting the larger mathematical scheme that he generated for the monument. Finally Soviet restorers were trained to analytically justify and graphically insert their rational schemes in the preserved ruins of historic buildings producing a sort of a centaur such as the main portal of the mid-16th century Kukeltash madrasah in Tashkent also restored by Kriukov according to a mathematical model:

S. S. Kriukov’s reconstruction of the main portal of Kukeltash madrasah in Tashkent based on the proportional analysis (c.1956).10

10 K. Kriukov, “Nauchnyi otchet, m-se Kukel’dash v Tashkente” [Scientific report on Kukeltash madrasah in Tashkent] (Tashkent, 1956. Archive of Uzbekistan Ministry of Culture, Department of Heritage Preservation,
The quote from Konstantin Kriukov’s interview is loaded with historic, theoretical and methodological problems but above all it is a testimony to the conscious rejection of practices and ideals first codified in the Venice Charter and later propagated by ICOMOS, ICCROM and through the UNESCO World Heritage List. Kriukov himself accounted for this divergence:

Theory and practice of restoration is improving all the time. International charters that were prepared and signed in Athens (1931), Venice (1964), and Moscow/Suzdal (1978) had only determined the basic principles. ‘These documents are important because they took into account the need to constantly improve the methodology of restoration, the quality of building materials and technology. Therefore, the restoration is not static; its methods are constantly improving.’ And the restoration school of Uzbekistan is creatively participating and collaborating in this global process of improvement.12

This text was written in 1987 in the middle of Perestroika and therefore Kriukov’s position is much less polemical than it actually was. A decade ago in the same interview to Zvezda Vostoka he was considerably more straightforward:

Preserve the patina! I hear this incantation time and again. But what essentially is patina as an architectural term? Agglomerated layers of dust that distort the original colors of the

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11 Konservatsiya i restavratsiya pamyatnikov i istoricheskikh zdaniy [Conservation and restoration of monuments and historic buildings] (Moscow: Stroizdat, 1978).

Igor Demchenko, MIT

building; the film of salts and microorganisms that corrode the walls. Thus, why would
the restorer preserve the patina? Doesn’t it contradict his task? Patina means destruction.
Let the antiquarian, who values it as a witness of the age of a rarity, admire it.¹³

Here a reader can feel the real Soviet Kriukov true to his conviction that preserving history in its
material authenticity is the last thing that matters in architectural restoration. Moreover, there is a
striking consistency in the insistence on aesthetic perfection over the historic or age value in the
Soviet discourse on heritage preservation. On the opposite pole from Kriukov, a Moscow-based
theoretician of architectural restoration Evgenii Mikhailovskii insisted that “the contemplation of
the architectural beauty that is objectively present [italics added] in the monument (or the
cognition of this beauty) by the viewer considerably enriches his spiritual world ... this aspect of
social value ... calls for the conservation of the ancient building or for its high-quality
restoration.”¹⁴ With that in mind, my main question for this dissertation is how that aesthetic
approach to architectural heritage emerged and solidified. Or, put it differently, how the radically
anti-conservationist stance of Soviet restorers in Central Asia can be explained – without
explaining it away – as a consistent and well-considered position (which, as evident from the
quotes above, it was) rather than a deviation from the norms set by international organizations
and charters?

¹³ Zvezda Vostoka, p. 160
¹⁴ E. V. Mikhailovskii, “Obshchestvennoe znachenie pamiatnikov arkhitektury” [The Social Significance of
Architectural Monuments], in Teoriia i praktika restavratsionnykh rabot [The Theory and Practice of Restoration
Works] Vol. 3 (Moscow, 1972), p. 8. Yet, Mikhailovskii as a scholar was more complex than that; in his theoretical
writings he hesitated between the objectivist theory of beauty and the aesthetic relativism of Alois Riegl; see my
translation of E. V. Mikhailovskii “Glava I: Sovremennye teoreticheskie kontseptii” [Chapter 1 [of the book The
Methods of Restoration of Architectural Monuments (1977)]: Contemporary theoretical conceptions], from idem ed.
Metodika restavratsii pamiatnikov arkhitektury [Methods of Restoration of Architectural Monuments] (Moscow:
Stroiizdat, 1977), pp. 7-19 in the Appendix to this dissertation, in which Mikhailovskii differentiates between
artistic and aesthetic value and interprets the former as relative and the latter as objective.
In 1987 Kriukov argued for the plurality of approaches but the plurality of possible solutions was not among the virtues of his scientific method. On the opposite, the seductive quality of building mathematical models for architectural monuments consisted in the fact that these models generated precise results from often highly fragmented and inconsistent input. The aspiration for the suppression of ambiguity (the ambiguity which after all must be inherent to the study of history and broadly speaking to humanities per se) was shared by the Soviet science of restoration with all other disciplines of the humanistic cycle as they crystallized in the last decade of Joseph Stalin’s dictatorship. History itself became an object of historical materialism, an exact science of societal development par excellence, but more important historical materialism was instrumentalized as a rationalist core of Soviet ideology. This is how the
founder of Soviet economic geography Nikolai Kolosovskii described the aspirations of Marxist-Leninist ideologists:

The society resting upon the scientific basis of historical materialism is not blindly building its future but is supported by the known (even if partially) natural patterns of its own development. The future of this society is built according to the plan, i.e. it is supported by the power and will of the workers’ collective, monolithic as a [social] class, and by the scientifically organized activity of planning and management organizations. 15

Here the rationalist interpretation of social history is projected into the future but it can equally well be projected into the past.

Yet all at once we come to the point of bifurcation: by saying that historical materialism does not study the past but instead is projected into or – put it strongly – artificially superimposed on it we take a clear ideological position dismissive of the Soviet project. But the fact is that Karl Popper with his “Poverty of historicism” (first published in 1944-5) was never received well in the Soviet Union or more precisely was virtually unknown until the very last years before its collapse. Therefore it should admitted that historical materialism with all its ramifications (including the Soviet discipline of architectural history in Central Asia) was practiced as a genuine science of the past. Thus, essentially Kriukov’s preference for aesthetic vs. historic value as an object of restoration should be judged against the framework set by the

ideology, which defined itself as the “integral, harmonious scientific worldview that constitutes the general theoretic basis for all forms of socialist consciousness.”¹⁶

By accepting – even if conditionally - historical materialism as a genuine science, we can focus on documenting the integration of restoration methodology in a universal project of building the Communist society and on the exact mechanism of transcribing ideology in the material culture generated and bequeathed by the Soviet Union. The materialization of ideology as an inevitable process was first conceptualized by Louis Althusser in “Ideology and Ideological State Apparatuses (Notes towards an Investigation)”:

Ideology has a material existence. I have already touched on this thesis by saying that the ‘ideas’ or ‘representations’, etc., which seem to make up ideology do not have an ideal (idéale or idéelle) or spiritual existence, but a material existence. ... Of course, the material existence of the ideology in an apparatus and its practices does not have the same modality as the material existence of a paving-stone or a rifle. But, at the risk of being taken for a Neo-Aristotelian (...), I shall say that ‘matter is discussed in many senses’, or rather that it exists in different modalities, all rooted in the last instance in ‘physical’ matter.¹⁷

Obviously for Althusser the material existence of ideology had a predominantly institutional modus but he apparently did not exclude other possible modalities. The actual physical materialization of hegemonic ideology in restored and conserved monuments is not a completely new topic in architectural historiography. However this approach to the study of historic

As of yet, almost no effort has been made to understand the logic of restoration methodology in Soviet Central Asia. A short non-Soviet bibliography of heritage preservation in Central Asia is essentially limited to three articles: Mounira Azzout’s “The Soviet interpretation and preservation of the ancient heritage of Uzbekistan: the example of Bukhara,”\textsuperscript{18} Charles Shaw’s “The Gur-i Amir Mausoleum and the Soviet Politics of Preservation,”\textsuperscript{19} and mine “Decentralized Past: Heritage Politics in post-Stalin Central Asia.”\textsuperscript{20} In his article Shaw focuses on a single case of excavation and conservation of Gur-i Amir mausoleum in Samarkand instrumentalized by Stalinist neo-imperialist propaganda on the eve of World War II. Azzout’s article is based on her interviews with Konstantin Kriukov and an archeologist Edvard Rtveladze, both of whom occupied high positions in the cultural bureaucracy of Soviet Uzbekistan. According to Azzout, “the main objective [of architectural restorations in the Uzbek Soviet Socialist Republic] was to give the tourist the impression of traveling through time… [e]verything was designed for the benefit of tourists.” She adds that the “[p]reservation efforts were also used as propaganda vis-à-vis other countries of the Soviet Bloc, particularly a number of Muslim countries.” (p. 168). In other words, the article takes the pragmatic approach and

\textsuperscript{19} \textit{Future Anterior} Vol. VIII, no. 1 (Summer 2011): 43-63.
\textsuperscript{20} \textit{Future Anterior} Vol. VIII, no. 1 (Summer 2011): 65-80. This article is partially integrated in the Conclusion to this dissertation.
interprets the restoration of pre-modern architecture in Central Asia as a Soviet effort to attract visitors, and particularly international tourists with hard currency, to the region.

As attractive as Azzout’s pragmatic approach supported by the authority of Kriukov and Rtveladze might initially seem it – as I will demonstrate bellow – is based on a number of anachronistic assumptions. First, the interviews were taken after the collapse of the Soviet Union when its communist ideology was discredited altogether and completely. Apparently Kriukov and Rtveladze themselves were trying to make sense of their Soviet experience and interpret it for the newly immerging market economy. Second, and more importantly, the value of Central Asian monuments for the purposes of Soviet propaganda in the developing world should not be overestimated: to the best of my knowledge, after World War II it was never discussed in professional publications among the main goals of heritage preservation. Yet, at the very beginning of the Soviet regime, the Ministry of Foreign Affairs [Narkomat inostrannykh del] and in particular its head Georgy Chicherin insisted that the opinions of, above all, Western scholars as well as the Middle Eastern intelligentsia should be taken into account: “The academic world is following the conditions of these monuments with utmost interest: American, German, Swedish and other [foreign] scholars visited Turkestan specifically to acquaint themselves with their current condition. ... Restoration of these monuments is of great political importance; it will be considered in the Middle East as a proof of exceptional attention of the Soviet government to the cultural and national interests of the aboriginal [tyzemnyi] population.” 21 Finally, Azzout’s conclusions regarding the importance of tourism are not supported by available statistics related

to national and international tourism in Soviet Central Asia.

Complex assessment of tourist resources in the USSR according to their importance. Level of importance: 1 – all-Union; 2 – trans-regional; 3 – regional; 4 – territories unsuitable for planned tourism.\[22\]

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\[22\] Iu. S. Putrik and V. V. Sveshnikov, *Turizm glazami geografa* [Tourism from geographic perspective] (Moscow: Mysl’, 1986).
Recreational zoning of the USSR. Regions and localities according to the density of [tourist] enterprises: 1 – very high; 2 – high; 3 – middle; 4 – low, 5 – very low, 6 – centers of tourism; 7 – borders of recreational zones; 8 – borders of recreational regions.²³

In the Soviet geography of recreation zones, Central Asia was mostly included in the forth zone, with only North Siberia being in the fifth, the least developed zone. By 1980, the density of recreational facilities in Central Asia was estimated as low (i.e. virtually non-existing) with an exception of Tashkent-Samarkand-Bukhara region and the Issyk Kul lake area, where it

²³ Geografiia rekreatsionnykh sistem SSSR [Geography of the recreational systems of the USSR] (Moscow: Nauka, 1980).
was marked as medium. In 1978, A. Kh. Abukov in a book Turizm segonia i zavtra: Turistsko-eksкурsionnaia raborta profsoiuzov [Tourism today and tomorrow: Tourist and excursion activities of trade unions] provides statistics covering the distribution of tourists between several popular destinations within the USSR. Thus, 27.8% of tourists went to Caucasus (presumably Black Sea Coast and the region of the Caucasus Mineral Waters); 18.7% went to Ukraine and Moldavia; 13.1% to Volga region; 11.9% to Crimea. Strikingly, Central Asia is not mentioned in this list at all.

In numerous articles on the urban planning of Samarkand and Bukhara published in Stroitěl'stvo i arkhitektura Uzbekistana [Building and architecture of Uzbekistan] journal during the 1960s and the 1970s, the development of tourism is discussed as a distant prospect. Thus, in the article “Printsipy organizatsii turisticheskoi zony” [Principles of organization of the tourist zone] authored by Iu. L. Bezmozdina and devoted to a proposed (sic!) tourist zone for Samarkand, it is reported that in summer the estimated average number of visitors to the city per day does not exceed 700 people. For the urban center of about 270 thousand people and a home of the best-preserved monuments of Timurid architecture this is a surprisingly small number. Yet, according to Bezmozdina, despite the generally small number of tourists, the recent growth of visitors was significant: 50% every year during the last three years. I believe that these figures reflect the number of official tourists coming to the city; in practice, there was an unaccounted number of local visitors coming from other towns and cities of Central Asia who

26 267,000 in 1970 and 299,000 in 1975. The data is taken from the second edition the Great Soviet Encyclopedia, article “Samarkand.”
did not stay in the hotels or in other tourist facilities; the projects for the delimitation and expansion of tourist zones also took them into account.

In the early 1980s, the flow of tourists has become quite substantial and the large-scale projects of tourist centers were commissioned for Samarkand and Bukhara. Thus, two projects were prepared for both cities by architect Felix Novikov between 1980 and 1983. However, none of these or alternative projects was ever realized. In fact, even in 1981, I. V. Israilov, the director of the Uzbekistan Restoration Institute, and P. Sh. Zakhidov, the research vice-director of the same Institute, spoke only about the potential that exists for the development of cultural tourism in the republic. Both authors advocated the creation of a complex development project that would attract tourism; however, in the context of similar proposals that appeared in the 1970s their words sounded more as wishful thinking. Local tourist flows are much harder to estimate. They might have been significantly more numerous than the meager 210 thousand that were registered by the tourist facilities of Samarkand, Bukhara, Kokand, and Andijan during the five years from 1976 to 1980.

It is even harder to find data on foreign tourists visiting Uzbekistan. According to Denis Shaw, in the second half of the 1970s, about 50% of all international tourists were coming only to Moscow. Where did the rest of them go? According to the statistics published in 1982 in the forth volume of the journal Problemy inostrannogo turizma v SSSR [The problems of foreign

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28 Uzbekskii nauchno-issledovatel'skii i proektno-isyskatel'skii institut konservatsii i restavratsii pamiatnikov kul'tury (УзНИИПрекрааатп) [Uzbek scientific-research and project-development institute for the conservation and restoration of cultural monuments].
tourism in the USSR\[^{32}\] only 17\% of foreign tourists potentially interested in the trip to the USSR expressed an intention to come to Central Asia. However, each of the main tourist centers of Uzbekistan got an Inturist hotel with a permission to host tourists from abroad. Thus, the Inturist Hotel was built in Bukhara in 1974; it had 378 rooms.\[^{33}\] Therefore, based on the comfort standards of foreign tourists, it can be estimated that the average number of foreign visitors in Bukhara during spring and autumn, the main seasons for tourism in the region, could hardly exceed 700 people per day.

To summarize, if local tourism was moderately supported by Uzbekistan Society for the Preservation of Monuments and the international tourism was encouraged by the Inturist travel agency through building hotels and developing tourist routs, the internal Union-level tourism was at the nascent stage of development. Other republics of Central Asia, with an exception of Issyk Kul area in Kirgizia did not receive either Union-level or foreign tourists. According to Viktoria Khmelnitskaia,\[^{34}\] at least in Tajikistan, local cultural tourism almost did not exist. The situation with tourists coming to Central Asia from more developed republics of the Soviet Union began to change in the early 1980s when the critical mass of tourists from northern and western regions the USSR started to arrive to Uzbekistan. However, Perestroika and the subsequent decline of Soviet economy slowed the development of Central Asia as a tourist region. Thus, Azzout's pragmatic interpretation of Soviet restoration zeal goes against the available statistic data and above all it does not explain the scientific methods of architectural restoration of which she was most probably not aware.

\[^{32}\] The journal was published annually by the Problem Laboratory of the Foreign Tourism, a department of the State Tourism Committee in Moscow.
\[^{33}\] "Bukhara the pearl of the east."
\[^{34}\] Inspector of Historic Monuments in Tajikistan (1965-80).
The influence of ideology on historic preservation and architectural restoration is explored in a number of systematic studies. Thus, a group led by Nezar AlSayyad, Irene Bierman, Nasser Rabbat, and Paula Sanders published two volumes titled *Making Cairo Medieval* and *Creating Medieval Cairo*.\(^{35}\) The goal of both volumes was to draw a link between the practices of architectural preservation in British-ruled Egypt and the discourse of Oriental inferiority investigated by Edward Said in his seminal *Orientalism*.\(^{36}\) According to AlSayyad, Bierman, and Rabbat, “the concept of a ‘medieval’ Cairo first appeared in 1867…; the shaping of a ‘medieval’ Cairo, a project largely confined to European and local elites, hardly echoed the sensibilities of its residents…; the process through which Cairo was ‘medievalized’ consisted of … the representation of medieval Cairo through literary narratives, painting, photography, etc. … and the fabrication of a ‘medieval’ Islamic Cairo… through the reorganization of the physical space of the city.”\(^{37}\) Joining them, Sanders promises to demonstrate “some of the precise mechanisms through which orientalism’s underlying conceptual framework found expression at identifiable historic monuments.”\(^{38}\) Yet it is specifically those transcription mechanisms that ultimately escaped the grasp of the scholars due to the limited number and almost exclusively procedural nature of textual sources that cover the activities of the Comité de Conservation des

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\(^{37}\) *Making Cairo Medieval*, pp. 2-3.

\(^{38}\) Sanders, *Creating Medieval Cairo*, p. 90.
Monuments de l'Art Arabe, which was responsible for the conservation and restoration of monuments in Cairo of the second half for the 19th and the first half of the 20th century.39

Medina Lasansky’s project of tracing the restoration and conservation of Renaissance architecture in interwar Italy back to Fascist discourse of powerful simplicity is possibly less critical but certainly more detailed.40 The plethora of factual material that contextualizes the preservationist interventions in Fascist Italy allowed Lasansky to establish connections between the concept of *medioevo* and the actual restorations completed in San Gimignano and Arezzo. According to Lasansky the restoration of the spirit of *medioevo*, which “incorporated the ideas of simplicity and integrity central to Ruskin’s definition of the Middle Ages, as well as the notion of the state as a work of art borrowed from Burckhardt,”41 was “a party agenda and accomplishment.”42 Promoting the concept of *medioevo*, the Fascist party and Mussolini himself “idealized the Middle Ages and Renaissance as the golden age of physical activity,” which “was an important element of Fascist-period rhetoric and was another way in which regime officials demonstrated an interest in the past.”43 Yet, both Lasansky’s elegantly written Arezzo chapter of the *The Renaissance Perfected* and the San Gimignano article evade a more pedestrian task of reconstructing step by step the process of translating the abstract concept of *medioevo* into the practical methods of architectural restoration. Either those methods are not well-covered by available sources, or their criticism was outside the scope of Lasansky’s academic interests, the

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39 Comité de Conservation des Monuments de l’Art Arabe systematically published its *Bulletins* in French and Arabic between 1882 and 1961. The *Bulletins* did not include any technical documentation on actual restorations completed by the Comité, neither theoretical program shared by its members. The *Bulletins* are available online at http://www.islamic-art.org/comitte/BArchMain.asp.


readers are left with a convincing impression that restorers – through often being directly involved in party politics – were indeed somehow closely inspired by the Fascist cultural discourse, but the exact formal mechanism of this inspiration remains unknown. In other words, Lasansky presented documental evidences that the discourse of cultural production was actually framed by the Fascist ideology and that it was most certainly interiorized by architectural historians and architect-restorers, but then what is missing in her writings – as well as in the volumes of Cairo group – is the technology of materializing the discourse and making it immediately obvious at the intuitive level of visual and spatial perception.

That said, I owe to the Cairo group and particularly to Medina Lasansky’s monograph the general scheme of my research project. First, I aim at reconstructing the intentions and conceptual content of Soviet ideology that played into the restoration of Central Asian architectural monuments. Next I will move to the immediate theoretical foundations of the restoration method, which I see in the proportional studies of Islamic architecture inspired by the classicist turn in Stalinist architecture and culture of the 1930s and continued until and even beyond the very collapse of the Soviet Union. Finally with archival materials at hand I will analyze the technologies of transcribing ideology, already assimilated by architectural historiography, into the actual monuments of Central Asian architectural heritage. In the concluding part I will reflect upon the limits of material persistence achieved by Marxist-Leninist ideology in the monuments and heritage preservation institutions established in Central Asia during the Soviet period.

Finally the title of my dissertation reflects the dual status of pre-modern architectural heritage conscribed by the Soviet authorities in their effort to create the new "Red" Orient – the story that began in the early 1920s with the consolidation of Bolshevik power in the region and
ended in 1991 with its collapse. While on the one hand my dissertation tells the history of architectural restoration in Soviet Central Asia, on the other hand it points at unexpected and previously unnoticed heritage generated by the Communist ideology that shaped and framed the thinking of historians, preservationists, and cultural bureaucracies. Thus, the "Red Orient" – the term coined in the 1920s – stands as a metaphor for a very specific type of epistemic violence, grounded in the ultra-rationalist science of history, that projected the progressivist vision for Central Asia's future into its past and which, after all, in its own turn deserves preservation as a testimony to the power and failure of the Communist project.
Chapter 1:

Historic heritage in Soviet ideological project
"From the culture of the past only progressive [elements] enter the socialist culture of nations," instructed Soviet students the fifth edition of *Scientific Communism*, a standard college-level textbook published in 1982, a year when Leonid Brezhnev passed away cleaning the stage for the renewal of communist elite, which proved to be fatal for the regime.\(^{44}\) In Russian the rhetoric status of this statement is ambiguous due to the imprecise nature of Russian present tense combined with the imperfective aspect—a grammatical category which does not have a direct correlate in English: it is neither a program for the future, nor a description of the current situation, nor a statement of Soviet achievements. It is something in between—an ideal vision that shaped the past, defines the present, and is creating the desirable future. Ideal, that is reflecting the set of ideas, which Soviet ideologists deemed right or, in other words, specifying the implications of broader communist ideology for a very narrow domain of heritage preservation.

The phrase quoted above was distilled from a long tradition of Bolshevik thinking about instruments and methods of forced development that could convert the colonial periphery of Russian Empire into a thriving socialist society—and in the near and foreseeable future lead it to Communism. As I will demonstrate below, this train of thought started well before the Bolshevik Revolution and by the 1950s developed into an ideological dogma. Compare that brief statement from 1982 textbook to an extended treatment of the subject in 1951 official survey of historical materialism, which reflected the ideology of Joseph Stalin’s government in the last years of his life and rule:

> Developing the culture, national in form [and] socialist in content, the peoples of the USSR are taking everything positive and valuable that was in the culture of the past, in

literature, music, in national songs, melodies, in the style of national architecture. They critically assimilate the culture of the past, apprehending the best, the advanced, the revolutionary, the democratic and the socialist elements and traditions of [their] cultural heritage.

Certainly the culture of the past also has reactionary content, anti-national features, and obsolete sides that prevent [nations] from moving forward as, for instance, religious beliefs and rituals, shamanism, vendetta, polygamy, female seclusion, burqa, etc. Socialism rejects everything reactionary and creatively develops positive achievements of past culture in the interests of toiling masses.45

Essentially, in its attitude to historic heritage the official ideology of the Soviet Union remained consistent (and consistently Stalinist) throughout the most dynamic period of architectural restorations in Central Asia, i.e. from the early 1950s and until the late 1980s, which is the main chronological focus of this dissertation.

In 1965, when Konstantin Kriukov defended his dissertation titled “Progressive tendencies in the architecture of Central Asia in the 16th century,”46 he apparently knew what is progressive in local architectural heritage, and what should be preserved to enter the socialist culture of new Central Asian nations. And those nations were new indeed, constituting an institutional manifestation of Bolshevik ideology. They were only created in a series of political and administrative moves between 1924 and 1936 from the “raw material” of the old Khanate of

45 Historical materialism (1951), p. 442.
46 I wasn’t able to access either the dissertation or its official extended abstract (avtoreferat); however, I assume that for the most part the dissertation was published as K. S. Kriukov, “Modul’ v pamiatiakh sredneaziatskogo zodchestva” [Module in the monuments of Central Asian architecture], Arkhitekturoe nasledstvo [Architectural heritage] 17 (1964): 155-165 and idem, Proportsi v arhitekture: Analiz pamiatiikh drevnego Egipta, Gretsii, Rima, Tsentral’noi Azii [Proportions in Architecture: Analysis of Ancient Egyptian, Greek, Roman and Central Asian Monuments] (Tashkent: Mukharrir, 1995).
Khiva (then Khorezm People’s Soviet Republic), the Emirate of Bukhara (Bukharan People’s Soviet Republic), and the former Governorate-General of Turkestan (Turkestan Republic).

This highly controversial process which involved a good deal of ethnographic and anthropological expertise derived Moscow and Leningrad as well as economic planning, which often contradicted the advice of professional anthropologists and the aspiration of local cultural and political elites, is painstakingly documented and analyzed in Arne Haugen’s excellent monograph *The Establishment of National Republics in Soviet Central Asia* (2003). Here it is important to note that the idea of developing imperial periphery through restructuring it according to the model of nations derived from Western Europe was a broader theory to which the concept of progressive (vs. retrograde) heritage was subordinated.
This is how *Historical Materialism* described the developmental deficiency of Russian Empire that, together with its equally retarded Austro-Hungarian sister, suppressed the progressive process of nation-building first in Eastern and Central Europe and then by extension in Caucasus and Central Asia:

In Western Europe the development of nations generally coincided in time with a process in formation of centralized states, and therefore nations developed into independent *national states*. Ireland, which was oppressed by England, was an exception.

On the contrary, in the east of Europe the formation of centralized states, intensified by the requirements of defense (from the invasions of Mongols, Turks, etc.) happened before the liquidation of Feudalism,\(^47\) and hence before the formation of nations. Therefore multinational states formed here ([e.g.] Russia, Austria-Hungary). Here ethnic groups [narody] did not have time to form nations and were united into big states. At the head of these states were the ruling classes of the strongest, politically and economically developed groups [narodov]. Such was the [process of] national formation of Ukrainians, Belarusians, Armenians, Georgians, Latvians, Lithuanians, and of other ethnic groups [narody] of Russia; [and such was the process of national formation of] Czechs, Poles, Slovaks, Croatians, and other ethnic groups [narody] of Austria-Hungary. Something that was an exception in Western Europe ([i.e.] the condition of the Irish) became the rule in the East.\(^48\)

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\(^{47}\) In Marxist theory of history, the Feudalism is a necessary stage of societal development historically located between Slave-owning and Capitalist formations.

Thus Soviet ideologists perceived the development of ethnic groups into nation-states as a historic norm – a position so unlike the western Marxist criticism of nations as imagined communities. The authors of *Historical materialism* rather shared Gustave Le Bon’s vision of a nation as an objective phenomenon that did not exist primordially but evolved recently in the process of social modernization:

French Revolution was to hasten this formation by greatly promoting the breaking up of the minor nationalities: Picards, Flemish, Burgundians, Gascons, Bretons, men of Provence, etc., into which France was formerly divided. ... When a nation has readied this stage, there is an instinctive agreement amongst all its members on all great questions, and it ceases to be a prey to serious dissensions.

This community of sentiments ideas, beliefs, and interests, created by slow, hereditary accumulations, gives a high degree of identity and fixity to the mental constitution of a people.  

Le Bon’s book was translated into Russian in 1906, and therefore was widely accessible to the ideologists of the Soviet Union. In fact Stalin’s classical definition of a nation reverberates with the speculations of Le Bon: “A nation is a historically constituted, stable community of people,

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49 Proposed by Benedict Anderson in *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (London: Verso, 1983) the concept of nations as “imagined communities” derives its interpretive power from the decline of objectivist approaches to historic process. For Soviet Marxists, history itself was a highly ordered system and therefore, even assumed that nations were in fact imagined, the idea of, for instance, belonging to a French nation would never gain currency unless an objective stage of historic development was manifested in it. In other words, nations – as long as they have become established social institutions – couldn’t be unimagined and therefore, for Soviet Marxists, the discussion of their “imaginary” genesis is useless since history cannot be reversed. At best it can be directed into a broader and more convenient riverbed – hence the Soviet idea of socialist (as opposed to bourgeois) nations.

formed on the basis of a common language, territory, economic life, and psychological make-up manifested in a common culture." \(^{51}\)

However, in itself the Bolshevik theory of nations and their historic development is outside the scope of this dissertation. The relevant part of this theory here is the consequences from this theory for the ethnic groups that failed to become independent nation-states and therefore were, according to the Bolsheviks, suffering from political, economic, and - most importantly from the perspective of heritage preservation history - cultural oppression of a dominant nation, i.e. Russians in the case of Russian Empire (the so-called "Great-Russian chauvinism" in Bolshevik terminology). Still before the 1917 Revolution, Vladimir Lenin developed a consistent position that acknowledged the rights of oppressed ethnic groups for, what he called, self-determination. \(^{52}\) For Lenin "self-determination" of nations meant "the political separation of these nations from alien national bodies, and the formation of an independent national state." \(^{53}\) The reasons that he gave for this right were grounded in the Marxist theory of history, i.e. historical materialism:

Throughout the world, the period of the final victory of capitalism over feudalism has been linked up with national movements. For the complete victory of commodity production, the bourgeoisie must capture the home market, and there must be politically uniting territories whose population speak a single language, with all obstacles to the development of that language and to its consolidation in literature eliminated. Therein is

\(^{51}\) Stalin, "Marxism and the national question" (1913), http://www.marxists.org/reference/archive/stalin/works/1913/03a.htm#s1.
\(^{52}\) Lenin insisted on this idea since the beginning of his political career. The slogan of national self-determination took its final shape at the beginning of World War I in Lenin's article "The right of nations to self-determination" (February-May 1914), http://www.marxists.org/archive/lenin/works/1914/self-det/.
\(^{53}\) Lenin, "The right of nations to self-determination" (1914).
the economic foundation of national movements. Language is the most important means of human intercourse. Unity and unimpeded development of language are the most important conditions for genuinely free and extensive commerce on a scale commensurate with modern capitalism, for a free and broad grouping of the population in all its various classes and, lastly, for the establishment of a close connection between the market and each and every proprietor, big or little, and between seller and buyer.

Therefore, the tendency of every national movement is towards the formation of national states, under which these requirements of modern capitalism are best satisfied. The most profound economic factors drive towards this goal, and, therefore, for the whole of Western Europe, *nay, for the entire civilized world* [italics added], the national state is typical and normal for the capitalist period.\(^{54}\)

It is worth noting that Lenin’s reasons for granting all oppressed ethnic groups a right for self-determination are logically consistent with the 1951 explanations of the differences in the development of nations between Western and Eastern Europe quoted above. The theoretical consistency of Soviet Marxism is often underestimated in light of Bolsheviks’ apparent readiness for political maneuver. However, in this particular case we have to acknowledge that the lack of national statehood was seen as a major deficiency by successive generations of Bolsheviks even though they eventually did not address this problem by creating effectively independent states (with an exception of Finland and, partially, Poland, Estonia, Latvia, and Lithuania – the latter three annexed to / voluntarily joined the Soviet Union in 1940).

\(^{54}\) Ibid.
While Lenin was advocating for the self-determination of nations, Stalin was proposing a scheme that, in Bolshevik mind, would attract the “belated” ethnic groups to the union led by social democrats. In his programmatic article “Marxism and the national question” (1912-13) Stalin wrote: “The national question in the Caucasus can be solved only \textit{by drawing the belated nations and nationalities into the common stream of a higher culture}.”\textsuperscript{55} Since the insufficiency of development in Central Asia was even more pronounced than in Caucasus, this statement of Stalin can be extended onto all the peripheral ethnic groups of Russian Empire: all of them had to go through the cultural upgrade aiming for at least catching up with the Russians if not with the Germans or the French. Returning to the very first quote in this chapter: “from culture of the past only progressive [elements] enter the socialist culture of nations” (1982) – these words can now be interpreted as a middle ground between Lenin’s vision for national self-determination in the form of Soviet republics (a skeptic of the Bolshevik project would say: fake self-determination, after all) and Stalin’s idea of catching up development.

For Stalin, who effectively controlled the Soviet government since 1925 and had dictatorial power since at least 1929 and until his death in 1953, the project of upgrading the imperial periphery to the level of Russia was extremely dear. Returning to this topic in 1921, Stalin sharpened his thesis: “the fourth point is that a new element has been introduced into the national question—the element of the actual (and not merely juridical) equalization of nations (help and co-operation for the backward nations in raising themselves to the cultural and economic level of the more advanced nations), as one of the conditions necessary for securing

\textsuperscript{55} I. Stalin, \textit{Marksizm i natsional'no-kolonial'nyi vopros} [Marxism and the national-colonial question] (Moscow: Partizdat TsK VKP(b), 1937), pp. 36-7. The English translation is quoted from \url{http://www.marxists.org/reference/archive/stalin/works/1913/03a.htm}. 45
fraternal co-operation between the laboring masses of the various nations."\(^{56}\) The fact that Stalin put cultural ahead of economic development did not remain unnoticed. Thus, Sluchak a Tajikistan commissar and a protagonist of Jushua Kunitz propaganda book *Dawn over Samarkand; the Rebirth of Central Asia* published in New York in 1935 insisted on “removing, in the briefest possible time, the cultural and economic inequality between the Tadjik people and the peoples of the other republics in the Union.”\(^{57}\) Sluchak, whose first name never disclosed by Kunitz was Vladimir, emphasized that “the rate of development of Tadjikistan’s national economy and, *primarily*, of its social and cultural life, had to be much greater than in the rest of the Union, so that this backward country might catch up with her sister republics and together with them overtake and surpass the capitalist countries.”\(^{58}\) When challenged by his Communist companions on the precedence given to the cultural over the economic, Sluchak referred to the Resolution of the Twelfth Congress of the Communist Party (1923) drafted by Stalin in very similar terms: “Hence, the second immediate duty of our Party is to struggle for the abolition of the actual inequality of nationalities and for raising the cultural and economic level of the backward nations.”\(^{59}\)

With all their investment in the cultural development of small nations Bolsheviks always kept in mind a broader perspective of gradual advancement to Communism, when all nations would be abolished and a single language and culture would replace the historically inevitable evil of national fragmentation. Stalin was fully conscious of this contradictory dynamics when in


\(^{58}\) Ibid.

\(^{59}\) Ibid., p. 220.
1930 he outlined what in Marxist-Leninist language would be called “the dialectics” between the national development and the transition to Communism:

It may seem strange that we who stand for the future merging of national cultures into one common (both in form and content) culture, with one common language, should at the same time stand for the *flowering* of national cultures at the present moment, in the period of the dictatorship of the proletariat. But there is nothing strange about it. The national cultures must be allowed to develop and unfold, to reveal all their potentialities, in order to create the conditions for merging them into one common culture with one common language in the period of the victory of socialism all over the world. The flowering of cultures that are national in form and socialist in content under the dictatorship of the proletariat in one country for the purpose of merging them into one common socialist (both in form and content) culture, with one common language, when the proletariat is victorious all over the world and when socialism becomes the way of life – it is just this that constitutes the dialectics of the Leninist presentation of the question of national culture.  

Thus national culture is presented as a temporary concession to previously oppressed ethnic groups and yet no temporal frame for the conclusion of the transitional period is given. In fact, it was indefinitely postponed both in 1951 *Historical Materialism* and in 1982 *Scientific Communism*. Therefore, for the purposes of studying Soviet heritage politics the universalist aspect of the communist project is by and large irrelevant. Again, returning back to the very first quote of this chapter, the creation of progressive cultures for the new nations more than anything

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Igor Demchenko, MIT

else was in the focus of state ideology at the Socialist stage of societal development, which started with the Bolshevik Revolution but never bore the desired fruit of Communism, or at least not until 1991 when the Soviet Union fell apart.

The totality and urgency of the requirement to preserve the progressive heritage of national cultures should be taken seriously: in the Soviet Union ideology replaced religion and philosophy – or rather philosophy in its only legitimate form of Marxism-Leninism was consumed by ideology – and constituted a single legitimate worldview. And above all this worldview was a rational one. For Soviet readers the seminal work of Lenin’s philosophy was *Materialism and Empirio-Criticism* (1909), in which Lenin defended the objectivity of knowledge against what he perceived as subjective idealism of Ernst Mach and Richard Avenarius (although Lenin’s actual target was a rival leader of Russian social democratic movement Alexander Bogdanov leaning towards Empirio-Criticism). Based on the concept of objective knowledge, Lenin developed an idea of scientific ideology, which would replace the intentionally irrationalist ideologies cultivated by the dominant classes for the subjugation of the toiling masses: “every ideology is historically conditional, but it is unconditionally true that to every scientific ideology (as distinct, for instance, from religious ideology), there corresponds an objective truth, absolute nature.”61 Thus, Soviet ideology intentionally strived to be scientific and as *Historic Materialism* put in 1951, “in the socialist society the scientific ideology is of decisive importance.”62 But what was the “objective truth” to which the Soviet ideology corresponded?

The answer to this question is surprisingly simple even if somewhat circular: the essence of objective truth that scientifically supported the Soviet ideology consisted in laws of historic

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development formulated by Karl Marx. In 1964 Louis Althusser, at that time leaning towards
Soviet Marxism, succinctly formulated its highest aspirations: “In fact Marx established a new
problematic, a new systematic way of asking questions of the world, new principles and a new
method. This discovery is immediately contained in the theory of historical materialism, in
which Marx did not only propose a new theory of the history of societies, but at the same time
implicitly, but necessarily, a new ‘philosophy’, infinite in its implications.” Thus, historical
materialism itself was that objective truth, which justified the programmatic statements of the
Bolshevik ideology, including the requirement to jettison the retrograde aspects of past cultures
and cultivate the progressive ones.

To summarize the general scheme of argumentation of the Bolsheviks was as follows:
there is a main line of development which leads to an accomplished capitalist society ready for a
transition to Socialism and hence to Communism. (As a side-note it is worth mentioning that
according to the discipline of Scientific Communism the transition from a developed capitalist to
communist society cannot be evolutionary, since, as was demonstrated by Lenin in *What is to be
done?* (1901), the grassroots initiatives of industrial proletariat can only lead to trade-unionism.)
The peripheral regions of Russian Empire were diverted from this straight and logical line by the
over-development of imperial state apparatus, which responded to the external threat. The goal
of Bolsheviks was essentially to restore the normal and the most rational course of history by
establishing separate nation-states for every sizable ethnic group. At the same time Bolsheviks
realized that these states would drift towards what they called bourgeois nationalism. The ruling
classes would exploit the superstitions of the toiling masses for their egoistic purposes, and this
should be prevented. The progressive socialist culture (in Soviet language, “socialist in content”)

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63 *Marxism and Humanism* (1964), http://www.marxists.org/reference/archive/althusser/1964/marxism-
humanism.htm.
adapted to ethnic psychology and local traditions ("national in form") would counterbalance the
tendency towards bourgeois nationalism. Yet the socialist culture could not be built from scratch;
rather it should be assembled from the progressive elements of national historic heritage. Hence,
in the domain of historic preservation the job of architectural historians, profession restorers and
the amateurs of monuments consisted in finding, revealing, preserving and restoring the
progressive elements of architectural heritage. Two questions immediately stem from this
program: 1) to what extent did Soviet cultural workers [rabotniki kul’tury] interiorize this
ideological program? and 2) what was the general definition of "progressive" for the
architectural heritage of Central Asia? I will devote the rest of this chapter to answering these
two questions.

The first of the two questions, i.e. to what extent Soviet art historians and restorers
interiorized the communist ideology, cannot be answered in general because, obviously, different
people had different level of loyalty and besides the loyalty to the communist regime generally
increased with its solidification and decreased with its decline. In other words, unless a cultural
worker leaned towards social democracy before the Revolution, he or she would be rather
skeptical about Soviet ideology or would more or less convincingly pretend to be loyal often
under a mortal threat. The people of the second type dominated the cultural scene of Central Asia
up until the 1950s. For those born and/or raised in the Soviet Union its ideology was a natural
intellectual environment and, in turn, resisting to it required a special effort. Therefore the period
of maximum loyalty to the Soviet ideology extended from the mid-1950s to Mikhail
Gorbachev's Perestroika of the mid-1980s. The quick economic decline of the late 1980s washed away the last traces of ideological loyalty by the beginning of the 1990s.

For the first generation of Soviet architectural historians and restorers involved in the re-assemblage and linking of Central Asian heritage to the socialist culture the assimilation of Bolshevik ideology was a tedious and uneasy process, which often went against their very basic assumptions about the history and the logic of culture. The first significant step in this direction was made by Aleksei Shchusev (1873-1949), a distinguished Russian architect who designed the Theater of Opera and Ballet in Tashkent, Uzbekistan constructed between 1940 and 1947. The theater was the major statement of Stalinist architecture in Central Asia “national in form and socialist in content;” it combined the compositional elements of neoclassicism with traditional Uzbek ornament. Shchusev widely employed local masters, the so-called usto’s, for the decoration of the Theatre, including the most famous of them, the gypsum carver Shirin Muradov (1880-1957). Therefore, even though the construction of the Theater was obviously not a case of historic preservation it strived to assimilate the progressive elements of local culture, including the “people’s” [narodnoe] art of gypsum carving.
Aleksei Shchusev as an Uzbek (source: Wikimedia Commons) and his Alisher Navoi (Uzbek) Theater of Opera and Ballet in Tashkent (source: Igor Demchenko)

Shirin Muradov as an usto (source: Bukhara Historic Museum) and as an Honorary Member of the Uzbek Academy of Sciences and the Stalin Prize Laureate (source: Igor Demchenko)
The architectural career of Shchusev started long before the Bolshevik Revolution; he was designing and building in Russian Art Nouveau style, specializing in highly ornamented churches and chapels; he was also involved in a number of restoration projects in mainland Russia. His most famous building is without doubt the Lenin Mausoleum finished in 1930; during the 1920s and the early 1930s he was close to Constructivism and switched to neoclassicism when modernist architecture was disallowed by the Soviet government. Tashkent Theater of Opera and Ballet with its mélange of traditional and neoclassicist architecture was more of a side-track for Shchusev, yet in 1934 he published a programmatic article titled “Architecture of the Soviet Orient.” This article introduced the notion of oriental klassika, which was extremely influential well beyond the 1930s and essentially up until the collapse of the Soviet Union. Klassika is a complex idea peculiar to the communist understanding of cultural history. It denotes a cyclic sub-theory of historic development, which interprets every successive stage of societal progress in terms of the rise, flourishing, and decline. The concept of klassika etymologically related to English ‘classics’ describes the cultural product of the flourishing phase, with Greco-Roman culture serving as its archetype. Thus, for instance in the history of Italy there were two periods of klassika: that of the Slave-owning formation and the klassika of the Feudal formation, i.e. the Renaissance. Klassika included all possible types of cultural production: literature, science, painting, sculpture, and certainly architecture. Above all klassika reflected the progressive development in a particular period or a region and by this virtue was spiritually in line with the progressive movement in the direction to the communist future.

64 Shchusev also designed a building for a Tbilisi branch of the Institute of Marxism-Leninism (completed in 1938); however this building is much closer to the classicist canon and avoids the overt references to the traditional architecture of Georgia.

In his 1934 article, Shchusev was gradually developing the concept of *oriental klassika* by first referring to Lenin, who, according to the architect, “pointed that in the development of the culture of the republics of the [Soviet] Union it is necessary to take into account their old culture, to borrow all its best and useful [elements] for socialist creative work, and to utilize these useful [elements] in the building of these republics.”66 First, we can see that already on the 1930s the idea, concisely formulated in the 1982 quote introducing this chapter, had a wide currency and was presented as a conventional wisdom. Besides, Shchusev attributed this idea to Lenin without citing any of Lenin’s published works, which meant that the project of borrowing the best elements of the past culture for the construction of the new one was in the mainstream of communist ideology and did not require any separate justification. Finally, Shchusev was writing about the republics of the Union, which were exactly the self-determined nations of pre-Revolutionary Lenin in the Bolshevik discourse.

Next Shchusev moved to the definition of “best and useful” or in other words the progressive. First he glorified the creative genius of simple people, which “through many ages occupies a large [cultural] space and creates significant values in the culture of nationalities.”67 After that Shchusev encouraged architects, who like himself work in the new national republics, to study the history of local architecture. He pointed out that in Central Asia the “remarkable monuments [were] created under the Persian influence primarily during the epoch between the 13th and the 15th century.”68 Yet Shchusev did not claim that the masterpieces of Central Asian architecture were the creation of simple people’s genius; instead he attributed them to the era of *oriental klassika*:

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67 Ibid.
68 Ibid.
The architecture of the Oriental countries (both of the Near and the Far East [i.e. both of the Middle East and Asia]) is similar in its features to the Western European Klassika, which has its roots in the architecture of Mesopotamia and Egypt. ... The same can be said about Muslim monuments that were built in Palestine, Africa, Spain, and Persia beginning from the 7th century. Both Byzantium and the Muslim Orient directly continue [the tradition] of Classical architecture [of Rome and Greece]; they originated on its ruins, and every building of these countries has all the features and particularities in planning, proportioning, and the design of interior spaces that are characteristic of the theory of Classical architecture. ... As for the period between the 13th and the 17th centuries in Persian architecture, it should also be perceived as the time of the highest flourishing of Islamic architecture; and we have all the rights to call it the klassika of the Orient.69

Here for the first time we witness an attempt to define the progressive features of non-vernacular architecture, i.e. the architecture produced for the ruling classes by supposedly professional architects. In the case of vernacular or folk architecture the task of identifying its progressive features was rather straightforward: every complex decorative element was attributed to the genius of simple people and hence deserved preservation through replication. In the case of unique monuments created by highly experienced artists it was their rational capabilities reflected in the architecture, including the ability to draw plans and generate proportional and harmonic schemes, that qualified historic buildings as progressive.

In the case of Shchusev we can be certain that, even if he did not believe in a single word of Marxist-Leninist doctrine (which judging from his stylistic flexibility most probably was true)
he fully interiorized its logic and was able to project it onto historic architecture of Central Asia. The notion of oriental klassika, which Shchusev singlehandedly invented, wrapped the significant monuments of the region in the intellectual foil of multiple references to the classicist architectural theory with its fixation on proportions, modules and rational harmonization. Eventually, whether Shchusev intended it or not, he inscribed Islamic architecture in a complex project of social rationalization, which goes back to the age of Enlightenment. Compare his train for thought that brings together the classicist rationality and the construction of culturally progressive nations with a project of normative objectivist aesthetics as formulated by Anthony Ashley Cooper, the 3rd Earl of Shaftesbury in his Characteristics of Men, Manners, Opinions, Times (1711):

Should a writer upon music, addressing himself to the students and lovers of the art, declare to them 'that the measure or rule of harmony was caprice or will, humour or fashion,' 'tis not very likely he should be heard with great attention or treated with real gravity. For harmony is harmony by nature, let men judge ever so ridiculously of music. So is symmetry and proportion founded still in nature, let men's fancy prove ever so barbarous, or their fashions ever so Gothic in their architecture, sculpture, or whatever other designing art. 'Tis the same case where life and manners are concerned. Virtue has the same fixed standard. The same numbers, harmony, and proportion will have place in morals, and are discoverable in the characters and affections of mankind; in which are laid the just foundations of an art and science superior to every other of human practice and comprehension.
In fact Shchusev was grafting the Soviet ideology to the old European tradition of social kalokagathia, which brought together the objectively beautiful and objectively moral, with a special reference to the classical culture of ancient Greece and Rome, where this ideal was allegedly achieved.

In the realm of architecture the program of reinforcing the politics of nation-building with rational aesthetics was formulated already by Christopher Wren in *Tract I on architecture* (mid-1670s): “Architecture has its political Use; publick Buildings being the Ornament of a Country; it establishes a Nation, draws People and Commerce; makes the People love their native Country, which Passion is the Original of all great Actions in a Common-wealth. ... Architecture aims at Eternity; and therefore the only Thing uncapable of Modes and Fashions in its Principles, the *Orders.*” The orders for Wren were exactly the rational structure that organized the politically useful architecture; the same was argued by Shchusev.

And still there are traces of pre-communist worldview and cultural intuitions in Shchusev’s treatment of *oriental klassika.* Above all, despite his lip service to the differences between the architectural traditions of “separate Central Asian republics such as Uzbekistan, Tajikistan, and Turkmenistan..., which cannot be grasped by a superficial gaze but are accessible only for a profound study,”70 Shchusev repeatedly draws the genealogy of Central Asian heritage back to the Persian tradition. Yet already in the 1920s this “ideologically blind” approach was criticized by Boris Zasypkin (1891-1955), a leading restorer and architectural historian of the early Soviet Central Asia and the teacher of Konstantin Kriukov.

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70 Ibid, p. 8.
Zasypkin first arrived from Moscow to Samarkand in 1922, before that, Old-Russian (i.e. medieval Russian; *drevnerusskiaia*) architecture was in the center of his professional interests. His first noticeable project was in – then – suburbs of Moscow, the village of Kolomenskoe. On the second year of his studies at the Moscow College of Painting, Sculpture, and Architecture in 1912, Zasypkin participated in the restoration of the Ascension Church...


72 Moskovskoe uchilishche zhivopisi, vaianiia i zodchestva.
Igor Demchenko, MIT

built between 1528 and 1532. In the period preceding his first professional trip to Central Asia he completed several other projects all focused exclusively on old-Russian monuments. With such a pedigree in the conservation and restoration of religious architecture Zasypkin was hardly particularly loyal to the Bolshevik rule; yet he accepted the rules of the game, which among other things meant the rejection of pre-Revolutionary insistence on Persian cultural supremacy over the Turkic ethnic groups of Central Asia.

Aleksandr Semenov (source: Wikimedia Commons)

In relation to architecture, the agenda of Persian supremacy was propagated by Aleksandr Semenov (1873-1958), a professional orientalist who graduated from Moscow Lazarevsky Institute of Oriental Languages and served as a vice-governor of Samarkand region during World War I.\textsuperscript{74} In his 1925 article “Material monuments of Aryan culture” Semenov wrote: “If in many places Aryan population has currently disappeared completely, the monuments of the past powerfully tell us about this population, as if pointing at the fact that Aryan culture spread far

\textsuperscript{73} Tserkov’ Vozneseniiia. See the drawing and the proportional analysis above.

outside the borders of contemporary Tajikistan. We still find its striking traces in autonomous republics and regions of the rest of Turkestan (i.e. in Uzbekistan, Turkmenistan, Kirgizstan, Kara-Kirgizstan, and Kara-Kalpakstan).”

Before anything else it should be noted that Semenov was a particularly, or even uniquely, disloyal citizen of the Soviet Union, and the only reason he avoided communist repressions was because his pro-Aryan sentiments reverberated with Tajik nationalist aspirations, and he eventually managed to hide in Stalinabad/Dushanbe, the capital of Tajikistan, and survive both Lenin and Stalin. Here Semenov essentially voiced the official position of Russian imperial government and, while we can speculate about the reasons why it preferred Persians (or Aryans) over the Turks, it is obvious that in linguistically Turkic republics of Soviet Central Asia the progressive architectural heritage couldn’t belong to now foreign Tajiks (the Iranian-speaking nation of the region) not to mention the capitalist Iran, the self-proclaimed land of Aryans.

Therefore in 1926 Zasypkin stepped ahead and wrote that “at the moment we avoid giving names and terminology to the art of Central Asia and Islam, which we know little, but we cannot agree with A. A. Semenov who in his article published in the volume Tadzhikistan described all monuments of Central Asia as ‘Monuments of Aryan culture’.” Zasypkin had a number of reasons to reject Semenov’s position. First of all, it could be that he wanted to

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76 The colonialist ideology of the Russian Empire remains poorly explored, partly because it was twofold: if in its western part and in the Black Sea region the Empire was officially reclaiming the alleged Orthodox heritage of Byzantium and Kievan Rus’, in the Asian provinces the discourse shifted towards the mission civilicatrice and the racial supremacy of Russians, often presented as Aryan. On the racist ideology in Russian Empire see: Marlène Laruelle, Mythe aryen et rêve impérial dans la Russie du XIXe siècle (Paris : CNRS, 2005).
distance himself from tsarist colonial ideology, but probably more important was his wish to find support and response among the more populous Turkic ethnic groups of Central Asia; Turkic-speaking people also dominated Uzbekistan, the republic that inherited most of important Islamic monuments. In his 1928 article “Architectural Monuments of Central Asia: Problems of study and restoration,” Zasypkin wrote: “the epoch of the first Turkic dynasty in Central Asia, that of Kara-Khanids... provides us with architectural elements that are most characteristic for the local region;” later in the text he concludes that “undoubtedly, Kara-Khanids contributed to the progress and flourishing of the building [craft].” Thus, Zasypkin integrated history with the present and supplied the Turkic population of Central Asia with architectural heritage, which was confiscated by the imperial government in favor of weaker, less populous, and potentially more loyal Iranian-speaking ethnic groups.

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78 Although Bukhara and Samarkand were predominantly Tajik-speaking.
80 Ibid, p. 231.
In the 1920s both Zasypkin and Semenov worked for Sredazkomstaris, a Central Asian state committee for the preservation of historic heritage, this is a 1926 photograph with Sredazkomstaris’s most active members; from left to right: B. N. Zasypkin, E. A. Shmidt, V. V. Bartol’d, D. I. Nechkin, V. L. Viatkin, A. A. Semenov; standing behind: I. I. Umniakov (source: Izvestiia Sredazkomstarisa, )

Yet for Zasypkin interiorization of communist ideology did not end up with a rather humanistic gesture of rejecting Aryan cultural supremacy over Turks. In the late 1940s under the

pressure of Stalin’s anti-cosmopolitanism he had to publically confess the national belonging of architectural heritage. In other words he had to describe the major monuments located on the territory of Uzbekistan as Uzbek national heritage even if, as in the case of Samanid mausoleum, they were known to be produced by Iranians, for an Iranian dynasty and historically before the Turkic colonization of the region:

Samanid mausoleum, erected in Bukhara a thousand years ago, visibly demonstrates the great height achieved by the art of building, architecture, and artistic methods [during the Samanid era]; it also testifies to the naïveté of attributing this monument to “Arab,” “Iranian,” or “Islamic” art. Soviet science armed with the Marxist-Leninist theory has discovered and will continue discovering the authentic history of Uzbekistan and the authentic ancient art created by the masters of simple background – the art that embraces the progressive ancient traditions.82

And yet from this quote it is worth noting that Zasypkin, being a professional historian of pre-Revolutionary training, did not accept Shchusev’s notion of oriental klassika; instead he took a less anachronistic path of attributing the progressive elements of past culture to the creative genius of “the masters of simple background” – an option also known to Shchusev.

Playing anti-cosmopolitanism was certainly a tough game for Zasypkin who in his publications produced before World War II was using the technocratic language and taking the position of professional neutrality to shield himself from the communist regime, which in the

82 B. N. Zasypkin, “Metody i praktika restavratsionnykh rabot po pamiatnikiam arkhitektury Uzbekistana” [Methods and practices of restoration of architectural monuments in Uzbekistan], 1949, Archive of the Uzbekistan Ministry of Culture, Department of Heritage Preservation, C 539, 3-36, p. 13.
1930s forced him out of Moscow into Central Asian exile from which he was never allowed to return. However he had no choice but to learn the rules and play the game:

[Soviet] scientific-research methods substantially differ from bourgeois methods of research and from formal methods practiced by Professor A. I. Nekrasov’s [1885-1950] Art History Department [kafedra iskusstvoznaniiia] at Moscow State University as well by several independent art historians including N. I. Brunov [1898-1971], etc. When formalist art historians studied monuments – if they ever did this at all – they approached them hastily and superficially, documenting only their own experience and feelings, which they described with enthusiastic pathos – or grieved, when monuments contradicted their speculative armchair theories. Attracted by the ideology of bourgeois art historians-idealists, formalists were mainly addressing general art historical problems; they degraded to idealistic opinions regarding the history of architecture or even to mysticism as in the case of N. I. Brunov’s *Essays in the history of architecture.* ... All of this resulted in the anti-scientific conceptions and in architectural literature of worthless and harmful false-works. It is clear that the formalist methods, which in certain cases went as far as servility [nizkopokonstvo, literally: low-bowing] in front of the reactionary scholars of the capitalist West, and cosmopolitanism had nothing to do with the Soviet science, with Soviet methods in sciences and research.

The almost hysterical tone of this rant reveals the actual attitude of Zasypkin to the communist ideology at its extremes. Still the fact that he was able to put it in writing is a testimony to a

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83 Aleksei Ivanovich.
84 Nikolai Ivanovich.
85 *Ocherki istorii arkhitektury* (Moscow: Academia, 1937).
certain level of interiorization, which the restorer perceived as an acceptable price for the preservation of his life and the right to stay in the profession, in other word – as a necessary evil. After all, Soviet regime was always open about being a dictatorship (officially, “a dictatorship of proletariat”), and brutally forcing people into accepting its ideology was consistently perceived by its leaders and ideologists as a fully justifiable means to an end.87

For the next generation of Soviet architectural historians and restorers the task of responding to communist ideology was simplified by the fact that it acquired a self-evident status: when rigid Soviet censorship eliminated all of its alternatives, communist ideology moved from the forefront of intellectual discussions to the omnipresent background turning into the neutral language of thinking. In the domain of historic preservation of Central Asian architecture the first fully “communist” generation, which immediately followed and largely overlapped with a generation of Zasypkin, Semenov and Shchusev, was dominated by a monumental figure of Mitkhat Bulatov (1907-2004), who was born still before the Bolshevik Revolution but received the good deal of his education already in the Soviet state. His professional career was exclusively Soviet. His single most important intervention consisted in conceptualizing Central Asian heritage as reflecting the scientific theory of architecture allegedly practiced by pre-modern master-builders, who designed the major monuments of local Samanid, Kara-Khanid, Timurid, and Shaybanid dynasties. Chronologically these dynasties cover the era of oriental klassika, loosely outlined by Shchesev.

87 Thus, according to Historical Materialism (1951), “Lenin taught that the dictatorship of proletarian ‘does not simply mean violence, although it is impossible without violence [italics added]...’” (p. 339).
Unlike most people involved in preservation of Central Asian architectural heritage, Bulatov was of Muslim background; yet, he was neither born nor grew up in that region.  


Besides Bulatov very few scholars working in the field of heritage preservation in Soviet Central Asia could confidently read Arabic script; among them ethnically local Pulat Zakhidov (see his Osnovy kanona garmonii v arkhitekture [Foundation of the Canon of Harmony in Architecture] (Tashkent: Fan, 1982) and Samarkandskaia
Bulatov did not belong to pre-Revolutionary Muslim intelligentsia and did not share its memories about the past. He was a fully loyal and heavily ideologically indoctrinated Soviet citizen. This image of Bulatov is supported by the sheer importance of the administrative positions that he occupied during his career in Central Asia: a head of a workshop and the chief architect of the Design and Planning Department of the Ministry of Communal Economy of Uzbek SSR (1937-1941);\(^90\) a head of the Tashkent urban planning department (under different titles, 1941-1964); and a head of the Union of Architects of Uzbekistan (1951-1961).\(^91\)

The extent to which Bulatov interiorized the communist ideology can be appreciated from his first substantial written work, the dissertation titled “Architecture of Samanid mausoleum and the Principles of Central Asian Architecture,”\(^92\) which he completed in the early 1950s. An edited version of Bulatov’s dissertation is preserved in the archives of Uzbekistan Ministry of Culture, Department of Heritage Preservation as a manuscript titled “Proportions in the architecture of Uzbekistan” (1953).\(^93\) In the introduction to the dissertation Bulatov gives an already standard reason why the architecture of the past needs to be studied: “the creation of authentically Soviet architecture, national in form and socialist in content, is unthinkable without the study of the theory and history of architecture of the past.”\(^94\) Again, within the framework of

\(^{90}\) PyKOBOAHTeJIb \(\text{maCTepcoK} \ H rJIaBHbIi \ apXHTeKTOP \ JaHHpoeKTa \ HapKoMKoMXo3a \ Y3CCP. \)

\(^{91}\) Bulatov, "Kosmos i arkhitektura", pp. 252-3.

\(^{92}\) "Akhitiktura mavzoleia Samanidov i osnovy zodchestva Srednei Azii"; Bulatov mentions the title of this dissertation in his short memoirs, Mitkhat Bulatov “Iz vospominiui [From memoirs].” \(\text{Arkhitektura i stroitel'stvo Uzbekistana} \ 5 \ (1991), p. 19. \) There are no traces of this dissertation in the biographical material assembled in the Appendix to M. S. Bulatov, \(\text{Kosmos i arkhitektura} \) [The Universe and the Architecture]. (Moscow, Tashkent: SMI-Aziia, 2009).

\(^{93}\) M. S. Bulatov, “Proportsiy v arkhitekture Uzbekistana. Pervaia redarktsiia” [Proportions in the architecture of Uzbekistan. First edition], 1953, Archive of Uzbekistan Ministry of Culture, Department of Heritage Preservation, O\(^{1829}\) B\(^{90}\).

the communist ideology cultures of the past do not have any independent value; they are nothing but a repository of elements used in the construction of socialist culture for the new nations. In the first edition of his major work *Geometric Harmonization in the Architecture of Central Asia from 9th to 15th Century* (1978), which grew out of the dissertation, Bulatov substantiates the same idea with a direct quote from Lenin: “The whole spirit of Marxism, its entire system demands that every proposition be viewed only (α) historically, (β) only in connection with other propositions, and (γ) only in connection with the concrete experience of history.” What Bulatov extracts from this rather ambiguous demand of Lenin is the need to study the culture of the past for prognostication and for rational and conscious construction of the future, or in his words for “the active influence of theory on practice”.

Bulatov draws a general rule for separating progressive from retrograde elements of past cultures (the rule, which, as I mentioned above, was already invented by Shchusev in the form of *oriental klassika*) directly from *Das Kapital* of Karl Marx: “a bee puts to shame many an architect in the construction of her cells. But what distinguishes the worst architect from the best of bees is this, that the architect raises his structure in imagination before he erects it in reality.” For Bulatov this meant that “the beautiful monuments of Central Asian architecture, which deserve their universal glory” must have been constructed by exceptionally well-trained architects on the basis of scientific and rationalist aesthetics. Bulatov makes this even more clear in the conclusion to *Geometric Harmonization* (1978), when he claims to “have proved the existence of the science of architectural design in medieval Middle East, which was tightly

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96 Ibid.
connected to the geometrical methods [of harmonization] and was classified (according to al-Farabi) as a mathematical discipline.\(^9\)\(^8\)

If Bulatov used the clichés of communist ideology as a neutral language of academic presentation, the younger generation of proportionalists\(^9\) who were learning from him, Zasypkin, and Shchusev, completely interiorized the postulates of historical materialism with its dialectically related categories of national and socialist, and the binary opposition between progressive and retrograde elements of past culture. Besides Mitkhat Bulatov, the leading figures of Central Asian proportionalism in architectural history were Konstantin Kriukov (1929–200?), Vladimir Filimonov (1924–?), Pulat Zakhidov, Sergei Khmelnitskii (1925-2003), and Iudif Shvab; Iosif Notkin (b. 1928) initially leaned towards this group but gradually became disillusioned in the ideas of proportionalism. It is worth noting that besides the interiorization of communist ideology, proportionalists’ vivisectional attitude to the culture of the Central Asia was simplified by the fact that ethnically they did not belong to the region and constituted the classical colonial elite even if installed with a purpose of propelling the cultural decolonization of Central Asia.\(^1\)\(^0\)

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\(^9\) I owe the information about the informal name of the group that cultivated the idea of *oriental klassika*, which manifested in the aesthetic principles of proportioning and harmonization, to Iosif Notkin, a leading preservationist, urban planner, architectural historian, and theoretician of Soviet Uzbekistan who currently resides in Jerusalem.

\(^1\)\(^0\) Judif Shvab, Sergei Khmelnitskii and Iosif Notkin were Russian Jews; Konstantin Kriukov and Vladimir Filimonov were Russians; only Pulat Zakhidov was an Uzbek. It is also worth recapitulating that Shchusev, Semenov, and Zasypkin were Russians, while Mitkhat Bulatov was a Siberian Tatar.
The most impressive feat of reinterpreting Central Asian architectural heritage in terms of Marxist-Leninist ideology was achieved by Vladimir Filimonov in his unpublished dissertation “Certain pattern in the development of architectural methodology” (1970).\(^{101}\) As a scholar and restorer, Filimonov was a product of Central Asian academia: in 1951 he graduated from Central Asian Polytechnic Institute; there he defended his dissertation in 1970. In the 1950s, together with Konstantin Kriukov and Iosif Notkin, Filimonov started his career as a restorer at the Special Scientific-Restoration Manufacturing Workshop of Uzbekistan\(^{102}\) where he worked under the direction of Boris Zasypkin. Later Filimonov joined the Uzbekistan Institute of

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\(^{102}\) Специальная научно-производственная реставрационная мастерская Управления по делам архитектуры при Совете Министров УзССР.
Scientific Restoration$^{103}$ where he collaborated with Iudif Shvab and Pulat Zakhidov.$^{104}$ Filimonov began his dissertation from already familiar programmatic statement: “At the contemporary stage of development of Soviet architecture, which is rushing forward into the future, the question of scientifically grounded evaluation of architectural heritage of the past eras is particularly urgent...”$^{105}$ The evaluation of architectural heritage, with which Filimonov is concerned, requires an ability to distinguish between its progressive and retrograde elements. Filimonov approaches this problem from the perspective of Marxist theory of historic formations, i.e. the progressively evolving societal types; he argues that each of three formation – Slave-owning, Feudalist, and Capitalist – developed its particular method of architectural designed, or in Filimonov’s words “architectural methodology.” All the three methods are based on the level of mathematical development achieved by each formation. According to Filimonov, Slave-owning formation epitomized by Vitruvius used the method of symmetry; Feudalist formation developed the method of triangulation; and the Capitalist formation relied on the proportional method. Islamic architecture of Central Asia belongs to the Feudalist formation and therefore reflects the method of triangulation, which Filimonov described as “based on arched marks [dugovye zasechki] and related to the solution of architectural problems” and as “designs that follow from the geometric properties of the square with inscribed circle.”$^{106}$ Thus, according to Filimonov, architectural heritage of Central Asia still reflects a certain type of rationalist

$^{103}$ Узбекский научно-исследовательский и проектный Институт реставрации Министерства культуры УзССР.
$^{105}$ Filimonov, “Certain pattern in the development of architectural methodology,” p. 3.
scientific aesthetics, yet it is simpler than the complex proportional schemes of Italian Renaissance expected by Shchusev and discovered by Bulatov.

The language of historical materialism fully frames Filimonov’s thinking. It allows him to construct an axiologically neutral science of architectural development and by extension to estimate the quality of architectural monuments according to the criteria of that science. So as long as a monument reflects the best feature of respective method practiced during the societal formation when it was designed and constructed, this monument should be preserved as a progressive element of a past culture. Moreover, the language of Marxism-Leninism proved to be flexible enough to allow for competing perspectives, intellectual experiment and debate. From this perspective architectural history in Soviet Central Asia was a normal academic discipline, while Bulatov, Filimonov, Kriukov, and other proportionalists were responsible scholars. As counterintuitive as this idea might seem, it explains the reserved attitude to international historic preservation methods and approaches to historic monuments demonstrated by Kriukov, a spokesmen of the proportionalists group, already after the launch Perestroika. It also explains why Kriukov and Khmelnitskii proceeded with publishing their proportionalist studies after the collapse of the Soviet Union. In the late 1990s, when reproached by Notkin for publishing proportional analysis of Arab-Ata mausoleum in Uzbekistan, Khmelnitskii was offended by Notkin’s lack of trust in his professionalism and mentioned that “proportions, whether good or bad, define the artistic perception and constitute an aesthetic phenomenon.”


108 Sergei Khmelnitskii, a letter to Iosif Notkin dated 7 June 1999, personal archive of Iosif Notkin. I would like to thank Iosif Notkin for allowing me into his personal archive and for time that he devoted to answering my questions about the restoration and architectural history in Soviet Central Asia.
In the next chapter I will offer an outline of proportionalists approach to Central Asian architectural heritage, tracing the development of this approach from rather primitive schemes of the 1930s to extremely sophisticated systems of Bulatov and Kriukov. I will also indicate the points, at which medieval material resists the proportionalists’ interpretations, even though they would most certainly reject my skeptical comments as unperceptive. And yet I still hesitate to fully solidarize with the argument of Bernard O’Kane, who in his article “Poetry, geometry and the arabesque: Notes on Timurid aesthetics” (1992) dismissed Soviet theories of geometric harmonization in medieval Islamic architectural theory based on the following considerations which, at the same time, I find quite convincing:

Bulatov and others have also attempted to reconstruct the proportional theory that was used in plans and elevations, but so many different systems of proportions are claimed to have been at the disposal of the Timurid architect – the square, the equilateral triangle, the semisquare, the root five rectangle, and all their derivatives – that it may be wondered whether such a theory can be applied to almost any building. Another difficulty in determining the validity of proposed geometric schemes is that modern drawings of monuments rarely specify whether they are in part reconstructions, or are records of the standing monument, in which craftsmen may have made mistakes or purposely have diverged from an original design.109

I believe that O’Kane’s criticism missed the intention of Soviet proportionalists, who certainly made a sincere (and very possibly failed) effort to reconstruct objective aesthetic principles of composition in Islamic architecture in Central Asia – but that effort was not an end in itself.

Their research was instrumental to solving an ideologically predicated problem of distinguishing between progressive heritage, which should be preserved, and the rest of built heritage, which was a testimony to the perceived backwardness of pre-Revolutionary Central Asia and therefore was destined to erasure. Mathematics, geometry, proportions and rational harmonization were the criteria that reverberated with Soviet cult of progress epitomized by exact science. From this perspective Bulatov and his younger colleagues successfully employed the available scholarly instruments and indeed saved a number of important monuments from almost inevitable destruction – even if to eventually disfigure (or improve) them by restorations that brought the salvaged monuments closer to their aesthetic ideal. Thus, in Samarkand and Tashkent most of historic urban fabric was bulldozer and only selected monuments of oriental klassika were saved from demolition.

That said, it would be absurd to argue against the fact that there was a tendency to Soviet architectural historiography in Central Asia. It was none other than Lenin who established the neutral notion of ideology that dominated Soviet intellectual scene and was never completely abandoned after the collapse of the Soviet Union.\(^{110}\) It is important to understand that Lenin’s neutral concept of ideology did not presuppose disinterestedness and did not aim at projecting the academic standards of unbiased research onto ideology. On the opposite, Bolsheviks were open about their interests and goals, which included the rationalization of cultural sphere according to the matrixes of historical materialism. For Lenin and for the Communist Party every society was based on ideology, and the critique of capitalism was intended at exposing the ideology and demonstrating the toiling masses how the ruling classes employ the omnipresent

\(^{110}\) I owe the distinction between “critical” and “neutral” notions of ideology to Jan Rehmann’s *Theories of Ideology: the Powers of Alienation and Subjection* (Leiden, Boston: Brill, 2013). I fully embrace Rehmann’s thesis of inconsistency between Lenin’s and original Marx’s concepts of ideology formulated in “The Concept of Ideology from the Second International to ‘Marxism-Leninism’” of the monograph.
ideological background to rob them of income and opportunities. The socialist society was also based on ideology (first socialist and subsequently communist), which was now clearly formulated and openly promoted by the state since there was absolutely no reason to hide it from the majority of population now supposed to benefit from the initiatives of the government. Thus, what O’Kane perceives as an unacceptable bias and the laxity of academic standards was in fact the adjustment of research apparatus to extra-academic goals.

In Marxist-Leninist philosophy the objectivity of historic study was not guaranteed by the scrupulous investigation of historic facts. Instead the objectivity was achieved though systematic application of Marxist historic laws that ordered and classified the chaos of historic data. In the Soviet Union, the western blindness to Marxist historic laws was perceived as a reflection of capitalist ideological pressure. Essentially when a Soviet scholar managed to find a piece of evidence that worked in support of a known historic law he was reassured and comforted. When evidences seemed to contradict a particular law, Soviet scholars were looking for another one in a repository of historical materialism. Rather short chains of causal relations, with which “capitalist” scholars were normally content, did not impress Soviet academics. Hence, from the outsider’s perspective, there is always a touch of megalomania in Soviet historiography, and the grandiose schemes of Filimonov, Zakhidov, and Kriukov is a testimony to that. All three scholars did not limit themselves to Central Asia, or even Islamic world, but produced overarching conceptions bridging from Ancient Egypt to Le Corbusier, with Central Asia as just 

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111 For Lenin and all subsequent generations of communist ideologists, a distinction between natural societies free from ideological violence and societies that abandoned the natural condition in favor of artificial ideology formulated in, for instance, Ernest Gellner’s “Notes towards a Theory of Ideology” (L’Homme T. 18, No. 3, Jul. - Dec., 1978: 69-82) was altogether unacceptable. Personally I also find it over-optimistic.

a particular case in point. Yet, in their mind, the reference to recurrent events or to parallel lines of progressive development made their research scientific and worth scholarly attention.

Geometric analyses of Parthenon produced (1) by P. Zakhidov (source: *Osnovy kanona garmonii v arkhitekte*) and (2) by K. Kriukov (source: *Postroenie arkhitekteurnoi formy (khram Parfenona v Afinakh i sobornaia mechet’ Timura Bibi-Khanym v Samarkande)*)

Canalizing rationalist and scientific ideology in the sphere of architectural historiography, proportionalists were acting as a productive force of Soviet economy. Essentially they participated in making ideology self-evident by spreading and trivializing its programmatic claim of total rationalization, while, as I mentioned above, themselves being a product of that increased trivialization. In fact, the triviality of hegemonic discourse, which was a source of acute concern for Antonio Gramsci, became a desired goal for Soviet communist. (Obviously Gramsci was fighting against the hostile bourgeois ideology, but with his attitude he would hardly surrender to
Its communist counterpart.) This growing trivialization created a particular atmosphere of the last Soviet decades described by Alexei Yurchak in a book with a telling title *Everything Was Forever, Until It Was No More* (2005). Yet, unlike many elements of Soviet culture, Central Asian proportionalism did not completely disperse with unexpected and tragic collapse of the Soviet Union, but was preserved in restored monuments, which consequently encapsulate the last traces of communist rationalism. This fact ultimately justifies a long excurse in currently all but forgotten dogmas of Soviet historical materialism presented in this chapter.
Chapter 2

Rationalization of Central Asian architectural heritage in Soviet historiography

Unlike Kriukov’s generation of architectural historians and restorers which started their careers at Zasypkin’s Restoration Workshops of the late-1940s and the 1950s, Bulatov was intellectually and professionally a fully independent figure. However, Bulatov still owed to Zasypkin and Sredazkomstaris a canon of Central Asian architectural monuments that he studied with his methods of proportional analysis. Before moving to reviewing Zasypkin’s attitude to mathematization of Islamic monuments and his impact on the thinking of proportionalists group, let us first review the principles that underlay the assemblage of this canon. Zasypkin’s approach to architectural monuments combined orientalist fascination with their exotic qualities with the sincere effort to help first the region as a whole and later the separate republics in rediscovering

\(^{113}\) Bulatov’s *Geometricheskaia garmonizatsiia* was followed by P. Sh. Zakhidov’s *Osnovy kanona garmonii v arkhitekture* [Foundation of the Canon of Harmony in Architecture] (Tashkent: Fan, 1982) and K. S. Kriukov’s *Proportsii v arkhitekture: Analiz pamiatnikov drevnego Egipta, Gretsii, Rima, Tsentral’noi Azii* [Proportions in Architecture: Analysis of Ancient Egyptian, Greek, Roman and Central Asian Monuments] (Tashkent: Mukharrir, 1995); Vladimir Filimonov’s dissertation defended in 1970 remained unpublished.
their local historic heritage shaped after the abstract model borrowed from Europe, possibly with some specific features of pre-Revolutionary national culture of the Great Russians (velikorossy).

Zasypkin had no background in Oriental studies, languages, or any other training related to Islamic art, culture, or history; he never mastered Arabic, Farsi or any local Central Asian language. In other words Zasypkin had no direct access to local mechanisms of transmitting historic memory: all his information about architectural monuments came from academic and popular Russian-language publications and the limited selection of Central Asian historic sources translated into Russian. He also might have learned some local traditions about monuments from masters-ustos, who collaborated with him in his restoration projects.

Unidentified traditional masters restoring the vault of Shir Dar madrasah in Samarkand under the supervision of Boris Zasypkin (photo c. 1925). Source: Zasypkin, B. N. “Arkhiitekturnye pamiatniki Srednei Azii. Problemy issledovaniia i restavratsii”
Zasypkin was exactly a type of a technical specialist who did not reflect on the conceptual matrix that he filled in with historic monuments – a perfect state employer similar to the Europeans who populated the Comité de Conservation des Monuments de l'Art Arabe in British-occupied Egypt. The matrix of standard national culture that pervaded the mind of Zasypkin was explicated by Petr Pokryshkin in his *Brief Advise on the Questions of Repair of Historic and Artistic Objects* published in 1915, just two years before the Revolution.\(^\text{114}\) In the absence of Russian Viollet-le-Duc or John Ruskin,\(^\text{115}\) this tiny brochure (29 pages) is the only authoritative source, particularly because Zasypkin mentions Pokryshkin as the founder of the Russian tradition of scientific restoration in his 1949 unpublished survey of restoration works completed in Central Asia.\(^\text{116}\)

\(^\text{114}\) P. P. Pokryshkin, *Kratkie sovety po voprosam remonta pamiatnikov stariny i iskusstva* [Brief advice on the questions of repair of the monuments of history and art] (Petrograd, 1915).

\(^\text{115}\) Ruskin’s *The Seven Lamps of Architecture* were translated into Russian in 1901 and therefore known both to the specialists and the general public; since a certain level of proficiency in French was standard norm among educated Russians before the Revolution and it is safe to assume that Viollet-le-Duc’s ideas regarding architectural restoration were also well-known.

\(^\text{116}\) “It should be mentioned that Soviet methods were developed on the basis of the traditions of Russian architectural science and scientific restoration, which was established by architect P. P. Pokryshkin /died in 1918/. P. P. Pokryshkin developed methods of architectural measurements; in that he achieved the level of scientific precision.” B. N. Zasypkin’s “Metody i praktika restavratsionnykh rabot po pamiatnikam arkhitektury Uzbekistana” (1949), p. 1-2.
In his brochure Pokryshkin briefly elaborates on the status of historic monuments in culture and society:

It is essential to stimulate every initiative in propagating the correct attitude to the repair of historic and artistic monuments. It is essential to inform officials by all possible means that the effort to preserve historic and artistic monuments is the effort to preserve the state and national heritage bequeathed by our ancestors. This effort will inevitably find response in the society in general or the people [narod], which – as an heir of Russia’s cultural life – is an involuntary and unconscious admirer of historic and artistic
monuments. Without the sympathy of people and society the preservation of monuments could not have achieved the level of development that it has currently achieved. 117

This text reflects two dissimilar — or even conflicting — trends in social and cultural history of Russian imperial society both of which were halted in 1917. 118 On the one hand Russian Empire experienced the maturing of nations that developed within its borders and the central among them was obviously the Russian nation (or the Great Russians in pre-Revolutionary terminology); the growth of Russian nationalism was generally approved by the imperial government. 119 On the other hand, the government strived to preserve the state as an empire, and the growth of Russian nationalism was perceived as a dangerous development that — even if indirectly — could stimulate the rise of peripheral nationalisms. Between those two positions, restorers of the last pre-Revolutionary generation were leaning towards the former, as testified by Pokryshkin’s romantic notion of the people [narod] — obviously Russian people, or properly speaking the Russian nation — as an involuntary and unconscious admirer of the historic heritage.

In itself there is nothing special in Zasypkin’s Central Asian career: many professional restorers traveled from Europe to the colonies and practiced the romantic nationalist attitude outside the frontiers of their nation. 120 If anything, it was the forced exile from Moscow after 1934, first to the northern town of Vel’sk and then to Bukhara, that made his life trajectory

117 Pokryshkin, Kratkie sovety (1915), p. 5.
unusual: while Russian nationalism (rejected in the Soviet Union as the Great Russian chauvinism) was all but prohibited, controlled peripheral nationalisms were allowed and stimulated in the name of forced development. Fundamentally and throughout his entire career in Central Asia Zasypkin would treat medieval Islamic architecture in the same way that he would treat and was treating the old-Russian monuments (even though he had a very limited understanding of local culture, religion, and history).

Zasypkin's *Architecture of Central Asia* (1948) was a decisive step in assembling the Central Asian canon of architectural heritage; in fact, it covers all the major monuments of the region. It was preceded by two other milestone publications issued by Sredazkomstaris, the heritage preservation organization uniting imperial Russian intelligentsia that chose to be at least outwardly loyal to the new Soviet regime: Ivan Umniakov's (1890-1976) small book *Architectural Monuments of Central Asia: Study, Maintenance, Restoration, 1920-1928* (1929) and Zasypkin’s extensive article “Architectural Monuments of Central Asia: Problems of study and restoration” (1928). Before those publications the Central Asian canon of architectural monuments virtually did not exist. Separate monuments, including for instance Gur-i Amir mausoleum in Samarkand and the Ahmad Yassawi mausoleum in the small town of Turkestan, were known to the Russian and Russified public; the rest were either appreciated

121 Later, after World War II this common heritage was divided between the republics and the separate compendia of important historic monument were published in each of them. See: E.g.: Bernshtam, *Architectural Monuments of Kirgizia* (1950); Pugachenkova, *The directions of development of southern Turkmenistan architecture during the ages of Slaver-ownership and Feudalism* (1958); Pugachenkova and Rempel', *Outstanding monuments of Uzbekistan architecture* (1958); Margulan, *Architecture of Kazakhstan* (1959).
125 In 1864 Russian army besieged and conquered the Kokand fortress of Turkestan, which contained the mausoleum of Khoja Ahmad Yasawi built in the late 14th century by Amir Timur. It is reported that Colonel Nikolai Verevkin ordered his troops to spare the monument; however, when he learned that the defenders of Turkestan attribute the
on the purely religious grounds or were perceived as regular elements of the habitual urban fabric.

In his descriptions of individual monuments prepared for *Architecture of Central Asia* (1948), which is an encyclopedic dictionary of regional built heritage, Zasypkin is very technical and reserved. Let us have a closer look as an article devoted to the 10th century Samanid mausoleum in Bukhara. It begins with dating and stylistic attribution of the monument. Zasypkin argues that although “building is not yet a typical example of medieval architecture, but it already contains the methods that, in the 11th and 12th centuries, became the foundations of the medieval style.” This argument reflects the evolutionary approach to formal analysis of monuments assimilated by every subsequent historian of Central Asian architecture in the Soviet Union; it reverberates with historicism of communist ideology. Zasypkin discusses the ornament of the mausoleum and next moves to the general composition, which he interprets as “a simple combination of a cubic body with a half-dome.” The methodology of reducing historic preservation of the mausoleum to the “miracle of Azret Sultan” (that is Khoja Ahmad Yasawi), Verevkin ordered the artillery to bomb the building. Twelve cannon-balls hit the mausoleum however without substantially damaging the dome. (The story of Azret’s miracle is recorded by A. K. Geins in *Sobranie literaturnykh trudov* [Collection of literary works]: Vol. 2: “Dnevnik 1866 g. Puteshestvie v Turkestan [The travelogue, year 1866: Trip to Turkestan]” (Petersburg, 1897)).

In 1870, the military administration of Turkestan decided to demolish the mausoleum because “if the mausoleum collapses, it could bury the military barracks built of mud brick.” However, the general-governor of the province intervened, and the building was saved. This incident attracted attention of the provincial administration to Khoja Ahmad Yasawi mausoleum. In 1872, the *Turkestanskie vedomosti* newspaper announced that the building was repaired. These maintenance works were limited to the cleaning of the building and its roofs from the accumulated rubbish. In 1883, *Turkestanskie vedomosti* announced the planned restoration of the “outstandingly graceful ancient mosque of Azret”; in 1884, the scheduled works had started. Imperial government allocated 15,000 rubles for the restoration of the mausoleum conducted during two years. The works were supervised by the military engineer Pechenkin; the skilled local masters/craftsmen from Tashkent were brought to the site. The main goal of the preservation team was to prevent the building from collapse: four brick buttresses were built; the roofs and the main arch (peshtaq) were covered by alabaster; the facing bricks of the outer walls were isolated from the ground waters; the floors were paved with baked bricks. (A. U. Toktabaev, “Istoriia restavratsii kompleksa Khodzha Akhmed Iasawi v g. Tukestanane” [History of the restoration of Khoja Ahmad Yassawi complex in the town of Turkestan], Archive of Kazrestavratsia, Alamaty, Kazakhstan, undated, inventorial No 1294/1 and K. Tuiakbaev, *Restavratsia – iskusstvo vozrozhdenia* [Restoration is the art of rebirth] (Almaty: Arys, 2007)).

For the full translation of this particular article see the Appendix to the dissertation.

monuments to basic geometric volumes paved way to the mathematical analysis of the proportionalists.

Although in the Soviet Union the retrospective rationalization of pre-modern architecture started already in the mid-1930s when Zasypkin was restoring the Samanid mausoleum in Bukhara, which later became one of the icons for the proportionalists led by Mitkhat Bulatov, Zasypkin himself was never particularly invested in the mathematical study of monuments – neither did he reject these methods. Historicism and rationalism were not essential to the pre-Revolutionary idea of a nation that supplied the conceptual matrix for Zasypkin’s work; therefore, the discovery of aesthetic laws governing the design of monuments and essentially similar to those of contemporary Soviet architectural theory did not add much to the value of the monuments in the eyes of Zasypkin. Yet, he was open to the possibility that there are mathematical laws that govern the design of historic buildings. Thus, already in 1928 Zasypkin published a mathematical analysis of a pre-modern Central Asian building that reflected his belief in fundamental applicability of neo-classicist architectural theory to the monuments of the region:

The remaining height [of the pishtaq] is defined by the following proportion: the square + 12.00 meters of the side + 2.80 meter of the socle (it can be 3.00, if we take into account the historically accumulated level of soil, since 12 is divisible by 3) + cornice of the

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unknown height = (remaining 0.48 m) = the total height of the remaining part, which is
15.15 m, while the hypothetical original height if the proportion equals 1 ½ of the square
= 18 m. The width of the arch of the pishtaq is 5.57 m, the current depth is 1.43 m, and
the height of the arch is defined by the proportion of two squares, i.e. 11.46 m.129

The magic of numbers is seductive, but it is obvious that for Zasypkin this is just an intellectual
experiment, and unlike the proportionalists he would never insist that the ancient builders
actually used these calculations in their design. In fact, when approached by Bulatov and asked
about the Oriental theory of architecture, Zasypkin responded by mentioning the book in Chinese
that a sinologist Aleksei Ivanov130 once showed him; the book contained a scheme of a square
inscribed in another square at the angle of 45°. According to Bulatov, Zasypkin called this
scheme “a canon of architecture.”131

129 Zasypkin used these calculations for the reconstruction of Rabat-i Malik (a structure of unknown purposes near
the town of Navoi, Uzbekistan) original forms; Zasypkin, “Arkhitekturnye pamiatniki Srednei Azii” (1928), p. 211.
130 Aleksei Ivanovich Ivanov (1877-1937), repressed and executed as a spy.
131 M. S. Bulatov, “Iz vospominanii” [Of memoirs], Arkhitektura i stroitel’stvo Uzbekistana [Architecture and
That was as much of non-Western architectural theory that Zasypkin allowed himself to believe in.

Retrospective rationalization of feudal/Islamic architecture in Soviet Central Asia was accomplished by different people along different lines. Inspired by a series of translations and original studies of proportions and architectural harmonization in Greco-Roman Antiquity and Italian Renaissance that were published in Moscow around the mid-1930s, Central Asian scholars applied the ideas of module and mathematical proportioning to the monuments of the region. In fact, in the 1936, almost immediately after the official Soviet turn away from modernist architecture and architectural theory associated with Proletkul’t experiments in constructing a new culture for the new Communist Man, a number of original and translated monographs in Classicist proportional theory was published, including N. I. Brunov, Proportsii antichnoi i srednevekovoi arkhitektury [Proportions of Antique and Medieval Architecture], in Architecturnye proportsii [Architectural proportions] series, issue I (Moscow: Izdatel’stvo vsesoiuznoi akademii arkhitektury, 1936); Ernst Moessel, Proportsii v antichnosti i v srednie veka [Proportions in Antiquity and Middle Age], trans. by N. B. Vurgaft, N. Brunov ed., in Architecturnye proportsii [Architectural proportions] series, issue II (Moscow: Izdatel’stvo vsesoiuznoi akademii arkhitektury, 1936); Jay Hambidge, Dinamicheskaia simetriia v arkhitekture [Dynamic symmetry in architecture], trans. by V. M. Beliustin, N. Brunov ed. (Moscow: Izdatel’stvo vsesoiuznoi akademii arkhitektury, 1936); Matila Ghyka, Estetika
Among foreign scholars, translated in the 1930s, an American Jay Hambidge was probably the most influential. His idea of dynamic squares, which he found in the architecture and applied art of Ancient Greece (as opposed to Ancient Rome, where the squares were static) closely inspired Pulat Zakhidov and was somewhat indirectly employed by Bulatov, which I will discuss below. The other stream of proportional speculations that inspired Central Asian proportionalists came from the normative Soviet theory of composition developed by the former students of Nikolai Ladovsky, a leader of architectural Rationalism, which competed with
Constructivism in the 1920s. Of that strand the monograph of I. V. Lamtsov and M. A. Turkus titled *Elemeny arkhitekturnoi kompozitsii* [Elements of architectural composition] (1938) was particularly important.

The first essay in the proportional reading of Central Asian architecture came in the 1936; it was an article by Shalva Ratiia (1906–1958) and Leonid Voronin (1881–1960) titled “Barak-khan mausoleum.” The earliest of its kind, this article establishes the model of rationalist reinterpretation for Central Asian architectural heritage, so it would be useful to analyze it in detail.

Entrance portal of Barak-Khan madrasah before the restoration, c. 1936; plan of the complex. Source: Ratiia and Voronin “Mavzolei Barak-Khan”

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In their article Ratiia and Voronin explore the history and the architectural composition of the complex of buildings currently known as Barak-Khan madrasah. It includes two mausoleums, one of which is now believed to have been built by Suyunij-khan, the grandson of Ulugh-beg in 1531; the construction date of the other one is unknown. Within the complex of the madrasah, Ratiia and Voronin specifically focus on two mausoleums, which they consistently name “the big” (№1) and “the small” (№2).
The authors attribute the big mausoleum to Barak-khan III who ruled Tashkent in the 16th century. They mention that the excavations showed no grave in this structure, which means that the original function of the building is in fact unclear. Ratiia and Voronin note that Barak-khan
mausoleum was traditionally called Kok Gumbaz (Blue Dome) and are uncertain when the name of Barak-khan was attached to the building.\footnote{Ratiia and LVoronin “Mavzolei Barak-Khan.”p. 68.}

What is immediately striking about Ratiia and Voronin’s article – as well as all other texts of proportionalists – is the air of excitement and intellectual self-indulgence that pervades it. Ratiia and Voronin begin their article by revealing their research ambitions that are neither supported by prior knowledge of pre-modern Central Asian culture (Ratiia was ethnically Georgian, Voronin was Russian), nor by the proficiency in medieval Islamic literature devoted to mathematics, aesthetics, or architectural production (neither of them could read Farsi or Arabic, most of the relevant texts were not yet translated into Russian):

Architectural forms, their genesis, formation, the composition of major architectonic masses, proportions of buildings, i.e. the whole complex of questions regarding the “style,” the face of Central Asian architecture is unfortunately explored only in a very general way. In fact, we have a better knowledge of the architecture of Iran, Syria, and Spain than the architecture of our Central Asian republics. Meanwhile, the architectural analysis of Central Asian monuments – besides being extremely important from general academic prospective – is of practical and creative interest since without knowing this heritage of the past it is hard to achieve the correct solution of questions related to the design of national form for our contemporary architecture.\footnote{Ibid, p. 67.}

Ratiia and Voronin are certain that this problem has a simple solution: “Upon exploring the measured drawings of the mausoleums it is easy to become convinced that both [the big and the small mausoleums] are bound by a certain system of compositional relations that in both cases
have a geometric foundation; this system pervades the building from its plan to the main and subordinate articulations of the facades. Yet, Ratiia and Voronin had no serious grounds to hold this opinion besides the intuition expressed by Shchusev, when he insisted on the fundamental resemblance between the classical architecture of Greco-Roman antiquity and the outstanding architectural monuments of the Orient (the oriental klassika in Soviet terminology), and a very vague reference to “the old studies of M. Mauss, [Marcel-Auguste] Dieulafoy, and [Auguste] Choisy,” who “called this [i.e. Islamic] architecture ‘constructed geometry’.”

Ratiia and Voronin, as well as other proportionalists, were operating with normalized measured drawing; the nature of historic monuments - which deform due to the aging of structures and the earthquakes (and therefore it is often impossible to establish their original ground level) and accumulate changes and alterations – allowed Soviet architectural historians to re-normalize plans and elevations whenever they felt that a building can be better explained by a more sophisticated or aesthetically appealing proportional scheme. Hence, all the calculations, presented proportionalists, are internally coherent and convincing; yet, none of them are reliable. Let us look at the proportional scheme designed by Ratiia and Voronin for the 2nd mausoleum of Barak-khan architectural complex:

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135 Ibid, p. 73.
136 Ibid, p. 73.
137 Ibid, p. 72.
Both the proportional schemes of the façade and the section are so full of approximations that they completely preclude any substantial criticism. Here is the detailed proportional analysis of this monument generated by Ratiia and Voronin with my comments in italics:
The following ratios are noted in the mausoleums:

1. The form of the plan of the mausoleum (№2) is almost square \( M = 21.99 \text{ m}, M_1 = 23.42 \text{ m} \). In plan we have:

the side of the external square \( M_1 \) – 23.42 m,

First, the plan is NOT square, the difference between sides is 1.5 m which is almost 7% of the smaller side. Second, why do Ratiia and Voronin choose the bigger side for their plan over the smaller side, and why not the mean? – no explicit explanation is given.

the side of internal big square \( M_2 \) – 14.1 (mean),

In this case, why the mean value is chosen and what are the actual measurements of the "square"? Same with:

the side of the square foundation of the dome \( M_3 \) – 8.5 (mean),

the side of the square under the dome \( M_4 \) – 5.1 (mean)

\[
\frac{M_1}{M_2} = \frac{M_2}{M_3} = \frac{M_3}{M_4} = 1.66666...\]

This is the inexplicitly formulated answer to all questions above: 1.6666... is a close approximation of the golden ratio 1.618...

2. The inscribed square (with a side \( \sqrt{\frac{M^2}{2}} \)) in a circle with a diameter \( M \) gives the axes of the main walls of the mausoleum.
Besides the extremely obscure way of arriving to this result, Ratiia and Voronin don’t give the actual numerical value of the “the axes of the main walls of the mausoleum” – whatever this might mean – and still do not explain why in this particular case they have chosen $M = 21.99 \, \text{m}$ over $M_1 = 23.42 \, \text{m}$.

3. $M$ is the basis of the articulation of the façades of the mausoleum.

This should probably follow from the second point, yet it sounds more like a postulate.\(^\text{138}\)

Ratiia and Voronin make more points regarding the commensurateness between the big and the small mausoleum, which are even less convincing particularly because it is known from archeological data that the two mausoleums were not constructed simultaneously and the idea that the architect of whichever mausoleum was constructed later made the same calculation as the Soviet scholars is simply impossible to assume.

On the most general level the problem with Soviet theoretical reconstructions is twofold: first, it is in the self-confirming nature of the idea that historic monuments are organized according to the proportional or other mathematical scheme; second, it is the systematically recursive mechanism of producing facts for the mathematical analysis.

Commenting on the first aspect of the problem, in Karl Popper’s terms Soviet approach to historic monuments did not allow for the falsification; in other words, no experiment could convincingly prove whether a particular reconstruction is true or false. Each monument was

\(^{138}73.\)
Igor Demchenko, MIT

claimed to be unique and therefore presenting its own scheme of mathematical harmonization. On the level of a single monument, falsification experiment was firmly prevented by the fluidity of measurements and their interpretation. Thus, Mitkhat Bulatov in his book *Samanid Mausoleum, the Perl of Central Asian Architecture* (1976) insisted on the incorrectness of its ground level defined by an archeologist and the active member of Sredazkomstaris Vasili Viatkin and accepted by Zasypkin:

Before proceeding to the exploration of the proportions of Samanid mausoleum we need to clarify the exact ground level around, since the ancient level, established by V. L. Viatkin ... is raising doubts.

... The ancient ground level around the monument could be reconstructed based on the construction features, i.e. according to the edge of the belt of large bricks.139

This operation allowed Bulatov to establish that the “general height of the ‘cubic’ volume [equaled] 18M,”140 where M, or module “equals a gaz (a measurement cubit) and the large square brick 60 x 60 cm [in size].”141 In reality the height of the cubic volume was closer to 15.21M but this approximation seemed close enough to Bulatov and he didn’t even mention it as something that can question the applicability of his method.

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140 Ibid, p. 96.
141 Ibid, p. 91.
Bulatov’s graphic analysis of the design of architectural form of Samanid mausoleum; section and plan. Source: Bulatov, *Mavzolei Samanidov – zhemchuzhina arkhitektury Srednej Azii*
Bulatov’s graphic analysis of the design of architectural form of Samanid mausoleum; elevation and plan. Source: Bulatov, Mavzolei Samanidov
In the absence of falsification criteria, all reconstructions of alleged harmonization schemes, pervading Central Asian monuments, were equally good or equally bad depending only on the administrative and professional position occupied by a particular proportionalist. Naturally the administrative career of some proportionalists progressed, while others were less successful or, like Shalva Ratiia and Sergei Khmelnitskii, eventually left the region for good. Some proportionalists were directly involved in the restoration of the buildings; others took office jobs. All these factors influenced the academic weight of particular scholars.

Bibi-khanym mosque in Samarkand as documented by Turkestan Album (1871-72)
Preserved parts and measurements of Bibi-khanym complex before the restoration\textsuperscript{142}

\textsuperscript{142} From Sh. E. Ratiia, *Mechet' Bibi-Khanym*, p. 68.
Standing at the beginning of the proportionalist school in Central Asia, Shalva Ratiia published a separate monograph devoted to Timur’s Friday mosque in Samarkand built at the very beginning of the 15th century (also known as Bibi-khanym mosque), which contained a detailed proportional analysis of the monument and could have served as a blueprint for its reconstruction.¹⁴³

Ratiia’s reconstruction of Bibi-khanym mosque based on its proportional analysis. Source:

Ratiia, *Mechet’ Bibi-Khanym*

Yet, the book came out too early (it was published in 1950, while the actual restoration of the ruins started in the late 1960s) and besides Shalva Ratiia left Central Asia for Moscow where he became the head of the Central Department for the Preservation of Architectural Monuments (in office from 1947 until 1958 when he passed away).  

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Ratiia’s theoretic reconstruction of purported original forms of this ruined building were based on a module, for which he took a diameter of the mosque’s minaret that, according to the Soviet scholar, consisted of eight gazes, while each gaz equaled 73 cm. Since in the third chapter of this dissertation we will specifically focus on the restoration of Bibi-khanym mosque, the project for which was based on the theoretical arguments establishing its module and the scheme of its geometric harmonization, let us have a closer look at how Ratiia arrived to these numbers. Besides it is another instructive example that demonstrates the non-falsifiable nature of the proportionalists’ method.

Before anything else it should be mentioned that Ratiia did not have access to written documents that could help him in establishing the size of the gaz during Timur’s era; neither could he present any historical confirmation of his assumption that Central Asian builders actually used the module. In fact, Ratiia arrives to the idea that the diameter of the minaret was the module through the following reasoning:

If we accept $\frac{1}{7}$ of a side of the mosque’s main building as a measurement unit for its plan, which at the same time corresponds, for example, to the width of the minaret, it would be possible to ascertain that all other articulations of the plan are divisible into this measured part that we accepted as a module and produce whole numbers.

For example, the interior space equals $2 \frac{1}{2}$ of a module, the depth of niches of the interior [equals] $\frac{1}{2}$ of a module, and their width [equals] $1 \frac{1}{4}$ of a module, etc.

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145 Ratiia, Mechet’ Bibi-Khanym, p. 90.
Therefore it can be assumed that the diameter of the minaret, which is the most pronounced architectural composition, was used as a module that defined proportions and the articulation of the plan of the building.\footnote{Ibid, p. 90.}

It can be equally well assumed that Ratiia borrowed the notion of the module from Vitruvius, who defined it as a radius of the column, and that the Soviet scholar identified the minaret as the most visible cylindrical element of the mosque, the shape of which is roughly speaking similar to the column.

Ratiia’s method of defining the module in gazes and the actual size of the gaz is even less logical:

According to different scholars the value of gaz varies. However, the accepted module, regardless of its factual size, must contain the whole number of gazes.

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The width of the minaret of the portal of main building of Bibi-khanym complex at the edge of its socle is 5.84 m. If we divide 5.84 into 8 (which in this case is accepted as the number of gazes in one module) the resulting gaz will be 0.73 m; the size of the interior space of the main mosque is 14.60 m, which equals 2½ modules in the adopted module system or 20 gazes; if we divide 14.60 into 20 we’ll once again have 0.73 m. etc.\footnote{Ibid, p. 90.}

This is a classical example of circular reasoning: obviously, if we already established that length of the building equals two and a half times the diameter of the minaret (which is the easiest thing
to do since the minaret is not exactly a cylinder but rather a truncated cone, therefore we can get whichever value we need as its diameter that would correspond to the already known length of the building in whole numbers), then it’s no wonder that whether we divide the module into 8, or 2 ½ modules into $8 \times 2 \frac{1}{2} (=20)$ we’ll get the exactly same result.

This mathematical trickery is easy to trace and is extremely annoying to follow when the reader doesn’t realize that this is not science but ideologically predicated projection of rationalist ideology into the past. But as soon as you put it in the context of endless chain of Soviet publications about oriental klassika and renaissances in literature, science, etc., and realize that similar epistemic violence was done to old-Russian architecture, Central Asian proportionalism in architectural history becomes just another element in the ideologically predicated mosaic of Soviet culture:

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148 In Russia proportionalism encountered limited resistance and was not as widely spread as in Central Asia; yet, it was still very present and, besides numerous articles published on the topics of proportioning and geometric harmonization of old-Russian architecture, two programmatic texts included B. A. Rybakov, “Arkhitkturnaia matematika drevnerusskikh zodchikh” [Architectural mathematics of old-Russian architects], Sovietskaia arkhеologiia [Soviet archeology] 1 (1957): 83-112 and K. N. Afanas'ev, Postroenie arkhitekturnoi formy drevnerusskimi zodchimi [Construction of Architectural Forms by Old Russian Architects] (Moscow: Izdatel'stvo Akademii nauk SSSR, 1961).
Pages from the *Essays in the Theory of Architectural Composition* (Moscow, 1960) discussing the mathematical principles of proportioning and applying them to the 16th century old-Russian church (*Tserkov’ Vozneseniia v Kolomenskom*) in Moscow.
Pages from Kirill Afanas’ev, *Construction of Architectural Form by Old-Russian Architects* (Moscow, 1961), applying proportional analysis to the ruins of Dormition Cathedral in Old Ryazan (11th/12th cent. CE); the monument explicitly resists this interpretation.

The collapse of the Soviet Union brought the proportionalist school to an end, yet the academic presence of its main figure Mutkhat Bulatov persisted,149 which is a consequence of an

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149 At least, despite O’Kane’s thoughtful criticism, Gulru Necipoglu in her monograph *The Topkapı Scroll: Geometry and Ornament in Islamic Architecture* (Santa Monica, CA: The Getty Center for the History and the Humanities, 1995) approaches Bulatov’s writings as a trustworthy source. Besides the chapter on the design process in Timurid architecture based on Bulatov’s theories, which was included in Lisa Golombek and Donald Wilber, *The Timurid Architecture of Iran and Turan*, vol. I, (Princeton: Princeton University Press, 1988), although published
original style of presentation that Bulatov developed in his monographs and that significantly distinguishes him from his fellow proportionalists. While the latter extracted their harmonization schemes directly from the measured drawings of the monuments, Bulatov presented the case as if he actually found traces of original Central Asian architectural theory in medieval Islamic sources.


right before the collapse of the Soviet Union was never critically reviewed; see this chapter with my comments in the Appendix to this dissertation.
Unlike most people involved in preservation of Central Asian heritage, Bulatov knew some Arabic, which was highly uncommon in Soviet Central Asia particularly in his circle of “Europeans”. He mentions manuscripts in Arabic in the list of literature attached to his *Geometric Harmonization* monograph and he occasionally inserts non-technical words in Arabic in his text – yet never a technical term. The Russian translation of somewhat irrelevant Persian treatise “On Interlocks of Similar or Corresponding Figures” included in the appendix to the *Geometric Harmonization* was done by A. B. Vil’danova; in the text of the book Bulatov only refers to the Russian translations of medieval sources.

Sometime in the early 1950s he submitted his first dissertation titled “Architecture of Samanid mausoleum and the Principles of Central Asian Architecture”\(^\text{150}\) to the academic committee of Tashkent Polytechnic Institute that rejected the dissertation with the motivation that “no Central Asian science of architecture ever existed;”\(^\text{151}\) Bulatov eventually defended in Moscow but only in 1966.\(^\text{152}\) This surprising resistance to Bulatov’s argument is explained by the manuscript of “Proportions in the architecture of Uzbekistan” (1953) preserved in the archives of Uzbekistan Ministry of Culture, Department of Heritage Preservation and which most certainly constitutes an early version of his dissertation.\(^\text{153}\) In it, unlike for instance Ratiia, Bulatov in fact makes a case for the historic existence of architectural theory in pre-modern Central Asia:

\(^{150}\) “Akhitiktura mavzoleia Samanidov i osnovy zodchestva Srednei Azii”; Bulatov mentions the title of this dissertation in his short memoirs, Bulatov “Iz vospominanii” (1991), p. 19. There are no traces of this dissertation in the biographical material assemble in the Appendix to M. S. Bulatov, *Kosmos i arkhitectura*.


\(^{152}\) Bulatov, *Kosmos i arkhitectura*, p. 267.

\(^{153}\) M. S. Bulatov, “Proportsii v arkhitekture Uzbekistana. Pervaia redarktsiia” [Proportions in the architecture of Uzbekistan. First edition], 1953, Archive of Uzbekistan Ministry of Culture, Department of Heritage Preservation, O 1829 B 90’
The beautiful works of Central Asian architecture that deserve their universal glory are well-known. We believe that those masterpieces of architecture could not have been designed without a project, without elementary theory, without the knowledge of the basics of geometry, without technical rules, and certain methods of proportioning – in other words, only based on intuition and practical experience. 154

Yet, at that time he did not have access to medieval Islamic sources that could support this claim; he found them only later and hence the ultimate success of his *Geometric Harmonization* (1978).

But let us now have a closer look at how Bulatov operated with medieval textual sources in his main work. But first it should be noted that in the first edition of the *Geometric Harmonization* out of 309 pages of the main text only 38 are devoted to the review of ancient and medieval texts, i.e. only about 10% of the book – the rest of it, with an exception of a small literature review section, consist of mathematical formulas and calculations methodologically similar to the ones that we saw in Ratiia’s Bibi-khanym monograph and Ratiia and Voronin’s article. Of the main section, we’ll later return to Bulatov’s proportional analysis of Bibi-khanym mosque and compare it to Ratiia’s approach. The smaller section devoted to textual sources consists of two chapters titled “Principles of medieval architecture in the Middle and Near East” that reviews general ideas regarding proportion and architectural decoration in Islamic philosophy and “The treatises for architects” that explores the books written by medieval Islamic mathematician for the benefit of engineers and builders. 155 In itself the first of two chapters is generally logical not particularly overstretching in its conclusions. Bulatov demonstrates that the concept of proportion was in fact known to medieval Islamic scientists and philosophers; for that

154 Bulatov, “*Proportsii v arkhitekture Uzbekistana*” (1953), p. 4.
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his main reference is al-Farabi. Obliviously this doesn’t mean that ordinary builders were reading the books of philosophers, but Bulatov insisted that this was the case—something we will probably never know for sure, but still it is safer to assume that complex theoretical treatises written by philosophers of neo-Platonic and Aristotelian school were not widely accessible.

However, when it comes to the treatises compiled with an aim to popularize mathematical knowledge among non-scientists, Bulatov apparently slides into a misinterpretation (or over-interpretation) of his sources. All mathematical treatises of this kind, written by al-Khwarizmi, Abu-l Wafa’ al-Buzjani, and Ghiyath al-Din al-Kashi among others, are extremely technical in nature and do not discuss the questions of proportioning and harmonization.156 Bulatov referred to the treatises written by these authors in an extremely elliptical way inferring that their popularization of mathematical methods somehow supports his case for the existence of medieval architectural theory in Central Asia. Let us put it plainly: no, it doesn’t. Even if those treatises were read by engineers and builders, they couldn’t extract from them any aesthetic theory—it is just not there, and it is not what these books are about: they are mathematical manuals. At times Bulatov slid into idiosyncratic digressions of circular reasoning presented as scientific analysis:

Ibn [Tahir] al-Baghdadi157 reviews the commensurable and the incommensurable from the philosophic perspective; he follows the Aristotelian interpretation of number and size and allows for the use of irrational squares in calculation techniques, at that he interprets


157 whose treatise was in fact not directly accessible to Bulatov; he knows it though G. P. Matvievskaia, K istorii matematiki Srednei Azii IX – XV vv. [Toward the History of Mathematics in Central Asia, 9-15 cent.] (Tashkent, 1962).
the square as a term of a proportion. This connects the ideas expressed by Ibn al-Baghdadi with the practice of architects – the skillful geometrical methods of designing the architectural forms – more than with any other practical sphere.158

In other words, Ibn al-Baghdadi did not mention architects; yet since Ibn al-Baghdadi’s interpretation of square roots reminded Bulatov of his own reconstructions of alleged medieval methods of geometric harmonization, the Soviet scholar insisted that Ibn al-Baghdadi was either writing for architects or borrowing his mathematical concepts from their practice. Bulatov continued:

It is known that during different historic eras in the architecture of civilized countries and nations, proportions was established not just based on the ratios of small numbers but also based on irrational roots including √2, √3, and √5, which are derived from elementary geometrical figures: the square, the equilateral triangle and two squares.

American scholar J[ay] Hambidge159 called the rectangles of √5 and of the golden ratio “the dynamic;” he believed that both rectangles possess the outstanding aesthetic qualities, while the rectangles of √2, √3, and √4 are transitional between dynamic and static rectangles and interpreted this as the reconstruction of the lost classical theory of proportioning of the Ancient Greeks.160

Evidently Hambidge has nothing to do with the practices of medieval Central Asian builders, yet Bulatov needed the speculations of the American scholar to contextualize medieval Islamic

159 Excerpts from his book Dynamic symmetry in composition as used by the artist (1923) were translated into Russian and published in the Soviet Union as Dinamicheskaia simetriia v arkhitekture [Dynamic symmetry in architecture] (Moscow, 1936).
monuments in the universal history of rationalist architecture and to essentially equate the
Oriental Classics with the Greco-Roman one, thus repeating Shchusev’s argument from 1934.
Bulatov proceeded with his theory of square roots in architecture, which he developed while
analyzing Central Asian monuments:

The data generated by our studies of geometric harmonization of medieval Central Asian
architectural forms and its examination from the perspective of Plato’s theory of
proportions … allows us to give another – compared to Hambidge – interpretation of the
[mathematical] values $\sqrt{2}$, $\sqrt{3}$, $\sqrt{4}$, and $\sqrt{5}$, namely:

$\sqrt{2}$ is a geometric mean between the one and the two, since

$$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}.$$ 

$\sqrt{3}$ is a geometric mean between the one and the three, since

$$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}.$$ 

$\sqrt{4}$ can also be interpreted as a proportional mean between the one and the four.

$\sqrt{5}$ is a geometric mean between the one and the five, since

$$\frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}.$$ 

It is easy to guess that all the proportions mentioned above have the general form of

$$\frac{a}{b} = \frac{b}{c}.$$
i.e. the proportion known back from the times of ancient Greek philosophers, in which the geometric mean establishes the harmonic relations, “commensurateness” between the extremes.

Our historic and theoretical explanation of proportions in dynamic rectangles of J. Hambidge evolves from a hypothesis into certainty because it finds documental support in [the works] of the scientist Ibn al-Baghdadi, who in his “Treatise on commensurable and incommensurable values” argued that “the square is the mean between the given number and the one or between the prime number and the irrational number.”

Ibn al-Baghdadi strived to justify the contemporary practice of calculation, which heavily relied on irrational numbers, and which – to a large degree – was connected to the architectural practice. Therefore the treatise of the scientist on commensurable and incommensurable values objectively reflects the theory of architectural proportions of [his] era.161

At this point Bulatov already did not even pretend that he extracts architectural theory from medieval sources. He de facto admitted that the theory is constructed and all he needed was the – however vague – confirmation of its logic in medieval sources. Ibn al-Baghdadi has nothing to say about architecture or theoretical aesthetics; his treatise is a purely mathematical study. Bulatov inverted the case presenting it as if Ibn al-Baghdadi was learning from the builders, which somehow must confirm the use of proportional schemes in architecture – yet the basic existence of these schemes still had to be demonstrated or rather confirmed by historic sources, which simply do not exist.

161 Ibid, pp. 54-55.
It is interesting to note that Bulatov was not content with the Hambidge scheme of dynamic rectangles; instead he creates his own theory based on the concept of geometric mean as an objective correlate of aesthetic value. However, Bulatov relies on the authority of Hambidge when he introduces his new theory; he needs Hambidge to create an illusion of academic continuity in the study of ancient and medieval proportional methods. This, as well as the intensive study of medieval sources, reflects the complex nature of Soviet rationalism, which was not purely logical, or normative, but rather functioned as a compromise between the methods of logical analysis and the scientific method of experiment. In other words, although in principle Bulatov – similar to his fellow-proportionalists – was satisfied with imposing pre-constructed normative theory of proportion onto historic monuments, he also felt the acute need to find the independent confirmation of this theory in historic sources; but when he couldn’t, he was eager to over-interpret medieval documents – and most probably he himself was convinced by these interpretations.

Although – at least until now – Bulatov’s research stood the test of time due to his imitation of the extensive use of medieval sources, the real intention of the Soviet scholar was the retrospective rationalization of Central Asian architecture; in fact, he devotes 80% of his main monograph to that latter task. Essentially Bulatov took every monument listed by Zasypkin and generates a proportional scheme intended to objectively codify its aesthetic value.

Let us focus on Bulatov’s calculations for Bibi-khanym mosque, since first, as we already know, it was a popular object of the proportionalists’ speculations, and second, although Bulatov’s interpretation was published exactly at the time when the actual restoration of Bibi-khanym ruins was in process, his calculations were quietly rejected even though the ultimate
reconstruction of this monument was also based on the proportional analysis. The reason for the latter fact was simple: there was no mechanism to prove that one proportional scheme is better than the other, therefore whoever had administrative control over the restoration process imposed his vision – and at that time of restoration the administrative power was not in the hands of Bulatov.

Bulatov’s geometrical analysis of Bibi-khanym mosque is infinitely more complex and sophisticated than Ratiia’s; yet essentially Bulatov did the same as his colleague: he postulated the existence of a module (or more precisely two modules, one for the main building of the mosque and another for entrance portal and the courtyard) and then he guesstimated suitable formulas that allowed him to generate any measured dimension of a mosque from the module(s) with convincingly low margin of error. Bulatov began from an *ad quadratum* assumption when he stated that “the basic parameter for establishing the proportions of Bibi-khanym complex was the square under the dome of the main mosque.” He maintained that the module (\(a\)) for the design of the main mosque was the side of this square that equals 24 gaz, i.e. 1458 cm, with one gaz equaling 60.8 cm. Bulatov never explained why, in contrast to Samanid mausoleum, he increased the size of gaz by 0.8 cm: is it only because he wanted 1458 to be divided into a whole number (e.g. 24) and produce something close to 60 cm? He proceeded with analyzing the plan of the main mosque in relation to the module \(a\) and the diagonal of the main square \(a\sqrt{2}\). In itself the design of the ground plan according to the side of the main square of the building is just a practical device, which is not the same as the conscious harmonization for aesthetic purposes. The intentional geometric harmonization can possibly reveal itself on two levels: the systematic

162 The complete translation of Bulatov’s proportional analysis of Bibi-khanym Mosque with his schemes and graphs is attached to this dissertation; see the “Translations” section.


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proportioning of the ground plan of a whole complex according to the single module of the main mosque, and the proportioning of elevations and sections based on the same module. Bulatov argued that the module A of the whole complex is the width of its courtyard which is commensurate with the square of the main mosque through the following formula: A=2a(2+2), i.e. the width equals the sum of four sides of the square of the main mosque (4a) plus two diagonals of the same square (2a2). Why? Bulatov did not explain; instead he solved the equation and arrived to the result of 9912 cm, which is only 2 cm more than the actual measurement of the width.165 And in his eyes this result persuasively confirmed that medieval builders actually used this formula. Bulatov did not notice the circular nature of this method: in reality, with a formidable arsenal of fractions and irrational square roots, all of which he interpreted as aesthetic tools, every measurement found in the monument can be put into a proportion with yet another measurement.166 Thus, when Bulatov needed to express the height of mosque’s interior (from the floor to the base of the dome) through the side of the interior square he provides the following formula \( \frac{a(\sqrt{5}-1)}{2} \), which is essentially the bigger segment of a divided according to the golden ratio.167 For the width of the niche of the entrance portal of Bibi-khanym mosque (L) Bulatov drew another, even more complex formula: L=\( \frac{A(3-\sqrt{5})}{4} \), where A is the width of the main complex, which, as we remember, equals 2a(2+2), i.e. if we insert the latter formula into the former L would actually equal \( \frac{2a(2+\sqrt{2})(3-\sqrt{5})}{4} = \frac{a(2+\sqrt{2})(3-\sqrt{5})}{2} = \frac{6a-2a\sqrt{2}+3a\sqrt{2}-a\sqrt{10}}{2} \). The last formula should probably stay as an epitome of the inexplicable refinement of mathematical

harmonization achieved by medieval Central Asian builders as imagined by Bulatov.\textsuperscript{168} The impossibility of such complex relationships is self-evident.

But even if we grant for a moment that this is the actual harmonization system of Bibi-khanym mosque, the question remains of why medieval methods of mathematical design are so unsystematic to the extent that Bulatov does not mention a single parallel case from any other Timurid buildings in his Bibi-khanym chapter. How about Kalan mosque in Bukhara, which, according to Bulatov himself, was built based on a model of Bibi-khanym mosque in Samarkand?\textsuperscript{169}
Bulatov's proportional analysis of the ground plan of Kalan mosque in Bukhara. Source:

Bulatov, Geometricheskaia garmonizatsiia
Let us assume that the width of the Kalan complex (A) equals $2a(2+\sqrt{2})$, where (a) is the size of the square under the main dome of its main mosque. Bulatov informs us that (a) for Kalan mosque equals 1026 cm, which according to the formula means that $A = 7006$ cm. The actual width of Kalan complex is 8070 cm and this can hardly be called a minor statistic error.

However there is yet another problem with Bulatov’s reasoning. We do not have written sources or archival material that would shed light on whether the *ad quadratum* articulation of the ground plan was used in medieval Islamic world for calculating the sections and the elevations of the buildings. But the construction of Milan cathedral, which was initiated in 1386 and thus roughly coincides with a construction of Bibi-khanym mosque in Samarkand, is very well documented by archival sources. James Ackerman studied the and came to the following conclusions:

In terms of the “rational” interpretation of Gothic construction, it is inconceivable that the height of a structure should remain undetermined after the foundations had been completed, but this is the case at Milan. The section project seen by Antonio was only the first of five different solutions which are known to us. This inversion of what we would regard as logical method is not unique, and it proves to have been standard procedure at Milan to permit the Cathedral to grow haphazardly, without an ultimate aim. In consonance with this method, the piers were redesigned in their present form shortly after Andrea’s visit, and their construction begun well before the height of the capitals had been fixed.  

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170 Ibid, p. 202. See also the graphic representation of Bulatov’s proportional analysis.  
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The situation in Timurid Central Asia might have been very different, but it is easier to assume that it was rather similar than not, which is in fact in agreement with the argument of Bulatov, who presumes that the design of Bibi-khanym mosque survived at least one recalibration in the process of construction:

Presumably, according to the [original] project the eastern wall of the square under the dome divided the whole interior of the main mosque in half, while the transversal axis of the mosque’s interior was located 21.6 gazes away from the exterior line of the western wall, meanwhile the distance between the axis of the forth bay of the arched gallery and western edge of the complex was 23.5 gazes. In the process of design, the coordination of these axes that passed through the northern and the southern entrances required a shift of the square under the dome to the east. The distance of this shift equaled 1.2 gazes; the divergence of the axes remained at 0.7 gazes; yet now it was hardly noticeable. 172

Besides it should be noted, that for Ackerman “rational” means “designed according to the logical system of structural rules,” i.e. rational from the perspective of modernist architectural theory. It’s a different rationalism than the aesthetic one that was projected on Central Asian monuments by Soviet proportionalists. Nevertheless, the logic of epistemic violence is identical in both cases: it produces a completely anachronistic, ideologized interpretation of historic monuments that only serves the purposes of the present.

Bulatov began his chapter about Bibi-khanym mosque from rejecting Rattiia’s reconstruction of the monument’s alleged proportional system, which was based on a module equaling the diameter of the minaret, as well as Konstantin Kriukov’s scheme that equaled the

module to the span between the columns of the courtyard. According to Kriukov this distance was 360 cm or 6 gazes, i.e. one Kriukov’s gaz measured 60 cm.\textsuperscript{173} Kriukov belonged to a younger generation of proportionalists;\textsuperscript{174} what distinguishes him from Bulatov and Ratiia is not his method but his active involvement in the actual restoration of historic monuments.\textsuperscript{175} Thus, the reconstruction of Bibi-khanym mosque was largely guided by Kriukov, who was a loyal member of the Communist Party and occupied a whole range of administrative positions in architectural preservation.\textsuperscript{176}

\textsuperscript{173} Ibid, p. 155.
\textsuperscript{174} His proportionalist opus magnum was published only as late as in 1995, i.e. already after the collapse of the Soviet Union: Proportsi v arkhitekturre: Analiz pamiatnikov drevnego Egipiia, Greitsii, Rima, Tsentral’noi Azii [Proportions in Architecture: Analysis of Ancient Egyptian, Greek, Roman and Central Asian Monuments] (Tashkent: Mukharrir); yet in the course of his career as a restorer and a professor of architectural restoration he published a number of articles on the questions of module, proportioning and harmonization in Central Asian architecture, including “Modul’ v pamiatnikakh sredneaziatskogo zodchestva” [Module in the monuments of Central Asian architecture] Arkhitekturnoe nasledstvo [Architectural heritage] 17 (1964): 155-165 and “Postroenie arkhitekturnoi formy (khram Parfenona v Afinakh i sobornaia mechet’ Timura Bibi-Khanym v Samarkande)” [Design of architectural forms: the temple of Parthenon in Athens and Bibi-khanym congregation mosque of Timur in Samarkand], Arkhitektura i stroitel’stvo Uzbekistana [Architecture and Building of Uzbekistan] 3 (1991): 8-12
K. S. Kriukov's proportional analysis of Bibi-khanym mosque in Samarkand (Source: Proportsii v arkhitekture, fig. 50)

Architect by profession, he graduated from the Building Department of the Central Asian Polytechnic Institute (SAzPI) in 1953, where his final project was a design for a movie theater in Tashkent executed in a combination of Stalinist neo-Classical and national styles.\textsuperscript{177} It was probably because of the serious interest in Uzbek national style that he decided to join the team of the Special Scientific-Restoration Manufacturing Workshop (SNRPM) where, by 1955, he was one of sixteen architects with four archeologists and only one specialist in architectural

\textsuperscript{177} See the biographical note on the page 35 of Arkiitektura i stroitel' 'stvo Uzbekistana [Architecture and Building of Uzbekistan], 8 (1990).
From 1962 to 1965, he studied in the Scientific-Research Institute (NII) for the Theory, History, and Perspective Problems of Soviet Architecture in Moscow, where he defended his dissertation, “Progressive Tendencies of the Architecture of Central Asia in the 16th Century”. By the mid-1960 the Uzbek Ministry of Culture finally allocated funds for the conservation of the Bibi-khanym’s ruins, and in 1967 Kriukov was invited to supervise additional excavations needed for the preparation of the restoration project. The project was completed in 1974. It was implemented by a group that consisted of Kriukov himself (as academic advisor), the architect N. N. Kuz’mina (chief architect of the project), the specialist in the applied sciences [engineer] Ia. L. Aradovskii (chief engineer of the project), V. N. Gorokhov (painter-restorer), specialists in the applied sciences I. F. Tsypeniuk and Iu. A. Gamburg, and the architect N. V. Lasovskaia. Bulatov, by that time the research scholar at the Tashkent Institute of Art History, was not included.

In fact, practicing restorers were consistently skeptical about the extreme sophistication of Bulatov’s theories, who went as far as claiming that pre-modern Central Asian architects used the methods of analytic geometry in the calculation of plans and commensurate heights of Sultan Sanjar mausoleum in Turkmenistan, Khoja Ahmad Yassawi complex in Kazakhstan, Ak-Sarai palace in Shahrisabz and Bibi-khanym mosque in Samarkand, Uzbekistan. If he was right, it would have been sensational a discovery, since, according to the conventional history of

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179 See the biographical note on the page 35 of Arhitektura i stroitel’stvo Uzbekistana [Architecture and Building of Uzbekistan], 8 (1990).
181 Ibid., p. 9.

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mathematics, analytic geometry was not known in the Islamic world. Professional restorers reflected on the limits and limitations of proportional methods in the teaching programs that they developed for the students of Tashkent Polytechnic Institute:

The main method of geometric analysis of monuments, which students [of architectural restoration] learn [at Tashkent Polytechnic Institute], is the consecutive revealing of regularities in the proportional relations between the parts of a building, beginning from its plan and moving through its main volumes – to the spatial solution of the building as a whole. In the process of such an analysis, the goal of students is to “re-play” or reproduce the way, in which the architectural organism was constructed by its creator. At that, the instruments of analysis are the methods of applied geometry, which in their time allowed builders to embody – with simplest devices – their designs in buildings. As a rule, mathematical methods, currently widely popularized by some researchers, are not used, because abstracted calculations do not relate to objective reality and in practice do not correspond with transferring the design in real objects. 183

Obviously Mitkhat Bulatov was that “some researches” disqualified by Vladimir Nilsen (1918–1994) and Iudif Shvab, who still belonged to the circle of proportionalists and adhere to the general concept of rationalist aesthetic embodied in the architectural heritage of Central Asia. The actual routes, through which Soviet proportionalism entered historic monuments and constituted the materialization of rationalist communist ideology, will be reviewed in the next chapter.

Chapter 3

“Scientific restoration” in Soviet Central Asia
Igor Demchenko, MIT

How sentimental can a Leviathan be? The biblical description of the beast hardly infers sentimentality: “Can you draw out Leviathan with a fishhook or press down his tongue with a cord? Can you put a rope in his nose or pierce his jaw with a hook? Will he make many pleas to you? Will he speak to you soft words? Will he make a covenant with you to take him for your servant forever? Will you play with him as with a bird, or will you put him on a leash for your girls?” Possibly this is the reason why Thomas Hobbes chose the Leviathan as a metaphor of state, an aggressive and ruthless Golem, a quasi-human creature created by the men of men:

For by Art is created that great LEVIATHAN called a COMMON-WEALTH, or STATE, (in latine CIVITAS) which is but an Artificial Man; though of greater stature and strength than the Naturall, for whose protection and defence it was intended; and in which, the Soveraignty is an Artificial Soul, as giving life and motion to the whole body; The Magistrates, and other Officers of Judicature and Execution, artificial Joynts; Reward and Punishment (by which fastned to the seat of the Soveraignty, every joynt and member is moved to performe his duty) are the Nerves, that do the same in the Body Naturall; The Wealth and Riches of all the particular members, are the Strength; Salus Populi (the Peoples Safety) its Businesse; Counsellors, by whom all things needfull for it to know, are suggested unto it, are the Memory; Equity and Lawes, an artificiall Reason and Will; Concord, Health; Sedition, Sickness; and Civill War, Death. Lastly, the Pacts and Covenants, by which the parts of this Body Politique were at first made, set together, and united, resemble that Fiat, or the Let Us Make Man, pronounced by God in the Creation.¹⁸⁴

¹⁸⁴ http://www.gutenberg.org/files/3207/3207-h/3207-h.htm#link2H_4_0001.
Igor Demchenko, MIT

The Leviathan of Hobbes does sound a lot more tame and civilized than the biblical creature. Yet notice that it still lacks the sentimental organ, the ability to get attached, miss and yearn. Leviathan has memory but one can hardly expect it to become nostalgic. What Hobbes describes is a bio-robot, a robot in the first place. However, it’s structured like a man and acts like one so it’s more than natural to assume that it’s more human than “the fleeing serpent,” “the twisting serpent,” “the dragon that is in the sea,” of the Bible. Since the Age of Romanticism this assumption has become such a commonplace that now it would only be natural to resist it.

There is a growing public demand for the introduction and implementation of heritage preservation laws, deep and consistent concern for real and alleged decline of national heritage, creation and volunteer support of heritage conservation and preservation committees. In the public consciousness, the Leviathan in its attitude to the national heritage is equaled to a grateful and nostalgic grandson passionately, yet sorrowfully preserving the old photo albums of his late grandparents – and is reproached when he doesn’t. Now, it’s quite natural that humans project their personal experience onto an artificial body, which – through the historic and cultural persistence of Hobbes’s metaphor – is intuitively perceived as a kind of an individual or even an expansion of a personal subject. However, this creates a whole series of problems, the biggest of which is the nature of individual experience generated by historic heritage.

The essence of this problem is in that an individual has no personal relation to the objects of Leviathan’s nostalgic attachment, yet he clearly experiences certain feelings that, as Alois Riegl in seminal article “The modern cult of monuments: its character and origin” (1903)\(^{185}\) points out, cannot be reduced to the appreciation of formal sophistication of historic monuments. Riegl rejects this option on somewhat mystifying grounds of the inconsistency between the

contemporary and the past *Kunstwollens*. And yet the intellectual honesty of Riegl’s position is uncommon: again and again preservationist and restorers from different countries are trying to prove the opposite – that their monuments actually possess objectively valuable formal qualities. In fact, the particular case of Soviet architectural restoration in Central Asia, explored in this dissertation, is an example of restorers’ firm subjective belief in the objective artistic value of national heritage.

In Soviet Marxist-Leninist aesthetics the turn to rationalism discussed above resulted in the ossification of objectivist approach to the concept of beauty. J. Fizer noticed this phenomenon already in 1964 and described it in his article “The theory of objective beauty in Soviet aesthetics.” Generally skeptical about the Soviet project, Fizer attributes objectivism to the inflexibility and dogmatism of Marxist-Leninist philosophy. He distinguishes several competing sub-schools of Soviet aesthetics and ranges them progressively against their ability to question the objectivity of beauty. This approach distorted the logic of Soviet discipline, which in fact functioned as an axiomatic science somewhat similar to Euclidian geometry aimed at describing reality rather than analyzing and revealing its internal logics. And indeed, Soviet aesthetics had several strategies of explicating the axiom of objectivity: it could have had formal, social, or psychological basis. However, fundamentally within all three strategies identified by Fizer the objectivity of beauty remained the consensual constant that allowed for rationalization and the scientific study of art and architecture. This consensus extended well beyond the

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theoretical epistemology of beauty into the normative theory of architecture and the Soviet
theory of architectural restoration.\textsuperscript{187}

Returning to the problem of individual experience generated by historic monuments, and
particularly by architectural monuments, it should be mentioned that this experience is most
certainly aesthetic, i.e. in Kantian words it can be described as an instant appreciation of
purposeful without a purpose. Riegl finds an elegant way of attaching individual experience to
Leviathan's efforts in preserving its heritage: he invents the \textit{age-value}, which makes human life
commensurate with trans-human existence of the Leviathan. According to Riegl, the
purposefulness of historic monuments consists in indicating the transitory nature of every life,
the ultimate finality is carried by every artifact even when this finality extends beyond several
human life spans. There is no specific purpose to this finality, like there is no purpose to human
life; yet there is a certain tension between the existence of a purposefully made object (or more
specifically an architectural structure) and its gradual deterioration into a useless heap of rubble,
which, according to Riegl, humans project onto their lives thus generating the aesthetic
experience. Conservation and restoration simply slows down the deterioration process; and they
are certainly not intended to reverse it. For Riegl the purpose of historic preservation consists in
prolonging the aesthetic experience of decline, in sharing it with subsequent generations.

This intellectually subtle solution was not received with any particular enthusiasm by the
preservationists. Riegl was almost at the edge of openly proclaiming the incommensurability

\begin{footnotesize}
\textsuperscript{187} A comprehensive critical study of Soviet normative architectural theory does not exist. The theory itself was
formulated in the following publications: I. V. Lamtsov and M. A. Turkus, \textit{Elemeny architekturnoi kompozitsii}
[Elements of architectural composition], 2\textsuperscript{nd} edition (Moscow – Leningrad: Glavnaia redaktsiia stroitel’noi
literature, 1938); A. I. Gegello ed., \textit{Ocherki teorii architekturnoi kompozitsii} [Essays in the Theory of Architectural
Composition] (Moscow: Gos. izd-vo lit-ry po stroitel’stvu, arkhiteture i stroit. materialam, 1960); V. F. Krinskii ed.,
\textit{Vvedenie v architekturnoe proektirovanie} [Introduction to Architectural Design] (Moscow: Gos. izd-vo lit-ry po
stroitel’stvu, arkhiteture i stroit. materialam, 1960); and A. Ikonnikov and G. Stepanov, \textit{Osnovy architekturnoi
\end{footnotesize}
between the Leviathan and the humans; his interpretation of purposefulness in historic monuments was all too individualist, while the main point of cultivating the Leviathan is in the collective experience – even of sentimentality and nostalgia. Besides, the illusive purposefulness of individual decline reflected in historic monuments led to the pessimistic assessments of the Leviathan’s fate, which went against the most basic intentions behind the creation of this “Artificial Man.” What took over Riegl’s subtlety was the simplified idea of authenticity, an aesthetic concept initially developed within the phenomenological paradigm and particularly in the later works of Martin Heidegger.

For late Heidegger of “The Fieldpath” (1949) the authenticity is not a condition but rather a rupture in the modern ontology, the ontology that in philosopher’s mind devaluates objects into mere instruments or resources for mechanical consumption. In the authentic experience things become polisemantic and – which is more important for the interpretation of authenticity common among preservationists – the things open the path to the tradition almost erased and eradicated by the Modernity. Or in Heidegger’s words: “Indeed, the number of those who still recognize the Simple as their acquired possession is quickly diminishing. But the few will everywhere be the abiding.” And he continues: “The message of the Field path awakens a spirit which loves the open air and, at a favorable place, leaps over even heaviness into an ultimate serenity. This protects against the nuisance of mere toil, which promotes only futility when pursued for itself.”

This William Morris’s style aestheticization of pre-industrial ways of life were picked up by a broad spectrum of mostly European architects and preservationists from violently anti-modernist architect Léon Krier to an international bureaucrat Jukka Jokilehto. In the material
authenticity of historic monuments they found a path to experience the transcending present with an impossible intention of reaching into the idealized past. Translating this into the formal language of Kantian aesthetics, authenticity provides the purposefulness of escapism without the purpose of escape. Hence the goal of preservationist is to conserve the materially authentic parts of the monuments since they serve as triggers of aesthetic experience in the encounter between the individuals and the national heritage.

What both Riegl’s and the phenomenological solution have in common is the unwillingness or inability to distinguish between the Leviathan with its clear almost programmed goals (after all it is a robot *par excellence*) and a human individual. This chapter will attempt to remedy the situation by proposing the analysis of historic monuments as post-Kantian aesthetic objects from the perspective of Althusserian criticism of the ideology. Jumping straight ahead to my final conclusions, I argue that the aesthetic effect generated by different preservation techniques and crystallized in historic monuments is achieved through the intentional de-conceptualization of Leviathan’s purposes by making them visually and corporally accessible and evident in the individual experience of intuitively purposeful material objects. In other words at the level Leviathan’s soul there are only purposes, while at the level of individuals there is purposefulness but no purpose – and what connects the two are, in the words of Stuart Hall, the mechanisms of encoding, i.e. enciphering historic objects with Leviathan’s vision for society: “Once accomplished, the discourse must then be translated – transformed, again – into social practices if the circuit it to be both completed and effective.” 188 This procedure simultaneously aesthetically charges historic objects – thus, in Riegl’s words, bringing them in resonance with contemporary *Kunstwollen* – and makes Leviathan’s ideology intuitively attractive.

In his 1926 article titled “Architectural monuments in Central Asia and their restoration,” Boris Zasypkin presented his philosophy of heritage preservation in a form of a short manifesto of flexible conservationism:

The main principles of [restoration] works were the following: wherever possible, monuments were preserved in their present condition; preference was given to maintenance and reconstruction of essential parts; monuments were protected from moisture through the construction of technically more advanced roofs and flat ceilings; strengthening and reconstruction of decorative facing wherever requited by technical necessity; reconstruction of lost parts exclusively based on the documental evidence preserved by monuments. Construction of new parts is allowed only when it is required by technical or constructive necessity.

... 

The relatively good state of monuments’ preservation [in Central Asia], i.e. the fact that they were not disfigured by alterations and new additions, is among the peculiar features that we encountered during our restorations and repairs [in the region]. ... At the same time, the vanished parts that don’t have direct analogues are lost forever to the history and art, because, unlike European monuments, Asian ones do not have iconography, historic data is very limited and, therefore, it is impossible to recreate the original image of monuments even in the description. For the purposes of repair and restoration we have to rely exclusively on those ancient parts that are preserved by the monuments. The goal of
repairs and restorations is to preserve those ancient parts and in principle does not presuppose the reconstruction of the parts that are lost forever. In our works we relied on local masters who preserve certain traditions and crafts of their great ancestors as well as a number of construction techniques including, for example, building of vaults without centering, etc. Our materials were analogous to that of the monuments, i.e. bricks and alabaster of local production; in certain cases we used lime mortar (repair of socle parts) and reinforced concrete slabs for new flat roofs. The [restoration] works were completed by the group of specialist from Moscow assisted by local cadres.¹⁸⁹

In this text Zasypkin made every effort to downplay the amount of intervention, which his group allowed itself in Central Asia. He insisted that the monuments were in a good state of preservation and at worst requited technical repairs and maintenance. He specifically mentioned that their present condition did not require the demolition of later layers to reveal the original monuments to the public. Yet it was Zasypkin, who prepared the ground for highly interventionist restoration of post-World War II proportionalists.

The idea that architectural heritage constitutes the living roots of a nation and that it can justify the nation’s claim for the territorial place and temporal or historic space is central to the later phase of Romantic nationalism.¹⁹⁰ The conceptual matrix of cultural nationalism organized the thinking of the early generation of now-Soviet restorers trained in Russian Empire regarding the status of architectural monuments and the methods of restoration – and Zasypkin was one of

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¹⁸⁹ Zasypkin, “Pamiatniki arkhitektury v Srednei Azii i ikh restavratsiia” (1926), p. 167-8. For the visual documentation of Zasypkin’s restoration practices see my translation of B. N. Zasypkin’s “Metody i praktika restavratsionnykh rabot po pamiatnikam arkhitektury Uzbekistana” (1949) in the “Translations” section of this dissertation.

them. It was a hard-earned position that went against the earlier approach to conservation and restoration of monuments sponsored by the government of Russian Empire. Thus, the followers of Fedor Rikhter (1808-1868), whose most influential restoration work is the Chambers of Romanovy Boyars (completed in 1857-1858), advocated complete restorations that glorified the achievements of Russian imperial statehood.¹⁹¹

On the opposite, Petr Pokryshkin, a chief architectural restoration authority in the eyes of Zasypkin, began his book Kratkie sovety po voprosam remonta pamyatnikov stariny i iskusstva [Brief advice on the questions of repair of the monuments of history and art] (Petrograd, 1915) by stating that “numerous unsuccessful essays in restoration lead the specialists to conclusion that ‘restorationing’ [restavrirovanie, реставрирование] should be avoided by all possible means.”¹⁹² For Pokryshkin and his circle, including Zasypkin, “restoration can only be approved in those cases when all the historic data is available, and nothing interesting is being destroyed.”¹⁹³ In the second half of this quote Pokryshkin is concerned with the demolition of layers that postdate the time of the monument’s construction – this extreme archeological approach was a common practice in pre-Revolutionary (as well as post-Revolutionary) Russia, and in some puritan cases in Europe. But why was Pokryshkin so concerned with later layers?

From the perspective of cultural nationalism, nations exist simultaneously in the present and in the past; therefore, the societal status of architectural monuments was not limited to one single meaning. Instead it was a testimony to the longevity of the nation’s existence, but more

¹⁹¹ On the general history of architectural restoration in Russian Empire and the first three decades of the Soviet Union see my translation of Sh. E. Ratiia, “Introduction [to the book Methods of Restoration of Architectural Monuments (1961)]” included in the Appendix to this dissertation. The text of translation also contains the graphic documentation of the Chambers of Romanovy Boyars before and after Fedor Rikhter’s restoration.
¹⁹² Pokryshkin, Kratkie sovety (1915), p. 3.
¹⁹³ Ibid, p. 4.
importantly, historic monuments constituted a reference point for different strata of society, each of them interpreting the monument according to their educational and cultural level but with similar irrational attachment. Obviously this theory of monuments was not specific to Russian Empire; it was shared with all other fully formed and developing nations of the fin-de-siècle and pre-World War I Europe.

Yet, all of those were Boris Zasypkin’s theoretical principles, while the reality was somewhat different. First, already in 1928 Zasypkin admits that “in certain cases he has to limit restorations to simple revealing [of a monument], i.e. liberating it from later layers,”194 which means that at least some Central Asian monuments were in fact “disfigured by alterations and new additions.” Subsequently he describes the conditions under which not just stylistic restoration but even large-scale reconstructions are possible:

… restorations and reconstructions in the true sense of these words [i.e. physic reconstruction] should be done when – besides purely academic reasons – they are required by the [architectural] ensemble as a whole, or by the need to complete architectural forms and achieve the integrity of the monument…195

Thus, whenever Zasypkin believed that he had enough data and the situation calls for the restoration, he would go ahead and restore:

All arches, small and big, that cover internal and external niches and doorways were supported by small columns in quarters; for the first time this was demonstrated by the vestiges of such a small column on the southern side. To support this observation we

195 Ibid.
Igor Demchenko, MIT

needed to find more fragments or, in other words, documental evidences in other corners that were partially infilled and plastered. A very careful approach was required to consistently remove all of the plaster and the [brick] patches. This way we found more vestiges of columns on the western side and in other places.

The second complicated goal was to find the traces of the ancient cornice [karniz] – or rather the completing element of external walls, since the architecture of Uzbekistan never knew cornices in the Russian sense of the word. We already lost hope to find the traces of the ancient cornice when in the north-eastern corner along the northern wall, under the layer of bricks and plastering, very well-preserved traces and details were discovered. The cornice was shaped in the form of inlayed frieze all filled with circles that consisted of very small bricks arranged into the system of six-pointed stars and held in circles by gypsum. On the corners, where this cornice goes around the building along the circumference of the maximum diameter, it was impossible to have the circles so the masters built the frieze by laying bricks on the edge. Several rows of brickwork survived above the frieze; they slightly hang over the surface of the frieze. Those documents [i.e. the traces of ornamentation] allowed us to reconstruct the cornice of the mausoleum with complete reliability.196

As for the selective demolitions intended to reveal the original building, they were fully justified by Zasykin’s concept of monument shared by all Soviet restorers and most architectural historians well until the mid-1980s. For Zasypkin, the monument is an object with very explicit borders that distinguishes it from the outside world. The monument is a self-contained entity, which is built at a certain moment in time in all its completeness; it can then receive additions,

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some of them – as emphasized by Pokryshkin - can have high historic value, but most are worthless. In Zasypkin’s work the notion of a monument as a single entity was particularly influential during conservation, restoration and – most important – revealing of the Samanid mausoleum.\[^{197}\]

Samanid mausoleum in Bukhara before (source: Archnet; 1920s) and after restoration (source: Igor Demchenko; 2009). For the complete visual documentation of Zasypkin’s restoration, see the translation of his “Metody i praktika restavratsionnykh rabot po pamiatnikiam arkhitektury Uzbekistana” [Methods and practices of restoration of architectural monuments in Uzbekistan] (1949) attached to this dissertation.

\[^{197}\] For the translation of Zasypkin’s account of restoration of Samanid mausoleum see “Metody i praktika restavratsionnykh rabot po pamiatnikiam arkhitektury Uzbekistana” [Methods and practices of restoration of architectural monuments in Uzbekistan] in the Appendix to the dissertation.
The mausoleum was first excavated between 1926 and 1928 by archeologist Vasilii Viatkin (1869-1932) and restored by Zasypkin between 1937 and 1939. Here is how Zasypkin described the access to the monument before the Soviet intervention:

The mausoleum was located in the middle of ancient cemetery completely surrounded by residential quarters. One had to take a narrow and crooked dead end trail to reach darvaza-khane, a small entrance building, connected to the mausoleum by a rather narrow alley submerged three meters below the ground level of the cemetery. A framed structure was attached to the mausoleum from its northern side; it served as an auxiliary space for the sheikhs that were in charge of Pasha-Ismail’s cult.

Up to the middle of their height the walls of the mausoleum were covered with graves shaped in the form of brick vaulted crypts /sagana/; there were so many of them that in thousand years many layers had gradually accumulated elevating the ground level of the cemetery.  

The data collected during the restoration, partially published by Zasypkin himself and later by Mitkhat Bulatov, as well as the photographs from the Ernst Cohn-Wiener collection, document the original condition of this historic site. And although Zasypkin was not directly involved in the demolition of the cemetery and the residential quarters that surrounded cemetery (the dwellings were then occupied by people who venerated a somewhat anachronistic saint Pasha-Ismail that rested in the mausoleum) he never gives a single hint pointing at his disapproval of

these measures. Instead he praises the possibilities that the demolition opened to the restorers, when he writes about their success in obtaining the “original” materials for the restoration of the mausoleum:

The manufacturing of the new bricks was out of the question. But a successful solution was found. ... Excavations brought numerous Samanid bricks of the same size as in the mausoleum; this allowed us to use ancient bricks for all restoration works. ... After the demolition of residential quarters and the cemetery, the ground was covered with pieces of old gypsum mortar. We collected those pieces, built a primitive furnace nearby, and used the burr that abundantly grows in Bukhara as a fuel. The resulting mortar had grey color; we used it for the restoration of the mausoleum. 200

The building as a single self-contained entity thus was the main focus of Zasypkin’s restoration and research as evident from his Architecture of Central Asia (1948) discussed in the second chapter of this dissertation; the historic trajectory of the mausoleum documented by its context and layers had no importance and was eventually erased.

Generally Soviet restorers of did not perceive themselves as agents of ideology; rather they identified themselves as genuine scientists who interpreted historic monuments as mathematical equations that consisted of the known terms and the unknowns. As any equation, a monument could be solved through the analysis of the known terms, i.e. the preserved parts of the building contain all or most of the information needed for the reconstruction of the lost parts.

200 Zasypkin, “Metody i praktika restavrationsnykh rabot po pamiatnikiam arkhitektury Uzbekistana” (1949), pp. 11-12.
This interpretation of historic monuments had two aspects: technical and purely mathematical. The technical aspect was based on the assumption of considerable standardization characteristic of medieval building profession. Already pre-Revolutionary Russian restorers operated under this assumption; later, in the circle and the school of Petr Baranovskii (1892-1984) the reconstruction from traces of lost structures became the main method. Thus, according to Shalva Ratiia, “while studying the ancient building techniques, architect P. D. Baranovskii has developed the method of defining the profile of removed brick details according to the parts of bricks that remained in the walls; he also developed the method of establishing the original width of enlarged openings based on the distribution of bricks. Baranovskii also proposed to use slots of the old wooden ties for the new ties made of the long-lasting materials.”

The existing nationalist fantasy of Old-Russian, and particularly pre-16th century architecture is a product of this approach:

The Savior’s [Spasskii] Cathedral of Andronikov monastery (Moscow, first half of the 15th century), before and during the restoration (1945, 1959)²⁰²

The Savior’s [Spasskii] Cathedral of Andronikov monastery; photographed by Igor Demchenko in 2010

In Central Asia the method of reconstructing from traces was used by Zasypkin specifically in the restoration of Samanid mausoleum in Bukhara described above, and generally in all his other projects. As we will see below, the pupils of Zasypkin, as well as their pupils, were constantly employing this method supplementing it by purely mathematical calculations.
The mathematical aspect of their equations was based on the spectrum of theories that interpreted pre-modern Central Asian building practice as a highly conceptual endeavor. Yet, eventually the schemes generated by practicing Soviet restorers were relatively primitive, at least in comparison with extremely complex harmonization methods advocated by Bulatov. In other words, although Bulatov’s *Geometric Harmonization* was a theoretical bible that dominated the thinking of his practicing colleagues, it was not a blueprint or a guidebook for actual restorations.

The documentation produced by Soviet restorers was not at all accessible to the general public, and the relative straightforwardness – if not naïveté – of their methods supplemented by the huge amount of pure guesswork was (and is) kept secret, while this secrecy is being camouflaged by Bulatov’s abstruse and self-referential mathematics.

Let us now review several specific cases of Soviet approach to solving the equations of historic monuments: first Hakim al-Termezi mausoleum (late 14th c.) in Termez, southern Uzbekistan, restored by Vladimir Filimonov in the late 1950s, and second Bibi-khanym Mosque, the most striking and problematic example of Soviet restoration activities in Central Asia completed after the collapse of the Soviet Union. In the case of Hakim al-Termezi mausoleum we will specifically focus on its southern portal that *de facto* did not exist before Filimonov’s restoration.

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203 Old-Russian monuments were also sometimes restored with this perspective in mind; see: V. S. Banige, *Vosstanovlenie Rostovskogo kremlia, 1953-1960* [Reconstruction of Rostov Kremlin] (Yaroslavl, 1963), p. 14-15; however, this was a much less common practice than in Central Asia.

204 See the complete translation of Filimonov's restoration project for Hakim al-Termezi Mausoleum in the "Translations" section of this dissertation.
Southern portal of Hakim al-Termezi mausoleum before and after Vladimir Filimonov’s restoration; fig. 1, source: Filimonov “Obosnovanie proekta restavratsii iuzhnogo portal bol’shogo kupol’nogo pomeshchenia Khakima-al’-Termezi”; fig. 2, source: Igor Demchenko
Unlike the restorers of Bibi-khanym mosque, Filimonov was lucky to have several 19th century photographs of the building, which document the portal before its complete destruction. Unfortunately he did not include them in his restoration project, yet we have a drawing of the mausoleum produced in the 1890s by B. Litvinov.\textsuperscript{205}

Based on these photographs, Filimonov is able to infer the general forms of the portal from the available visual documentation: “[a]mong numerous possible variants of the arch curve, we have chosen the one that better corresponds to the curve presented on the photograph, taking into account the foreshortening of the image in the photograph and the insignificant sag of the arch in the middle part of the slightly sloping curve. This variant also corresponds to the horizontal

\textsuperscript{205} From \textit{Termezskaia arkeologicheskaia kompleksnaia ekspeditsiia 1936} [Termez archeological comprehensive expedition, 1936], \textit{Trudy uzbekistanskogo filiala Akademii nauk SSSR} [Publications of the Uzbekistan branch of the Academy of Science of the USSR], Series 1: History, Archeology; Vol. 2 (Tashkent: UzFAN, 1941), p. 21.
articulation that passes through the base of the window on the gable wall, the base that supported the abutment of the arch-vault.” The physical dimensions of the structure were less certain. To verify them Filimonov applies technical analysis to the equation of the ruins. From the photographs the restorer knew the approximate number of brick rows in the portal and from the ruins he deduces the increasing size of layer of brickwork due to the decrease of the load; this allows him to establish the height of the portal. The combination of visual evidence with empirical data would probably satisfy Zasypkin; however, Filimonov is now certain that the medieval builders used proportional methods to design the portal and he aims at reconstructing this method:

However, since we were not satisfied by the experimental data, the portal was subjected to proportioning, which unexpectedly supported the chosen design scheme of the arch-vault [making it] even more [convincing].

Proportioning allowed us to establish the module, the numerical value of which equals 96-96.5 cm; in its turn, the module proved to be commensurate with the brickwork, i.e. [it equals] three bricks with three layers of mortar lengthwise and fourteen rows and fourteen layer heightwise.

It is worth noting that Filimonov himself was openly skeptical about the possibility of retrospectively projecting Bulatov-style complex proportional schemes onto medieval Central Asian monuments. In his dissertation he wrote: “The geometrical schemes discovered [by

208 Ibid, p. 4.
that are commonly believed to represent the objective aesthetic qualities, e.g. the proportions of the golden ration of dynamic squares etc., have proved unrelated to the goals of [producing] the aesthetic impression on the spectators: those proportional schemes most often don’t correspond to the architectural forms that could’ve been appreciated from the perspective of the ascribed merits. In other words, Filimonov advocates for simple and more practical systems of proportioning that would correspond to the presumed educational level of Central Asian builders.

In his dissertation Filimonov argues that the architects of the Feudal Period used the method of triangulation that Filimonov borrowed from Ernst Moessel’s Die Proportion in Antike und Mittelalter. Filimonov describes the triangulation method as “based on arched marks [dugovye zasechki] and related to the solution of architectural problems” and as “designs that follow from the geometric properties of the square with inscribed circle.” From his perspective those simple and more practical systems should not be interpreted as a complex aesthetic message to the audience but rather as a testimony to the builders’ technical abilities to design solid and stable structures. And yet, Fillimonov still shared the common Soviet belief that medieval monuments are the product of rationalist design and the goal of the restorer is to reconstruct the original intention of the builders disfigured by the disproportionate alterations, which in the case of Hakim al-Termezi mausoleum was the gallery in front of the ruins of the portal:

210 München: C.H. Beck, 1926-31; Russian translation was published in 1936.
Our study included the demolition of the part of the gallery located in front of the portal; this resulted in the revealing of the lower façades of the pylons, which were severely damaged during the construction of the gallery. The cleaning of the pylons from the later layers provided the data for complete restoration... 

The apparently successful reconstruction of the mausoleum's proportional scheme, confirmed by the correspondence of the established module to Zasypkin's formula of the brick \(\frac{GAZ}{5}\sqrt{3}\), brought an unexpected hassle: "as a result of proportioning, the module crossed the line of the upper horizontal small belt by half of a brick." 

Under these conditions, in Central Asian restoration practice the purely mathematical aspect of the equation describing the monument was taking over the technical aspect: "in the project, this 'surplus' was eliminated by adding the dandana." i.e. a narrow band of bricks ornamenting the edge of the portal. Thus, the restored monument was generated by mathematical apparatus allegedly designed to prove the validity of the experimental and visual data, and the result is a pure conceptual scheme materialized in brick. It embodies the rationalist myth of the past and replaces the unwieldy original, associated with backward religious practices of unenlightened local population.

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213 Ibid, p. 5.
214 Ibid.
Bibi-khanym Mosque before (source: samarkand-foto.ru; 1968), during (source: Archnet;1989), and after (source: Igor Demchenko; 2013) the restoration.

The restoration project for Bibi-khanym mosque is preserved in the archive of the Uzbekistan Ministry of Culture, Department of Heritage Preservation. This project and other similar documents prepared for numerous historic monuments restored in Soviet Central Asia have one common quality: from the discursive perspective they are located exactly at the point of verbal horizon where words begin to disappear replaced by images and blueprints, which later materialize in spatial objects. In fact, already Bulatov’s book is half-image and only half-text.

215 See my translation attached to the dissertation.
The encyclopedic nature of Zasypkin’s lists is substituted in the *Geometric Harmonization* by the slideshow with textual and mathematical comments that do not merge into a cohesive narrative. Thus, his interpretation of the Bibi-khanym mosque in Samarkand is not cognizant of the neighboring interpretation of Kalan mosque in Bukhara, and vice versa. Text falls apart; the persuasiveness of the presentation is generated at the meeting point between the image and the *expectations of the reader*: and if the reader does not *pre*-expect the theory of geometric harmonization to hold truth, he never opens the book.\(^{216}\)

The restoration project of Bibi-khanym Mosque is not dissimilar from that of Hakim al-Termezi mausoleum; if anything, it is different in scale and the amount of planning involved. However before proceeding to the analysis of the project itself, let us review a statement regarding the restoration of the mosque made *post factum* by the most acclaimed Soviet scholar of Central Asian architecture Galina Pugachenkova, who was actively involved in reconstitution of the original image of the monument:\(^{217}\)

Between 1971 and 1980, architect N. Kuz’mina under the supervision of Professor K. S. Kriukov produced detailed measurements and put together a technical and a working project that became the basis for the new stage of restoration. Archeological excavations [of the mosque] were also conducted. However this project was critically reviewed after the monument was transferred to the group lead by architect A. Tukhtaev. Several

\(^{216}\) Thus, the partial English translation of Bulatov’s harmonization theory in Lisa Golombek and Donald Wilber, *The Timurid Architecture of Iran and Turan*, vol. I, (Princeton: Princeton University Press, 1988, pp. 138-146) passed virtually unnoticed; see the Appendix to this dissertation.

changes were made, and all further restoration was done according to the practically new project.\textsuperscript{218}

It is obviously hard to know whether Pugachenkova ever saw the project prepared by Kuz’mina et al. In reality the project entirely corresponds to the resulting image of the monument produced by Tukhtaev’s group. Moreover, certain lost elements, like for instance the upper parts of the minarets, that Kuz’mina deduced in her project yet did not recommend to restore were indeed not rebuilt although the calculations that inform this reconstruction must have been perceived as particularly convincing and with the collapse of the Soviet Union the decline of state control over historic preservation could have provoked the restorers to experiment with more questionable solutions.

The scale model of Bibi-khanym Mosque produced by Kuz’mina’s group. Notice the upper part of the minarets of the entrance portal and the domed galleries reconstructed in the model but never reproduced in the actual restoration. Source: Historic Museum of Samarkand

In fact, Pugachenkova’s statements reverberate with assumptions regarding Central Asian restorations commonly held by non-Soviet scholars and succinctly expressed by Robert Hillenbrand: "In the decade since the disintegration of the Soviet Union, and with it the departure from Central Asia of the Russian historians of Islamic architecture who had made their careers
there, the monuments they have cared for so lovingly have in many cases suffered grievously from the ignorant, intrusive and frequently quite redundant restorations of inept local contractors.\textsuperscript{219} The reality is different from this somewhat orientalist vision: in post-Soviet Central Asia, restorers closely follow Soviet methods since no other approach could allow them to mass-produce life-size models of the imaginary past. The only difference is in the considerable expansion of funding allocated for the creation of national heritage and tourist attractions in now independent republics of Central Asia.

Entrance portal of Bibi-khanym Mosque (source Turkestan Album, 1871-72).

Now, returning to Kuz'mina’s project, it should be noted that this is a purely normative document that prescribes a particular interpretation of the monument.\textsuperscript{220} Here is one of its prescriptive descriptions: “The projecting part of the entrance portal equals \( \frac{1}{4} \) of the main façade of the complex, while the portal of the western mosque equals \( \frac{2}{5} M \sqrt{5} \), if we take the portal of the main façade for 1M.” An outsider to the Soviet method of “scientific restoration” would ask: why? The answer is because “on the attached drawing we see the proportions of all the spaces of the mosque, where the smaller articulations are derived from one conventionally accepted measurement unit.”\textsuperscript{221} In other words, if a conventional module suits a convincing harmonization scheme sufficiently well, it is good enough as a universal instrument of reconstruction. This sort of self-confirming argument was already present in Filimonov’s project reviewed above. Yet, Filimonov still relied on visual data to support his solution of the monument’s equation, while Kuz’mina worked exclusively from the ruins occasionally referring to perceived parallel cases in other parts of greater Central Asia.

\textsuperscript{220} For the translation of the text attached to the project (including all technical drawings and graphs that supported the reconstruction), see the Appendix to this dissertation.

Southern and northern small mosques of Bibi-khanym complex before the restoration (source: Turkestan Album, 1871-72).

A small mosque of Bibi-khanym complex after the restoration (source: Igor Demchenko; 2009).
The dome of the main mosque of Bibi-khanym complex before (source: Turkestan Album, 1871-72) and after (source: Igor Demchenko; 2009) the restoration.
In the restoration project, Kuz’mina proceeded from one compositional element for the mosque to another, providing the geometrical schemes that support the graphic reconstruction of the lost parts. The project combined the study of the existing parts, based on the above-mentioned assumption of standardization in pre-modern building technology, with purely mathematical analysis. Thus, in the reconstruction of the domes Kuz’mina arrived to the following conclusions:

[T]here is no reason to doubt in the [theoretical] reconstruction of domes of Bibi-khanym [big and small] mosques as well as in the actual rebuilding. The height of the drums is known from the ruins; the preserved fragment of the dome provides [enough data] for the easy geometrical reconstruction of the abutment point of the shell dome. We have not discovered any significant changes in the methods of dome design [practiced] in the course of the two [reviewed] centuries. We believe that it is possible to [re]built the domes; there can be an error in their height, which in this case would not exceed 20-25 cm. The [surface] of the dome of the western mosque [should be] smooth [rather than ribbed]; it should be faced with blue tiles of the ancient type.\[^{222}\]

The restoration of the big dome was completed still before the collapse of the Soviet Union. With no hesitation the restorers faced it with blue “Timurid” tiles – this was a standard practice, since, as explained by Kriukov, historic majolica “is not difficult [to reproduce] and it does not

bear the imprint of the master’s hand.” The encoding of rationalist ideology in probably the most valuable monument of Timurid architecture was completed.

In a dual encoding-decoding mechanism described by Stuart Hall, the encoding part is intellectually and pragmatically more intensive; the decoding part functions rather as an insurance for encoding. However, the machine of decoding is more pervasive. For instance, even when a historic monument is restored without much use of proportional theory, it is still re-conceptualized within its frames, since proportionalism was the highest level theory available in the Soviet historiography of Central Asian architecture. In the situation of the total state, when alternative memory is marginalized, published academic research presented as a neutral scientific discourse is the only reference point for the public. And since the Soviet Union was a hermetic system, both very little of external criticism of its ideology reached its citizens and no translations of non-Soviet scholarship of Islamic architecture was ever published. Besides, even if the foreign scholarship of Islamic architecture was translated and published in the USSR, the firm and scientifically grounded statements of the proportionalists would seem more convincing to the Soviet audience accustomed to the rationalization and scientization of reality.

From the discoursive perspective, the center of the dual encoding-decoding mechanism is occupied by the conceptual gap, an empty space of the non-conceptual. This gap involves a pure visual and corporal experience, which on a tourist trip can be filled with a voice of a tour-guide.

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224 To experience the totality of Soviet scientist project see my translation of A. A. Asanov’s “О некоторых закономерностях старения среднеазиатских памятников архитектуры” [Certain patterns of ageing of Central Asian architectural monuments], *Stroitel’stvo i arkhitektura Uzbekistana* [Building and Architecture of Uzbekistan] 11 (1971): 44-48 in the Appendix to the dissertation. In this article, Asanov formalizes and mathematically describes the aging of historic monuments, thus completely removing the subjective aspect from the domain of heritage preservation.
but on an everyday basis is mute. From this perspective the encoding part of the re-montage mechanism is not intended to incite its decoding counterpart; the mechanism is not intended to instigate the enlightenment of the public. Instead the aim of the decoding machine is to suppress the potential perplexity or to canalize the fascination of an individual interacting with a monument. If the encoding machine produces the de-verbalized environment of ideologically charged material objects, the decoding machine generates the potential feeling of comfort in the otherwise discursively inhospitable setting.

Thus, if a citizen of Soviet Central Asia, who had no special training in the history of art or architecture, asked about the meaning of architectural monuments which populated his everyday life, for instance of Bibi-khanym mosque, his question would not be left unanswered. In fact he would probably be referred to Galina Pugachenkova’s architectural guidebook to Central Asia. And here is what she had to say about the aesthetic program of Timurid architecture:

The system of architectural masses and forms of 14th and 16th century was based on the strict proportions and geometrical patterns of both low and high level: the foundations of the architectural theory were integrated into the practice of architecture.

If the reader of Pugachenkova’s guidebook decided to expand his knowledge of regional architectural heritage, this assertion would lead him straight to the theories of proportionalists, particularly of Bulatov, which in turn would confirm the official ideological narrative of proto-rationalism in oriental klassika of Central Asia.

226 Ibid, p. xxxiii
Conclusions
Of course, the material existence of the ideology in an apparatus and its practices does not have the same modality as the material existence of a paving-stone or a rifle. But, at the risk of being taken for a Neo-Aristotelian (...), I shall say that ‘matter is discussed in many senses’, or rather that it exists in different modalities, all rooted in the last instance in ‘physical’ matter

Althusser

Soviet architects-restorers involved in conservation and restoration of Central Asian monuments developed a complex methodology, which – as I argued – was not just profoundly rooted in Stalinist and late-Soviet ideology but was in fact generated for the purposes of reshaping the material environment of Central Asia into a series of images and spatial forms intended to constitute an imaginary historic progression that would ultimately resolve itself in the imminent Communist future of the region. The story narrated in this dissertation documents the formation of the new methodology, which required a long excursus in the Soviet historiography of Feudalist (= “Islamic” in the language of Western historiography) Central Asian architecture. The dissertation investigated the internal mechanics of the restoration methodology, explored its position within the broader scope of heritage and aesthetic politics, and outlined its function as a vital element of materialized state ideology.

Within Central Asia, the Bolshevik ideology functioned in its mobilization modus with an intention to increase the loyalty of local citizens – and therefore gain in their labor productivity –
by provisionally constructing the material reality of the new society yet to come and, both conceptually and materially, saturating publicly visible historic monument with progressivist connotations. Certainly the materialization of communist ideology was not limited to architecture or historic heritage. Even within the domain of historic preservation the main modality of ideology’s material existence was its institutionalization. However, by comparison to physical restorations the institutional modality proved to be considerably short-living. Yet let us have a closer look at the institutional supplementary of historic preservation.

During the period of Stalin’s dictatorship, both republican and Moscow cultural elites became accustomed to the idea that official Soviet policy of national self-determination in the Union-level republics is nothing but demagogy. Therefore, from the beginning they met Khrushchev’s attempts to loosen the over-centralization of Stalin’s Soviet Union and return to the Leninist ideals of socialist internationalism with skepticism and resistance. Moscow and the Russian Soviet Federative Socialist Republic\(^{227}\) were crucial to the success of Khrushchev’s initiatives; therefore, it is impossible to understand the results of Moscow’s heritage policies in Central Asia without reviewing its goals that are revealed in the documents of Russian State Archive of Contemporary History\(^{228}\) related to the All-Union preservation agency\(^{229}\) and the All-Russian Society for the Preservation of Cultural and Historic Monuments\(^{230}\).

\(^{227}\) RSFSR – Rossiiskaia Sovetskaia Federativnaia Sotsialisticheskaiia Respublika [Russian Soviet Federative Socialist Republic], the Russian republic within the Soviet Union. Contemporary Russia (officially, Russian Federation) inherited its territory and administrative structure from the RSFSR.

\(^{228}\) RGANI [Rossiiskii gosudarstvennyi arkhiv noveishei istorii].

\(^{229}\) Gosudarstvennaia inspeksiia po okhrane pamiatnikov [State Inspection for the Preservation of Monuments].

\(^{230}\) VOOPliK – Vserossiiskoe obschestvo okhrany pamiatnikov istorii i kul’tury.
In the sphere of heritage preservation, Khrushchev’s administration first moved to disband of the central Union-level preservation agency, which had controlled all preservation world across the USSR centrally from Moscow, and delegate its functions to cultural ministries and heritage preservation societies in the Union-level republics. Beginning in 1956, a group of top-level Moscow intellectuals, likely spearheaded by the Academician Igor Grabar and the correspondent-member of the Academy Boris Rybakov, and including Petr Baranovskii, the head of the Moscow school of architectural restoration – sought to halt this initiative that in their eyes jeopardized the quality of heritage conservation in the Soviet Union. The group sent the following telegram to Khrushchev:

“Despite the poor state of cultural monuments and the urgent need to consolidate efforts for their preservation, the Ministry of Culture of the Union is liquidating the State Inspection for the Preservation of Monuments. We ask you to order the perpetuation of this agency and to review the proposal, written with our participation, which aims at the radical improvement of the preservation of cultural heritage of the Union.”

In a separate telegram, Grabar indicated that “the transmission of the whole matter [of historic preservation] to the [national] republics will result in the direct destruction of monuments.”

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231 Igor Grabar’ (1871-1960), a neo-Impressionist painter of the pre-Revolutionary Russian school, who made a career of a preservationist and exhibition curator under the patronage of Anatolii Lunacharskii, the Commissar of Enlightenment during the first post-Revolutionary decade. In the 1920s, he became famous as a restorer and a student of old-Russian icons and frescos.

232 Boris Rybakov (1908-2001), a Soviet historian who authored numerous publications on the history of Medieval Russia (‘Ancient Russia’ in Russian/Soviet historiography), which constituted the mainstream of Soviet academic historiography of that period.

233 Petr Baranovskii (1892-1984), a spiritual leader of the Russian school of architectural restoration during the post-World War II period, primarily focused on the Old-Russian monuments. Among this most important restoration and conservation projects are the churches of Yaroslavl, Kolomenskoe manor and Krutitskoe podvor’e in Moscow.

234 RGANI [Rossiiskii gosudarstvennyi arkhirv noveishei istorii], fond 5, opis’ 35, delo 26. The document is signed by the historians B. Rybakov, A. Artsikhovskii, A. Smirnov, art historians V. Lazarev, N. Voronov, preservationists P. Baranovskii, A. Chiniakov, historian of architecture N. Brunov, etc.

235 RGANI, fond 5, opis’ 35, delo 26.
Thus, the leading Moscow-based architectural historians, art historians, and preservationists perceived the decentralization of heritage preservation as a clear threat to historic heritage. Subjectively, they also might have seen in this move a menace to their role as all-Union arbiters in the questions of study and conservation of monuments, which they secured during Stalin’s period, -- the position that allowed them to enforce rigid standards in these domains.

Next year, Nikolai Mikhailov, the minister of culture of the USSR, proposed to create the All-Union Voluntary Society for the Preservation of Monuments in an attempt to stop the transfer of responsibilities to the republics. He shared the concerns of the Moscow intellectuals, however the Department of Culture of the CC CPSU directly controlled by Khrushchev insisted that decentralization should be continued. The Communist Party supported the idea to increase public involvement in the preservation of monuments; however, it denied the Union Ministry of Culture the right to create the All-Union Society:

Considering the importance of the preservation of cultural monuments, the Department of Culture of the CC CPSU supports the proposal of the Ministry of Culture of the USSR to engage public in this activity. At the same time, the Department of Culture believes that instead of organizing the All-Union Society it will be more reasonable to create the republican societies and that this question should be delegated to the level of Central Committees of national communist parties and the Soviets of Ministers of the Union republics.

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236 RGANI, fond 5, opis’ 35, delo 49.
237 Tsentral’nyi Komitet Kommunisticheskoi Partii Sovetskogo Soiuza [Central Committee of the Communist Party of the Soviet Union].
238 RGANI, fond 5, opis’ 35, delo 49. The document is signed by the head of the Department of Culture of the CC CPSU D. Polikarpov and the head of the sector of the Department B. Iarustovskii.
Thus, the question of the creation of the All-Union Society was in principle decided against in 1957 at the same time when the All-Union preservation agency was scheduled to disband.

In the late 1950s and the early 1960s, the governments of the Union-level republics proceeded to create local heritage preservation organs, as well as voluntary societies for the protection of monuments. The latter organizations, that aimed to canalize newly encouraged cultural nationalism were created in Georgia in 1959, in Azerbaijan in 1962, in Armenia in 1964, in Tajikistan, Turkmenistan, and in Byelorussia in 1965. Somewhat surprisingly, despite the specific insistence of the Communist Party on creating the all-Russian over the all-Union Society, it also took eight years to create the All-Russian Society for the Preservation of Monuments. Why was it postponed for so long? Two main reasons can be seen for this. First, the creation the society was delayed because until the mid-1960s there was still significant support within the Communist Party for the creation of the All-Union Society based in Moscow and Leningrad similar to the Academy of Sciences of the USSR, which at the same time played the role of the Academy of Sciences of the Russian Soviet Federative Socialist Republic. Second, the Communist Party did not entirely approve of the moderate socialist nationalism in the Russian Federation, unlike the other Union-level republics. Its leaders, including Khrushchev himself, perceived Russian nationalism as a rudiment of pre-Revolutionary Great-Russian chauvinism officially condemned until the very collapse of the Soviet Union.

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239 These organs were usually affiliated with republican ministries of culture or state building departments.
240 The Society was officially established only in 1965, despite the fact that in principle its creation was approved by the Communist Party in 1957. Its full name was Vserossiiskoe obshchestvo okhrany pamiatnikov istorii i kul'tury [All-Russian Society for the Preservation of the Monuments of History and Culture], VOOPiiK.
241 The relationship between the rising Russian nationalism and the heritage preservation is discussed in Yitzhak M. Brudny, Reinventing Russia: Russian Nationalism and the Soviet State (Cambridge, Massachusetts; London, England: Harvard University Press, 1998) and Stephen V. Bittner, The Many Lives of Khrushchev’s Thaw (Ithaca and London: Cornell University Press, 2008). In both publications, however, the role of Russian nationalists in the creation of the All-Russian Voluntary Society is overemphasized, while the goals of Moscow intellectuals remain misinterpreted.
In 1964, immediately after Khrushchev was removed from power, the same Moscow intellectuals who sent the telegram to Khrushchev in 1956 wrote a number of official letters to the Department of Culture advocating the return to the all-Union system of heritage preservation, as well as the creation of All-Union Voluntary Society for the Protection of Monuments.\textsuperscript{242} They justified this by the apparent decline in the quality of heritage conservation in the national republics of the Soviet Union. The official Communist Party’s response was that national heritage preservation organs and voluntary societies had already been created in the Union-level republics by that point in time, and that therefore:

> based on the abovementioned facts, it is advised to postpone the consideration of the proposal to create the All-Union governmental organ of heritage preservation. … The authors of the letters were invited to the Department of Culture of the CC CPSU. The answer was transferred to them.\textsuperscript{243}

The All-Union Society was never created, whereas the republican societies existed until the collapse of the Soviet Union. This institutional reality suggests that the Brezhnev government (1964-82) understood the importance and approved of Khrushchev’s policy in heritage preservation as a part of its decentralization efforts.

Grabar, Rybakov, Baranovskii, and their circle of Moscow intellectuals were radically opposed to the Soviet government’s policy of stimulating cultural nationalism through the establishment of local heritage institutions that would encourage the formation of new socialist nations. They were highly attached to the late-Stalinist centralism, which had allowed them to exercise control over local preservationists working both in the regions of the Russian Federation.

\textsuperscript{242} RGANI, fond 5, opis’ 35, delo 157.
\textsuperscript{243} RGANI, fond 5, opis’ 35, delo 157. The document is signed by the vice-head of the Department Z. Tumanova.
itself and in the *de jure* semi-autonomous national republics that constituted the Soviet Union. In their eyes, the predominance of Moscow in the intellectual world of the Soviet Union during the late Stalinist period (1946-1953) had a positive impact, because it had allowed the effective imposition of rigid standards in the conservation and preservation of heritage, as in all other spheres of cultural life, in peripheral places that would otherwise never hold themselves up to such level of professionalism. However, the Moscow intellectuals had to retreat under the pressure of the Communist Party that effectively enforced cultural decentralization.

Let us now turn our focus to how the voluntary societies for the preservation of monuments in the republics of Central Asia were organized and functioning. In the 1960s when most of these societies were created, the Central Asian republics were the most underdeveloped parts of the Soviet Union, and they almost completely lacked local nationalistic movements. The lack of an ideological program for the formation of national cultural programs was partly due to the facts that the Central Asian educated classes were all but exterminated during the Revolution, and that artificial national division of the region in the 1920s radically redefined ethnic identity. Professional preservationists, who intellectually dominated Central Asian voluntary societies, were not nationally inclined since most of them did not belong to the title nations of the republics\(^{244}\) but were Russians, or highly Russified Jews, Germans and Tatars. Most of them could hardly even speak the local languages. Even into the 1980s, when more ethnically local specialists entered into positions of power within the preservation profession, Central Asian restorers neither supported nor aligned with local nationalisms in their published works.

The Uzbekistan Society for the Preservation of Historic and Cultural Monuments was the most active among voluntary heritage preservation societies in Central Asia. Since, the lion share

\(^{244}\) That is. Uzbeks, Tajiks, Turkmens, Kirgizs, and Kazakhs.
of the all historic monuments in the region was located within the borders of this republic, the government of Uzbekistan encouraged and generously funded the activities of its “voluntary” society by forcing local population to join it and paying the dues. Established in 1967, the society quickly grew to exceed two million members by 1972, and by 1975, it comprised three million members. Considering that the total population of Uzbekistan at the time was 14 million people this was a surprising successful society. By 1981, the Society counted 5.2 million members. One of the reasons for such a large membership was that, many people became members without ever knowing about it, since numerous factories, schools and farms joined it as collective members. According to the articles published in Stroitel’stvo i arkhitektura Uzbekistana [Building and Architecture of Uzbekistan] journal, the Society consisted of ordinary members that were not at all involved in its works, and activists who were taking part in the registration, preservation and propaganda of monuments, “guided by scholars, with the help of the [Communist] Party and Soviet organizations.” However, one has to take these reports with a measure of suspicion, since no single example of direct activists’ involvement in any type of preservation activities was ever given in Stroitel’stvo i arkhitektura Uzbekistana articles.

The governance of the Uzbekistan Society was structured around two social groups that co-existed without much interaction. On the one hand, there were a number of scholars and professional preservationists who studied and restored medieval and early-Modern Islamic architecture. On the other hand, it was managed by ethnically Uzbek bureaucrats, who were at

249 Ibid.
best interested in the maintenance of Soviet commemorative structures (i.e. the numerous monuments devoted to the Bolshevik Revolution and the “Great Patriotic War” or World War II) and in the use of these monuments to support the organization of Communist propaganda. For research scholars who, unlike practicing architectural restorers, were often underfinanced by the Soviet state the Uzbekistan Society was an additional source of funding. It provided money for the continuous inspection of monuments that should have resulted in the publication of a compendium on Uzbekistan’s architectural heritage. This was originally set up as a collaborative project between the Uzbekistan Society, the Khamza Institute of Art Studies in Tashkent and the Architecture Department of the Tashkent Polytechnic University, but the project was never finished because of the collapse of the Soviet Union in 1991. In 1974, the Uzbekistan Society successfully published a book by V. A. Nil’sen and V. N. Manakova titled Arkhitekturnyi dekor pamiatnikov Uzbekistana [Architectural Decoration of the Monuments of Uzbekistan]. But the Uzbekistan Society did not really control the content of the book. The Uzbekistan Society also funded architectural excavations and restorations but the actual work was done by other organizations over which the Society had very little control.

Within the Soviet bureaucratic hierarchy, the status of the Uzbekistan Society was unclear. Thus, N. M. Matchanov was simultaneously the Chairman of the Presidium of the Supreme Soviet of the Uzbek SSR and the head of the Uzbekistan Society for the Preservation of Historic and Cultural Monuments. With so many official positions, he could hardly devote any time to the activities of the Uzbekistan Society, and had to delegate power to his assistants, none of whom was a professional preservationist. The core of ethnically Uzbek bureaucrats was interested in the organization of local youth tourism that involved close collaboration with the

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250 Matchanov, Stroitel’stvo i arkhitektura Uzbekistana 6 (1975), 24.
251 Uzbek Soviet Socialist Republic, the official name of Uzbekistan in the Soviet Union.
Komsomol\textsuperscript{252}, the Communist Youth Union, and the building of tourist facilities.\textsuperscript{253} The Uzbek officials also sabotaged the efforts of professional preservationists to focus the Society on the preservation of Islamic monuments. Instead, they directed activists were to take care of Soviet monuments, namely memorials, busts, and obelisks installed in and outside the cities of the republic that commemorated “the glorious revolutionary, military and labor traditions of the peoples of the republic.”\textsuperscript{254} It is indicative that among three films that the Society produced by 1981 for the propaganda of monuments only one was about the restoration of Islamic architecture. Two others were devoted the Bolshevik Revolution in the region and the military glory of the Uzbek SSR.\textsuperscript{255} Nevertheless, some of the money raised by amateurs also went to pay for the labor of professional preservationists to work on what were known as ‘the monuments of the past,’ that is the monuments of pre-modern and early-modern Islamic architecture.

The similar voluntary societies in the neighboring republics of Central Asia are not so well documented since the only architectural journal that covered heritage preservation activities, \textit{Stroitel’stvo i arkhitektura Uzbekistana/Arkhitektura i stroitel’stvo Uzbekistana} was published in Tashkent and rarely included non-Uzbekistani authors. Thus, the Tajikistan Society for the Preservation of Historic and Cultural Monuments was created in 1965, by Sergei Khmelnitskii, architect and historian of Islamic architecture, and his circle.\textsuperscript{256} The more informal nature of bureaucratic procedures in smaller and economically less important Tajikistan, allowed him to form the Tajikistan Society without much government interference. It is unclear whether the Society received its funding exclusively from the budget of the Ministry of Culture, or whether it

\textsuperscript{252} Komsomol – Kommunisticheskii soiuz molodezhi [the Communist Youth Union].
\textsuperscript{254} Ibid, p. 3.
\textsuperscript{255} Ibid, p. 1.
\textsuperscript{256} I owe most of my information about the Tajikistan Society for the Preservation of Monuments to my interview with Viktoria Khmelnitskaia, Sergei Khmelniskii’s wife.
was funded from membership dues as was the case with other Central Asian Societies. What is certain is that the Tajikistan Society existed *de facto* as a department of the Ministry of Culture. During Viktoria Khmelnitskaia’s tenure as an Inspector of Historic Monuments (1965-80), she reported that the Society was not involved in any projects aimed at the conservation or restoration of Islamic architecture. The only accomplishment of the Tajik Society was the creation of a Register of Monuments within the Ministry of Culture. According to Khmelnitskaia, the Society failed to attract local population to the preservation of monuments – let alone spur nationalist sentiments.

Other voluntary societies established in Central Asia included the Kyrgyzstan Society for the Preservation of Historic and Cultural Monuments, founded in 1966, and the Kazakhstan Society for the Preservation of Historic and Cultural Monuments, founded in 1972, and the last of this type to be organized in the Soviet Union. Even when in principle the central government in Moscow had already decided that each republic of the Union should have such a society, it also mandated that societies be created locally. One of the reasons for the delay in the foundation of the Kazakhstan Society was the relative remoteness of the main Kazakhstan architectural monuments from its capital Alma-Ata, especially of Ahmed Yasawi mausoleum situated on the border with Uzbekistan. Until 1958, the Ahmed Yasawi mausoleum was restored by Uzbekistani restoration workshops. The relative paucity of preservation work in and around the capital meant that the local professionals were less motivated to create a Kazakhstan Society. According to Gulnara Kamalova, the head of the research department at Kazrestavratsiia (the main restoration agency in the independent Kazakhstan), when the Society was finally organized, it

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257 Viktoria Khmelnitskaia maintains that the Tajikistan Society was funded by the Ministry of Culture.
Igor Demchenko, MIT

conzentred its efforts on the creation of a comprehensive register of monuments. Its involvement in the actual restoration of monuments was minimal. Similarly to Uzbekistan, the membership in the Society was a mere formality, and the vast majority of members played no role in its activities.

Professional preservationists had no illusion that the new societies would support their work. For instance, when Khmelnitskaia went to inspect monuments located in the various rayons\textsuperscript{259} of Tajikistan it never occurred to her to reach out to fellow members of the Society. She addressed herself exclusively to the third secretary of each rayon, the official responsible for cultural matters. In Uzbekistan, rank and file Society members were not allowed to present at the meetings of the Society. For instance, at its third meeting in 1978 the papers were read by only by architects, restorers and architecture historians, including Mitkhat Bulatov, Iosif Notkin, Pulat Zakhidov, and Konstantin Kriukov, with the only exception of R. F. Faizulaev who represented the municipality of Khiva.\textsuperscript{260} As an index of the low esteem that professional restorers had of the voluntary societies, one need only turn to Konstantin Kriukov's article on the organization of architectural preservation in Uzbekistan, which devotes only one short paragraph to the Republic's Society.\textsuperscript{261}

The strong encouragement (if not obligation) to create national "voluntary" societies for the preservation of monuments in each republic came from the belief that preservation would inevitably lead to nationalism. While it may be true that nineteenth century nationalist

\textsuperscript{259} The administrative subdivision that can be compared to the county in the United State.
\textsuperscript{260} P. Sh. Zakhidov, "Okhrana pamiatnikov – zadacha gradostroiteli'naia (po materialam III plenuma Obshechestva okhrany pamiatnikov istorii i kul'tury Uzbekistana)" [The preservation of monuments should be achieved through urban planning (based on the materials of the third meeting of the Society for the Preservation of Historic and Cultural Monuments of Uzbekistan)], \textit{Stroitel'stvo i arkhitektura Uzbekistana} 11 (1978): 1-3.
movements in Western Europe and the United States produced strong preservation cultures, the Central Asian cases prove that the reverse is not necessarily true: the imposition of preservation bureaucracies did not guarantee the production of nationalist aspirations. The Khrushchev and Brezhnev governments assumed that heritage preservation societies would channel nationalist feelings away from the so-called ‘bourgeois’ xenophobic and secessionist nationalism and towards a more peaceful Soviet style nationalism that celebrated autochthonous cultures in an effort to provide evidence of Communism’s internationalism. Yet, for the most part, the preservation societies existed as a convenient stand-ins for any real construction of a civil society. They were “voluntary” only in name, and required little or no participation from their members. At best, they raised some money from dues that was redirected more often to rather inconsequential cultural activities, over actual preservation work on monuments. The complete collapse of the Central Asian societies after the disintegration of the Soviet Union indicates that their leaders did not integrate them into any nationalist movements.

Ultimately the institutional modality of ideology’s material existence remained predicated upon the virtuality of Soviet bureaucratic structures. It failed to generate the communicative immediacy that is essential to cognitive trivialization of ideas in ideology, which can be theorized as non-conceptual communication. Unfortunately we lack a systematic general theory of non-conceptual communication, which is the type of information transmission prevailing in highly ideological societies. Jean Baudrillard built a sub-theory of non-conceptual communication for consumerist cultures in his article “Simulacra and Simulation.”

besides the fact that Baudrillard’s theory is specifically intended at debunking the vanity of the consumerist society, particularly in its American variant, and therefore virtually useless for the purposes of analyzing Soviet realities, it also suffers from inadequacy of its conceptual apparatus. Encountering a complex communicative situation, Baudrillard interprets it as an intentional violation of the communication rules allegedly formulated by the semiotic theory. Limited by the narrow interpretation of semiotic theory, Baudrillard generates a chimera of simulacrum, which is simply a signifier that does not refer to the objectively existing signified. This already is a gross oversimplification of the semiotic theory itself, which can easily conceive and conceptualize signifiers that correspond to the imagined signifiers.

However, the real problem with Baudrillard’s theory is in that semiotics is not designed to describe the social phenomenon of communication: rather it is an instrument developed for the analysis of the internal dynamics of symbolic systems. At that, communication is not limited to presenting and exchanging verbal or visual marks of real or imagined objects. Rather the main goal of communication process consists in transmitting attitudes supplemented by the system of verification aimed at convincing the audience in the self-evident veracity of these attitudes, while the verification can be achieved by discursive and non-discursive means.\textsuperscript{263} Moreover, Baudrillard’s theory is all but useless for the analysis of non-conceptual communication in authoritarian and totalitarian states as well as for the study of political ideology in liberal societies.\textsuperscript{264}

\textsuperscript{263} Eventually the best available theory of communication is still the \textit{Rhetoric} of Aristotle, which however does not deal with non-discursive methods of verification constituting the main focus of this dissertation.

The rising interest in non-conceptual content among analytic philosophers is purely formal and is exclusively directed at the analysis of its logical status with no references to its pragmatic role in modern societies. Eventually we are left with Kant's *Critique of the Power of Judgment* that investigates the mechanisms of immediate communication, yet with goals that are entirely internal to his philosophical system of transcendental idealism. At the same time the influence of Kant's aesthetics on modern ideologists shouldn't be underestimated.

In the conclusion to this dissertation based on all the materials reviewed above I would like to propose an outline of a non-conceptual communication theory for totalitarian societies. However, before sketching out its basic theses, it should be noted that whether I talk about the materialization of ideology or about non-conceptual communication I have in mind the identical single phenomenon explained through the lenses of dissimilar theoretical paradigms. From the perspective of Marxist criticism, the materialization of ideology allows the ruling classes to bring their abstract ideas about the ordering of society closer to conceptually less sophisticated thinking patterns common among oppressed classes, and thus to make those ideas immediately obvious without reflection. Moreover, it can be argued that ideally the goal of the ruling classes is to prevent the oppressed classes from reflection altogether, or to capture and channel their thinking at its initial stage when it departs from reflecting on material reality, which in fact is not ideologically neutral – but just a materialized illusion that camouflages the heavily biased set of ideas working in favor of the ruling classes. In its turn, the study of non-conceptual communication allows me to move away from the over-generalized and still politically

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provocative statements of Marxist criticism and approach the exact mechanisms that organize the transmission and reproduction of information in the actual process of de-verbalization and potential procedure of re-verbalization of ideas. Although at a purely intellectual level it is impossible to differentiate between non-conceptual communication and the materialization of ideology by interpreting non-conceptual communication as an instrument of ideological indoctrination, in practice non-conceptual existence is just a modality of ideology’s materiality, which, in Althusser’s words, is different from “the material existence of a paving-stone or a rifle.”

The main problem of building a theory of non-conceptual communication, or non-conceptual content in analytic philosophy, is in that the content communicated non-conceptually evades logical analysis. Therefore all analytic theses that can be formulated regarding non-conceptual communication are either negative (with non-existence of non-conceptual communication being at their extreme edge) or exceedingly subjective, i.e. reflecting the critic’s personal experience of ideological pressure imposed through non-conceptual communication. However, here I will make a limited number of positive statements regarding non-conceptual communication in its relation to heritage politics in Soviet Central Asia. First, non-conceptual communication is different from experience since it actually communicates complex messages through dual encoding-decoding mechanism. Non-conceptual communication always begins from a verbalized system of ideas that are de-verbalized into material objects by specially trained professionals normally able to explain the meaning embodied in an ideologically infused object (encoding); in parallel, the ascension channel is built in academic and popular publications, audio and video materials that allow people who are perplexed or

268 See: Christopher Peacocke, “Does Perception Have a Nonconceptual Content?”
fascinated by ideologically saturated objects to recover their conceptual message (decoding). At that, the dominant assumption is that most people would not be interested in the ascension to the concepts; rather they would be satisfied by the feeling of the naturalness produced by the ideologically saturated objects through reverberating with the stream of omnipresent yet unspecific propaganda. Second, non-conceptual communication is a highly controlled sphere of societal activity monopolized by the state and the ruling classes; any efforts of marginal groups or institutions to develop parallel channels of non-conceptual communication with masses are either heavily censored or explicitly prohibited. And finally, third, due to its materiality non-conceptual communication persists after the collapse of ideology and therefore potentially has a power to bring the old ideology back if the new one fails.

I would like to conclude the dissertation with this theoretical scheme, which I developed in the process of analyzing the plethora of understudied material related to architectural restoration in the Soviet Union in general and Central Asia in particular. Rather than treating the protagonists of the dissertation as incompetent, I aimed to demonstrate how they were conscribed by the different elements of the coding mechanism the de-conceptualized the Communist ideology in the material objects normally associated with different culture and historic period. I analyzed the complex process of interiorization of Soviet ultra-rationalism doctrine of history, which often resulted in a conflict between professional standards and the mechanical logic of state apparatus — the conflict resolved in complete epistemological rewiring of architectural historiography that generated a self-confirming de-coding mechanism of ideologically charged material culture.
Contents:

a. Literature in Western languages;
b. Literature and archival sources in Russian;
c. Publications of Soviet scholars in Western languages.

a. Literature in Western languages:


Castañeda, Quetzil E. In the museum of Maya culture: touring Chichén Itzá. Minneapolis: University of Minnesota Press, 1996.


Igor Demchenko, MIT


b. Publications and archival sources in Russian:

- publications:


Gorshenina, Svetlana. “Ob izuchenii iskusstva Srednei Azii (Deiatel’nost’ istorika, arkhitektoora i restavratora Borisa Zasypkina” [Regarding the study of Central Asian Art: the activities of historian, architect, and restorer Boris Zasypkin]. In *Puti i pereput’ia: materialy i issledovaniia po otechestvennomu iskusstvu* [Road and crossroads: Materials and studies in the art of Fatherland]. Moscow, 1999, pp. 96-105.


Igor Demchenko, MIT


Kriukov, K. S. “K probleme koservatsii i restavratsii arkhitekturnykh pamyatnikov Uzbekistana” [Exploring the problem of conservation and restoration of the architectural monuments of Uzbekistan]


Михайловский, Е. В. "Основы современного подхода к реставрации памятников культуры" [The foundations of contemporary approach to the restoration of cultural monuments]. В
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*Metodika i praktika sokhraneniia pamiatnikov kul’tury* [The methods and practices of preservation of cultural monuments]. Moscow, 1974, p. 41-47.


Pokryshkin, P. P. *Kratkie sovety po voprosam remonta pamiatnikov stariny i iskusstva* [Brief advice on the questions of repair of the monuments of history and art]. Petrograd, 1915.

Presidium of the Union of Architects of the Uzbek SSR, the edition board, and the collective [of *Stroitel’stvo i arkhitektura Uzbekistana* journal]. “Prizvanie (k 50-letiiu K. S. Kriukova)”
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Zasypkin, B. N. “Pamyatniki arkhiitektury v Srednei Azii i ikh restavratsiia” [Architectural monuments in Central Asia and their restoration]. *Voprosy restavratsii. Sbornik Tsentral’nykh...*
Igor Demchenko, MIT

gosudarstvennykh restavratsionnykh masterskikh [Questions of Restorations. Collected Articles Published by the Central State Restoration Workshops] I (Moscow, 1926): 137-178.


- archival materials:


Asanov, A. A. “Mavzolei Sandzhara (arkhitekturno-konstruktivnoe issledovanie” [Sultan Sanjar mausoleum (the study of architecture and structures)]. Undated. Archive of Uzbekistan Ministry of Culture, Department of Heritage Preservation, O^{2831}_{A\,90}.


Ratner L. “Poiasnitel'naia zapiska k proektu restavratsii utrachennoi chastii girikha severnogo portal [kompleksa Khodzhi-Akhmeda-Iasevi]” [Explanatory note on the restoration of the lost part of the girih of the northern portal of Khoja Ahmad Yassawi complex]. Undated. Archive of Kazrestavratsia, Alamaty, Kazakhstan. Inventorial No 61/Д.


Svab, Iu. Z. “Nauchnoe obosnovanie proekta rekonstruktsii kupola mecheti medresse Tillia-Kari v g. Samarkande” [Scientific justification of the project for the reconstruction of the dome of
Igor Demchenko, MIT


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c. Publications of Soviet scholars in Western Languages:


Igor Demchenko, MIT


Introduction

The Appendix includes a set of commented and illustrated translations, produced by the author of this dissertation; a short excerpt from Golombek and Wilber ed. The Timurid Architecture of Iran and Turan (1988), which contains the only substantial presentation of Mitkhat Bulatov’s theories made available to English-speaking readers during the Soviet period; and the graphic documentation of Konstantin Kriukov’s realized restoration project for Kukeltash madrasah in Tashkent.

The translations are made from published works and archival manuscript of major Soviet theoreticians of historic preservation, Central Asia architectural historians, and practicing restorers. Together with an excerpt from The Timurid Architecture of Iran and Turan they serve a double purpose: first, they introduce the readers of the dissertation to the intellectual culture of post-World War II Soviet Union, which is generally lesser known than the Sturm und Drang period of the 1920s and the tragic cultural transition (often termed as the “great retreat”) of the 1930s; second, they provide readers with direct access to chains of argumentation and approaches to raw data developed by Central Asian art historians and restorers – the main protagonists of this dissertation.

Translations included in the Appendix are arranged thematically and chronologically. Thematically the appendixes are divided into three groups. The first group is intended to provide the readers with an insight in the general historic preservation theory developed in the Soviet Union. The second group of translations is focused on Mitkhat Bulatov’s reconstruction of architectural theory that he claimed to discover in pre-modern Central Asia. The third group includes four translations and one visual documentation file that cover the practical methodology.

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of “scientific restoration” in Soviet Central Asia. The third group is arranged chronologically from the first efforts in listing and classification of monuments to the highly complex approaches that employed mathematical methods for the reconstruction of historic buildings.

The first translation from Shalva Ratiiia constitutes an ideologically censored historic outline of architectural restoration in the Russian Empire and during the early Soviet years. Between the 1930s and the 1950s Ratiiia occupied a number of important administrative positions first in Tashkent and later in Moscow. Hence the historic narrative that he built is imbued with political reminiscences particularly to Stalin’s anti-cosmopolitanism campaign. At the same time Ratiiia was the first Soviet scholar to summarize the experience of restoring the Old-Russian architecture before the Bolshevik Revolution. The restoration of architectural monuments in Central Asia was initiated by Boris Zasypkin, an architect-restorer trained in the preservation of medieval Russian (same as Old-Russian) architecture; Ratiiia’s text contextualizes Zasypkin’s work and clarifies occasional reverences to pre-Revolutionary restoration authorities and villains in Zasypkin’s published works. Besides Ratiiia himself produced a number of proportional analyses of Central Asian architectural monuments referred in the dissertation, and the translated text frames his theoretical system.

The second translation in the first group is made from the first chapter of a collective monograph titled *The Methods of Restoration of Architectural Monuments* (1977) and is authored by the leading Moscow-based theoretician of architectural restoration Evgenii Mikhailovskii. The monograph was prepared by Evgenii Mikhailovskii as an official reference tool for Soviet restorers. It aimed at reflecting the state-endorsed position regarding the goals of heritage preservation activities in the Soviet Union. Published in 1977, it replaced the 1966 volume of the same title. Mikhailovskii intended the new iteration of *The Methods* to stimulate a
shift in Soviet restoration theory and practice from “complete restorations” that became common after World War II to the “analytic method,” i.e. from stylistic restorations to strict conservation of authentic historic monuments.

From the mid-1960s, Mikhailovskii, who was both a practicing restorer of Old-Russian church architecture and a scholar working for the Central Scientific-Research Institute of the History and Theory of Architecture in Moscow (the TsNIITIA, currently the NIITIAG RAASN), established himself as a firm proponent of the Venice Charter, opposed by the "patriotic" wing of the Soviet preservationist community. Mikhailovskii was concerned with the growing rift between the historicist approach advocated by the UNESCO heritage preservation institutions and the unruly aestheticism and cultural nationalism, which in the 1940s justified the reconstruction and recreation of monuments destroyed by the Germans in the western regions of the USSR and by the 1960s, spread to all the republics of the Soviet Union.

In the introductory chapter to The Methods volume Mikhailovskii attempted at differentiating between the artistic value that the restorers of the "patriotic" wing strived to recreate in monuments and the aesthetic value contingent in each historic period. Mikhailovskii inevitably aligned himself with the official position of the Soviet Marxist-Leninist aesthetics that postulates the objectivity of artistic value; however, in consent with Alois Reigl he argued that the creative modes of the past epochs, despite their objectivity, are inaccessible to contemporary restorers. Mikhailovskii insisted that, instead of trying to penetrate into the creative consciousness of the past epochs, Soviet restorers should clean, consolidate and reveal historic monuments so that they could provoke aesthetic feelings in contemporary viewers, who do not have special training in the history of art. According to Mikhailovskii, this was the only type of
intervention that could be done to a monument without relying on subjective – and thus inappropriate – stylistic conjectures.

The third text of the first group is a theoretical study written by Aleksei Asanov, an engineer, practicing restorer, and historian of architecture based in Tashkent. Asanov brought Soviet ideologically predicated rationalism to the highest level of theoretical reflection. Initially close to proportionalists, in this article he questioned the possibility of restoring lost parts based on the mathematical analysis of historic monuments. Instead he suggested that architectural heritage is a repository of scientific information, which constitutes both its social and academic value. This approach to architectural monuments might have been influenced by the rise of cybernetics in the Soviet Union of the 1960s. Besides Asanov developed a mathematical theory of aging specifically for Central Asian architectural monuments; apparently he was hoping that this theory would improve the quality and efficiency of architectural conservation in the region by precisely predicting the trajectory of monuments deterioration. This theory is a testimony to Soviet scientific optimism taken to an extreme by a specialist with a background in sciences and engineering.

Mitkhat Bulatov is a central figure in Soviet historiography of Central Asian architecture. His Geometric Harmonization in the Architecture of Central Asia (1978) defined, and to a large extent still defines, the perception of regional architectural heritage. Despite the importance of Bulatov’s work for the study of Islamic architecture, none of it was ever translated into English. The second group of texts, which consist of two translations produced by the author of this dissertation and an excerpt from Lisa Golombek and Donald Wilber, The Timurid Architecture of Iran and Turan (1988) most certainly based on Bulatov’s research, intends to fill in this lacuna. The translations are supplied with critical comments pointing at rather common lapses in
Bulatov’s argument. The mathematical apparatus used by Bulatov is essential to the understanding of the method employed by proportionalists for the rationalist re-interpretation of Central Asian architecture.

Since the restoration of Bibi-khanym mosque in Samarkand is among the recurrent topics of the dissertation, I selected for translation a small chapter specifically devoted to this monument from many case studies, of which for the most part Bulatov’s monograph consists. Both “Proportional systems in the architecture of Central Asia” and “Bibi-khanym mosque (1399-1404)” is a constant source of references for the main body of the dissertation. The excerpt from Golombek and Wilber book testifies to the accuracy of my translations.

The third group of appendixes is more diverse. It includes two translations of Boris Zasypkin’s works that marked the beginning of “scientific restoration” in Soviet Central Asia. A short article devoted to the Samanid mausoleum in Bukhara reflects Zasypkin’s methods of listing and description of historic monuments. A very technical text, it supplied the generations of Central Asian scholars with essential information about this highly important yet very controversial building. The second and a much large text of Zasypkin is an unpublished archrival note on the history of architectural restoration in Soviet Central Asia before 1949 and a specific report concerning the restoration of Samanid mausoleum in Bukhara. Since the manuscript does not have any pictures, I illustrated it with archival photographs of monuments and restorers.

The “Methods and practices of restoration of architectural monuments in Uzbekistan” (1949) bear numerous traces of Stalin’s anti-cosmopolitanism campaign, intended against the Soviet Jewry, and in many aspects the “Methods” respond to Ratiia’s text from the first group by glorifying often non-existent achievement of Russian restores. Yet, unlike Ratiia who was a fully loyal Soviet official, Zasypkin had to push himself hard to comply with the rules of that political
game and this is reflected in the tone and vocabulary of the note. Irrespective of that fact the “Methods” provide a number of important insights in the professional training that Zasypkin received before the Bolshevik Revolution. Besides it supplies a good deal of completely unknown data related to the restoration and study of Samanid mausoleum in Bukhara, and particularly regarding the extremely controversial aspect of its attribution and dating.

Vladimir Filimonov was among the first scholars who – although cautiously – introduced the methods of mathematical analysis to the restoration of actual historic monuments and the translation of the unpublished project for the restoration of Hakim al-Temezi architectural complex sheds light on his methodology. The practical methodology of “scientific restoration” is the most closed and guarded area of professional expertise mystified behind the closed doors of state institutions of heritage preservation. In the Soviet Union the publically celebrated image of a restorer was that of a demiurge able to recreate the whole building from its meager trace on the ground. The actual restoration methods with their quasi-mathematical precision were only revealed to the higher officials. Still Filimonov’s approach is only partially partakes in Central Asian fascination with the “exact science” of proportion, while the visual documentation and a partial translation of Konstantin Kriukov’s project for Kukeltash madrasah in Tashkent reveals the complete obsession with and reliance upon the methods of geometrical harmonization.

“Technical Project for the Restoration of Bibi-Khanum Mosque in Samarkand” is a testimony to the most advanced stage in mathematization of restoration methodology in Soviet Central Asia. Also an unpublished archival document, it discloses the succession of steps that resulted in one of the most controversial restorations in the region. Bibi-khanym mosque was only known as majestic ruins; in fact due the instability of constructions the mosque started to fall apart immediately after it was finished at the very beginning of the 15th century. The decision
to reconstruct its ideal image in reinforced concrete camouflaged with brick and industrially produced tiles reflected the ultimate state in rationalization of Central Asian architectural heritage and its complete subjugation to communist ideology.
Contents:

**i. General historic preservation theory**


**ii. Proportionalist approach**

4. M. S. Bulatov “Proortsional’nye sistemy v arkhitekture Srednei Azii” [Proportional systems in the architecture of Central Asia], in idem *Geometricheskaia garmonizatsiia v arkhitektury Srednei Azii IX-XV vv.: istoriko-teoreticheskoe issledovanie* [Geometric


**iii. Restoration methods**


kupol’nogo pomeshcheniia Khakima-al’-Termezi” [Substantiation of the project for the
restoration of the Southern portal of the big domed compound of Hakim al-Temezi].
Tashkent, 1957. Archive of Uzbekistan Ministry of Culture, Department of Heritage
Preservation C/115855/3.

documentation, 1870s - 1990s.

11. Ministry of Culture of UzSSR, Uzbek Scientific-Research and Project-Development
Institute for the Conservation and Restoration of Cultural Monuments of Uzbekistan.

Technical Project for the Restoration of Bibi-Khanum Mosque in Samarkand.

(Substantiation of T[echnical] P[roject]) (Architectural Part), Tashkent, 1979. Archive
of Uzbekistan Ministry of Culture, Department of Heritage Preservation, C/182485/26, pp. 155-
196.
Our ancestors valued architectural monuments of the past in their own way. They did their best to preserve buildings, which were constructed in memory of great historic events and – for this reason – specially valued. They restored the monuments damaged by fires, hurricanes or military actions to the previous or more magnificent shape.

Quite often, special respect to the buildings resulted in constructing additional spaces and in embellishing the buildings according to new architectural tastes. Thus, for example, Sophia Cathedral in Kiev, originally built in 1037 to commemorate the victory over the Pechenegs, was turned by several subsequent generations into the complex building that combines architectural elements of different epochs.
Occasionally additions were constructed to support dilapidated buildings or to provide additional space. Thus, for example, Dormition [Uspenski] Cathedral in Vladimir, initially built between 1158 and 1161 as a princely church, soon turned into the city cathedral; after a fire of 1185, additions were constructed on three of its sides. Sometimes attempts were made to recreate in the new building the architectural imaged of its predecessor. Thus, in Novgorod, archbishop Evtimii (1430-1450) aimed at reminding people about the former glory and grandeur of Novgorod: in the Church of John the Baptist [Ioann] on Opoki built in 1453, he reproduced the architectural forms of the original church built between 1127 and 1130. Also in 1455, the new building was constructed on the foundations of the demolished Church of Elijah the Prophet [Il’ia Prorok] in
Slavna originally built between 1198 and 1202 – to some extent it repeated the forms of its predecessor.

When V[asilii] D[mitrievich] Ermolin, the renowned builder of the second half of the fifteenth century reconstructed the churches of Ascension [Voznesenskii] Convent in Moscow (built in the beginning of the fifteenth century) and the Cathedral in Yuryev-Polsky (1230-1234), which were damaged by fire, he preserved – as much as possible – the walls of the old churches. Ermolin built anew only those parts of buildings that were heavily damaged. In Yuryev-Polsky Cathedral, the stones of the collapsed upper parts of the building were used for this purpose; thus, many elements of the former decoration of the building have survived, although they were not returned to their proper places or even kept in their original locations.

Later, already after the first decrees on the preservation of monuments of antiquity in our country (decrees of Peter I, 1718 and 1720), architect I[van] F[edorovich] Michurin [1700-1763] conducted research in the Cathedral of Novoierusalimskii [New Jerusalem] Monastery, which survived the fire and the collapse of the hipped roof; his goal was to reconstruct its original decoration. Unlike other architects, who considered it necessary to demolish the damaged part of the building completely and to build it anew, Michurin – based on the firsthand knowledge of the building – insisted on the preservation and reinforcement of its ancient walls and their decoration, and on the reconstruction of the collapsed hipped roof and its base in the original forms and materials. Despite the fact that Michurin’s project was never completely realized, it is valuable because of the author’s persistent desire not only to preserve the remaining parts of the Cathedral (this was done already by Ermolin) but also to reconstruct – based on the onsite study of the building – the lost parts to their original condition.
In 1770, wall paintings of Annunciation [Blagoveschenskii] Cathedral in Moscow were planned to be renovated; because of this, the search for the archrival materials related to the paintings of the Kremlin cathedrals and to their subsequent renewals was conducted. Accounting books [that registered] the “walled icon painting [pis’mo]” completed in 1642 and 1643 in Dormition [Uspenskii] Cathedral were found; the books contained the notes on the organization of works and on the materials used, which became the primary sources for the reconstruction of the paintings.

Thus, it is possible to trace the beginnings of the historical approach to the reconstruction of architectural monuments back to the second half of the eighteenth century. However, no attempts were made to begin the systematic research and the study of these monuments with an aim of reconstructing their original image. Only the middle and especially the second half of the nineteenth century saw the development of the concept of restoration, which went against the subjective approach with no solid scientific principles.

By that time, the profound advancement in the study of Russian architecture, resulting in the awareness of the value of monuments, and the progress of archeology awakened the public interest in discovery, study and preservation of the monuments of the distant past [starina]. The growth of public self-consciousness and the development of social thought in Russia also stimulated the creation of several academic societies, including the historic,

archaeological, and architectural ones. The articles, which sharply condemned careless attitude to the monuments of the past and the lack of their protection, started to be published.
In Petersburg, in 1850, the organization named Imperial Archeological Commission was established; it grew out of the numismatic society, which existed from 1846. The goals of the commission consisted in preventing the pillage and destruction as well as in revealing and appraising of monuments – primarily archeological one. In 1880, the commission was granted the right of priority to conduct the excavations on public and royal lands. Together with the Academy of Arts, it became responsible for the questions, related to the restoration of architectural monuments.

Later, because life itself posed more and more complicated problems to the Archaeological Commission, subsidiary commissions dealing with different arts were created. Thus, later, a special commission, which dealt with questions of protection and restoration of architectural monuments, was organized.

In 1864, public initiative resulted in the creation of Moscow Archaeological Society. Later, the commission for the preservation of ancient monuments was also organized in Moscow. In the end of the nineteenth century, historical and archeological societies and learned archival commissions emerged in some other Russian cities. To some extent, they also assisted to the preservation of architectural monuments.

The activities of the Imperial Archeological Commission and other abovementioned societies included the organization of archeological expeditions and congresses, the publication of research materials, the preparation of instructions on the protection of archeological and architectural monuments, consultations and final decisions on the reconstruction of the latter monuments, etc.; however, they had to work in very difficult conditions. Commissions and societies did not have any rights; moreover, the indifference and even hostile attitude to their
activities expressed by the bureaucrats, the clergymen and the private individuals, who were in charge of or owned the old buildings, hindered their work. 270

In spite of this, with the assistance of the Archeological Commission and societies, many architectural monuments were saved from alteration and destruction; some of them were repaired and restored (including Rostov Kremlin, parts of the fortress walls in Smolensk and Kolomna, Dormition [Uspenskii] Cathedral in Vladimir, Ferapontov Monastery, etc.). The passionate activity of some members of these societies resulted in the development of restoration theory and practice in the late nineteenth and early twentieth century. On the other hand, in the second and third quarter of the nineteenth century, the rising interest in antiquity – the interest which was not supported by proper knowledge of historic architecture – generated a huge number of dilettantish “restorations.” These works, which claimed to restore the ancient buildings to their original image, in fact were just pastiche alterations. For example, during the restoration of the so-called chambers of boyars Romanov [palaty boiar Romanovykh] in Moscow, carried out in 1858 by the architect F[edor] F[edorovich] Rikhter [1808-1868], new porch and the upper storey, built in the “ancient taste,” were added to the old building; the restoration of wall-paintings in Terem [Tower] palace was, in essence, the new wall-painting created according to the sketches of the painter F[edor] [Grigor’evich] Solntsev [1801-1892], etc.

270 The last sentence of the paragraph is a standard Soviet propaganda belittling the achievements of the ancien régime.
Chambers of boyars Romanov before and after F. F. Rikhter’s restoration. Source: Wikimedia Commons
The subsequent more focused study of the architecture of the past and the peculiar features of the reconstructed monuments has shown that such “restorations” did not restore ancient monuments to their original image, but often disfigured them even more. They only testify to the false ideas of restorers regarding the architecture of these monuments. Therefore, the reaction against such “restorations,” which spoiled architectural monuments, was quite natural. It was recognized that in certain cases it is better to refrain from restoration [altogether]; however, attempts were also made to create the theoretical foundation for the [future] restorations.

The works of the eminent architect-restorers of that period enriched both the young restoration science and the process of development of restoration practice.

The academician of architecture Andrei Mikhailovich Pavlinov [1852-1897] – based on the accumulated experience – attempted to attribute certain direction and theoretical validity to the restoration of architectural monuments. He demonstrated the necessity of strict historic approach to the restoration of ancient monuments; this approach has to be based on the study of their ancient depictions and descriptions, as well as on the study of all transformations that monuments have survived. At that time, the “restoration” was understood exclusively as the returning of the original image to the buildings. Therefore, Pavlinov believed that it is essential to study in details the whole corpus of architectural monuments that survived from a period, when a particular monument scheduled for the restoration was constructed.

In his practice (the restoration of the Kremlin in Kolomna city, 1886-1889), Pavlinov relied on the scientific study of the restored buildings; at the same time, he widely used the comparative method. In some cases, he went as far as relying on poorly grounded hypotheses: this has affected the restoration of Kolomna Kremlin that was decorated by the battlements, the form of
which was proved false by later research and ancient depictions – more detailed than the ones consulted during the restoration.

Nevertheless, for the first time in the restoration practice of that period the restorer made a step beyond the mere attempts to reveal original image of the monument – he paid attention to the later layers and transformations in the monument, and these transformations were taken into account during the restoration.

In the 1890s, another scholar and restorer of the late nineteenth century, the academician of architecture N[ikolai] V[ladimirovich] Sultanov (1850-1908) slightly developed those rudimentary ideas of scientific approach to the study and restoration of monuments.

N. V. Sultanov has formulated the views regarding the restoration of architectural monuments in his scholarly reports on the restoration of Prince [tsarevitch] Dmitry’s palace in the town of Uglich; this restoration project had become the most fundamental work of that period.

First, N. V. Sultanov believed that restoration could only be allowed when all necessary authentic scientific and documental data is available; this data should be supported both by iconographic and written sources, as well as by the on-site study of the building. He was also the proponent of the maximum preservation of those later layers that were of historic and artistic interest.

Sultanov’s scholarly definition of the optimal date, to which architectural monument should be restored, has become a step forward in the development of restoration methodology. For the first time, this date was not similar to the date of the construction of the building. Sultanov defined this date according to the sum of the following factors: artistic value of the image of the building during the different stages of its existence, the availability of scientific basis for its restoration to
each of those stages, and the historic and cultural significance of the building during different [historic] periods.

On the edge of the nineteenth and twentieth century, professor of architecture V[ladimir] V[asil’evich] Suslov (1857-1921) generally supported the views on the essence of restoration of architectural monuments that had become established during that time. However, he produced the detailed measurements of the buildings, prepared for restoration <1>; on top of this, he measured all excavations and findings, discovered in the process of research; he accompanied the measurements with detailed descriptions both of the process of work

<1> This was already done by F. Rikhter in the mid-nineteenth century.

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and of all the discovered materials.

Unlike Pavlinov and Sultanov, who called for the greater caution in the restoration of architectural monuments, Suslov recommended clearing away the later layers; moreover, he advocated the bold reconstructions of their original forms. However, in practice, he could preserve the later details only when they were of artistic value. When Suslov restored vault roofing [pozakomarnoe pokrytie] of Sofia Cathedral in Novgorod, he preserved the sixteenth century outer frescos as well as the seventeenth century window casings and portals.

The works of the academician of architecture P[etr] P[etrovich] Pokryshkin (1870-1921), who was active in the first two decades of the current century, were very important for the development of the scientific basis of architectural restoration. He summarized the earlier restoration experience and was the first scholar who attempted to provide the systematic advises on the protection, repairing and – partly – restoration of architectural monuments. He also

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created new, more precise methods of measuring the monuments; these methods are still used. The analysis of the reasons for the failures of earlier restoration works led Pokryshkin to the conclusion that "restorating" ["restavrirovanie"] should be avoided. According to Pokryshkin, one should conduct careful repair and partial restoration of the building; later additions should be removed only when they harm the monument from technical, scientific or artistic points of view. Unlike his predecessors, Pokryshkin (especially after he unsuccessfully applied the cement plastering during restoration of Savior [Spas] on Neredsa church near Novgorod – the restoration, which from many other points of view was perfect) recommended restorers to rely on only those building materials that are similar to the ancient ones, and limit the use of the new building materials to the cases when it is altogether unavoidable. At the same time, he developed and used bold construction solutions; for example, when he straitened the bell tower of Dormition-Borovskaia [Uspensko-Borovskaia] church in Archangelsk (to which we will return below),

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or when he reinstalled, without dismantling, the big fragments of the walls of Vasilievskia church in Ovruch town, which had fallen on the ground.
Vasilievskaya church in Ovruch and A. V. Shchusev’s restoration project (1908). Source: Wikimedia Commons

A[lexei] V[iktorovich] Shchusev (1873-1949) was the supervisor and the head designer of the restoration project for Ovruch; he was granted the title of “the academician of architecture” for this restoration. Ovruch works synthesized the achievements of Russian restoration practice as it developed in the late nineteenth and early twentieth century.

It is of primary importance that A. V. Shchusev attempted to share the information both regarding the restoration of architectural monuments and the progress of restoration together with the important historic discoveries made during this process not just with a narrow circle of
the specialists, but also with a general public, whose attention he tried to capture and incite the
discussion.

However, A. V. Shchusev’s reconstruction of the drum and the upper parts of the wall arches
[zakomara] and towers of Ovruch Cathedral were based exclusively on his creative intuition and
his own ideas about the Russian architecture of that period. This restoration departs from the
strictly scientific and always documented approach as well as from the principle of
reconstructing the lost – but vitally important – parts of architectural monuments in simple,
neutral forms, which would reveal their late provenance. The drum of Ovruch Cathedral built by
A. V. Shchusev does not correspond to our contemporary understanding of the twelfth-century
Russian architecture, which is more comprehensive than the ideas common to the early 1900s.

However, the forms of the drum are built in such a harmony with the ancient parts of the
building that they mislead even very a knowledgeable person. Thus, the famous French
byzantinist G[abriel] Millet in one of his publications has presented the drum of Ovruch
Cathedral as typical for the Russian architecture of the eleventh and twelfth centuries.

After the victory of the October Socialist Revolution, when all the treasures of culture and all the
“fruits of the thousands years of the development of civilization”\textsuperscript{271} became a property “all
workers without exception,”\textsuperscript{272} inexhaustible opportunities emerged for the comprehensive and
focused study and

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research of cultural monuments of the multinational Soviet Union.

\textsuperscript{271} V. I. Lenin “Uspekhi i trudnosti sovetskoi vlastii” [The achievements and difficulties of the soviet government], in
\textit{Polnoe sobranie sochenii} [The Compete Works], volume 38, p. 57. See also English translation of the complete
article: http://www.marxists.org/archive/lenin/works/1919/mar/x01.htm.

\textsuperscript{272} Ibid.
The Communist party and the Soviet government were taking care of the monuments of culture and art: from the first days of Revolution, they guaranteed their protection by the appropriate legislations and by creating special heritage preservation organizations. Central State Restoration Workshops [CSRW] for the restoration and study of the monuments of architecture and painting were established. The Workshops were active in the field of research and restoration between 1920 and 1934.

The following notable scholars and architect-restorers took part in the activities of the Workshops: Academician I[gor] E[mmmanuilovich] Grabar’ [1871-1960]; Professor I[van] V[asil’tvich] Ryl’skii [1876-1952], Professor D[mitrii] P[etrovich] Sukhov [1867-1958], Professor S[ergei] A[lexandrovich] Toropov [1882-1964]; architect P[etr] D[mitrievich] Baranovskii [1892-1984], architect B[oris] N[ikolaevich] Zasypkin [1891-1955], architect S[emen] F[edorovich] Kulagin [1867-1961], architect N[ikolai] Alexandrovich Pustakhanov [or Pustokhanov, 1889-1937], etc. The industrial functions were assigned to the Workshops; this facilitated the development of new complex method of work, which combined study, preservation, repairs, and restoration of architectural monuments. This method had become a logical conclusion of the development, which was in process already in the pre-Revolutionary restoration practice. The archeological-architectural method of study of architectural monuments used by SCRW also summarized all the previous experience; it included the following stages:

1) the complete survey of the building (measurements, photos, description);
2) the study and the description of building materials and technical conditions of the building;
3) the study of the peculiarities of structure, architectural forms and the decorations of the building;

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4) the thorough excavation of the building (probes, excavations);
5) the revealing of the original image of the building or of its ancient parts as well as later alterations;
6) the analysis of the accumulated materials, which takes into account literary and iconographic data;
7) synthesis: the proposal for graphic reconstruction or restoration of the building.

Moreover, in the process of the production of restoration works, conducted by CSRW in Moscow, Yaroslavl, Samarkand and other cities, the Workshops found new solutions for research and construction problems. The reinforcement of the ancient brick structures by the injection of the new mortar (developed by Professor I. V. Ryl’skii) was the novelty in the restoration practice. While studying the ancient building techniques, architect P. D. Baranovskii has developed the method of defining the profile of removed brick details according to the parts of bricks that remained in the walls; he also developed the method of establishing the original width of enlarged openings based on the distribution of bricks. Baranovskii also proposed to use slots of the old wooden ties for the new ties made of the long-lasting materials.

To the same period belongs the large-scale engineering project, which aimed at straightening of the falling minaret of Ulugh Beg madrasah in Samarkand; this work was completed under the supervision of the engineer M[ikhail] F[edorovich] Mauer [1866-1922].

Defining the essence and the goals of architectural restoration, the creative collective of CSRW shared the opinion that it is preferable to preserve monuments than to restore their original image. They believed that the restoration should be limited to revealing,
and that it should be limited to removal of later additions without the reconstruction of the lost parts. The later additions, which were considered for removal, were approached with great caution. The added parts that had artistic value were preserved; the reconstruction of altered parts to their original form was not always considered necessary – it was allowed only when the evidences were completely undeniable.

Further transformation in the established views on the restoration of architectural monuments happened during the postwar [i.e. post-World War II] period. During the war many architectural monuments were destroyed; thus, the scale of works had to grow, and not only the experienced architect-restorers but young specialists were engaged in these works. The very character of destructions pushed the works beyond the mere removal of later additions. Often the reconstruction of the lost parts was inevitable because they were vitally important for the buildings. At times it was impossible to avoid the question of recreation: should the huge sections of partly destroyed architectural monuments be rebuilt when they have the great historic-architectural or urban importance? By that time, Soviet architect-restorers were experienced in the study of architectural monuments and in designing the properly prepared projects of their restoration; this allowed them to conduct restoration works not only in the cities, which suffered during the years of the war. Although the restorers were most active in the reconstruction of architectural monuments in Leningrad, Novgorod, Pskov, Kiev, Chernigov, etc., important projects of the postwar years were also completed in the cities that were little touched or completely untouched by the military attacks (Moscow, Vladimir, Suzdal, Yaroslavl,\(^\text{273}\) Samarkand, Bukhara, Baku, Kutaisi,\(^\text{274}\) Vagarshapat [Ejmiatsin],\(^\text{275}\) etc.).

\(^{273}\) Vladimir, Suzdal, Yaroslavl are historic towns in the European part of Russia.

\(^{274}\) A city in Georgia.

\(^{275}\) Monastic complex in Armenia.
The expansion in the scale of restoration works and the fact that they were often done by architects, inexperienced in restoration, called for the preparation of the unified guidelines regarding the content and forms of documentation for restoration projects and the registration of works, as well as guidelines for photographs, measurements, the rules of the processing and approval of the maintenance and restoration projects, together with the rules of upkeep and occupation of architectural monuments. Therefore, in 1949, the Central Administrative Board for the Protection of Architectural Monuments of the Architecture Committee of the USSR has published “The Instruction regarding the procedure of registration, maintenance, and restoration of architectural monuments,” which also contained the brief description of goals and aims of restoration.

At the same time, the big problem of postwar restoration works consisted in the fact that different restoration workshops almost never exchanged their professional experience. Certain achievements remained unpublished and did not become common property. Therefore, the old mistakes were repeated and the complex approach to restoration works was not always pursued.

However, the immense growth of restoration industry, which is peculiar to our period, contributes to the perfection of theory and practice of architectural restoration. The broad network of restoration workshops, which should be built, will become the scientific foundation for the restoration industry supported by the appropriate theoretic basis – but not only that. Here the materials accumulated as a result of the study and restoration of different buildings should be collected and systematized; they could help to improve constantly developing methods of architectural restoration.

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At the same time, the accumulation of materials related to the completed restoration projects and the exchange of experience between the workshops of different republics and cities and between the individual specialists should help architect-restorers to define the correct amount and character of restoration intervention, to develop the most economical way of production, and to find the best solutions for the contemporary use of monuments. Due to the large scale of maintenance and restoration activities restorers are obliged to spend the [allocated] financial resources in the most rational way, being sensitive to the needs of state; the funding should be spent on truly necessary projects that guarantee the preservation of ancient monuments. Architect-restorers should do their best to avoid the creation of fake imitations [“novodel”] presented as the reconstruction of the original image of architectural monuments. This is unacceptable from the scientific perspective; and this is an improper over-spending of state funds, building materials and skilled labor force. Earlier we have mentioned such imitations produced in the middle of the nineteenth century and have given our assessment of them. It should not be allowed to repeat hundred-years-old mistakes in our times and to ignore the experience and the achievements of the subsequent period.
The term restoration is derived from the Latin word restauratio, i.e. reconstruction. For example, the inscription on the architrave of Roman Pantheon reports the restoration of the building by emperors Septimius Severus and Marcus Aurelius, during which the eight-column portico with pediment was added to the rotunda of the main volume. In essence, this was the renovation of the building, which fundamentally changed its previous image; there are good reasons to think that it did not restore its original image.

At present, the goals of restoration – and therefore the character of restoration works – have been considerably narrowed and limited. The formation and development of the theoretical conceptions of restoration was a long process; it was initiated by the critical statements of
Igor Demchenko, MIT

scholars already in the 1840s, and currently has been finalized by the resolution of the 2nd International Congress of Architects and Technicians of Historic Monuments in Venice, participated by the Soviet delegation (1964, the so-called Venice Charter). In its text, the goal of restoration is defined as safeguarding the surviving monuments [§3], or – in a more expended way – as revealing their aesthetic and historic value [§9] together with their subsequent reinforcement.

Thus, the definition of the goal of restoration is currently substantially different from the one in “The Instruction regarding the procedure of registration, maintenance, and restoration of architectural monuments protected by state,” which was approved in 1949. In it, the goal of restoration – in the broadest sense of this word – is defined as the “preservation and maintenance of monuments, the return of their lost or altered image” [§73], or – in the narrow meaning of the term – as the “reconstruction or recreation of monuments to their original form, or to the state in which the monument existed at the certain scientifically optimal date.” [§83] However, this definition is within the scope of the Venice Charter principles, which, according to the Charter, can be freely interpreted by every country, since different nations have dissimilar cultures and traditions.

The 1964 Charter definition of the goals of restoration is different from the one of the Methods of Restoration of Architectural Monuments, the manual for architect-restorers. In it, the approach of the Venice Charter is mentioned among the main goals of architect-restorers, together with the second “most important” goal – the reconstruction of the lost image of architectural monuments. However, the manual published in 1961 already considerably narrows the definition of the 1949 Instruction; it points out that the reconstruction of buildings “not always aims at the restoration

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of their original image.” Thus, here we see the definite and considerable step forward in direction of the Venice Charter. Specifically, in the chapter “Goals and aims of restoration,” which was written by a well-known Soviet restorer A. I. Tselikov together with the Doctor of Architecture P. N. Maksimov, three cases, or three types of restoration are mentioned. The third of those types (although the authors accentuate in it the reconstruction aspect) in fact is particularly close to the approach of the Venice Charter, i.e. “the revealing of aesthetic and historic value of the monument.” It is worth noting that the successful example mentioned in this article – the restoration of Athenian Parthenon in the beginning of the nineteenth century – precisely complies with the requirements of the Venice Charter. It is a classical example of the so-called fragmentary restoration – in this case anastylosis – which completely rejects the reconstruction of the monument to its original or any other intermediate image.

Thus, we can maintain that already in the 1960s the Soviet school of restoration started to move in the direction of narrowing the main concept of restoration to the increased strictness of methodological principles. In its theoretical foundations the Soviet school of that period returned to the 1920s and 1930s. The restoration ideals of the 1920s and 1930s were described by academician I. E. Grabar’ in his famous words: “Sometimes, when a monument is damaged, it is necessary to take measures and reinforce it, to mend it, or so to speak to repair it. Such a repair is a sort of reconstruction of the monument of art, or restoration in the true sense of the word…”

“The main stimulus for restoration is in conservation, i.e. in the totality of measures, which leads to the improvement of the conditions of monuments…”

This shift is also emphasized in the Proceedings of the meeting of restorers and scholars devoted to the conservation of the stonework (1964). The meeting was organized by the Scientific-

Methodological Counsel for the Preservation of Cultural Monuments of the Ministry of Culture of the USSR. In it – together with the discussion of the techniques of complete restoration, which was ordinary of those years –

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a lot was said about the conservation of architectural monuments; it was recognized that the conservation approach has the equal right to exist. Moreover, it is well known that already from the beginning of the twentieth century, Russian restoration school was following and developing these progressive principles.

Based on this, it can be maintained that the resolution of the 2nd International Congress of Architects and Technicians of Historic Monuments in Venice of 1964 attended by Soviet delegation has reflected the advanced and progressive ideas and principles, including the ones of the Soviet restoration school. Thus, one could say that the following definition of the term restoration corresponds to the contemporary theoretical conceptions: restoration is the reinforcement of an architectural monument and the reconstruction of its historic and – to a certain extant – its artistic significance. In other words, the general goals of any restoration are now the following: revealing and asserting cultural-historic role and significance of buildings-monuments, as well as revealing of their artistic merits (including the ones of urban significance), together with simultaneous reinforcement of the structure, parts, and elements of monuments.


To achieve the complete clarity, it is necessary to define the following concepts: first, the *historic significance* of an architectural monument, second, the *artistic significance*, and finally the main concept, i.e. the *architectural monument*.

Already the theoretical studies of the early twentieth century have demonstrated with utmost clarity that relativity is inherent to the artistic value of architectural monuments because the value constantly changes with the transformation of artistic preferences and the tastes of an epoch. Although initially it was not easy to make this statement (and even now, many do not share this point of view), even the brief retrospective of the constantly changing assessments of different styles proves its absolute accuracy. Thus, for example, the assessment of Modern architecture style\(^{281}\) in the Soviet scholarship was very different fifty years ago. It is important for us that this statement was made and proved by Riegl, who was not just an outstanding theoretician of art but also a recognized specialist in its preservation.\(^ {282}\)

It is [now] becoming clear that the public value of architectural monuments is primarily and mostly defined by their historic value, i.e. by their value as the monuments of the history of material culture\(^ {283}\) (archaeological value), or by their value as the object of art history (architectural value) \(<1>\), or – in certain cases – by their memorial value, as well as by their relation to the general history of the country, the history of its everyday life, or historical ethnography. \(<2>\)

Even if we assume that the historic value is the foundation of the public significance of architectural monuments, we should not treat this value syncretically because for the goals of

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\(^{281}\) *Modern* [Модерн] is the pre-Revolutionary Russian style, which combined the elements of French Art Nouveau with German Jugendstil.

\(^{282}\) A. Riegl, *Der modern Denkmalkultus. Sein Wesen und seine Entstehung* (Wien, 1903). Despite this apparently high opinion of Riegl's aesthetic relativism, later in this chapter and in his other articles Mikhailovskii speaks of objective aesthetic value distinguishing it from the artistic value. This hesitant position is peculiar to the mindset of Soviet scholars simultaneously fascinated by foreign theories and forced to express the basic intuitions of the Soviet ideology.

\(^{283}\) *pamiatniki istorii material'noi kul'tury.*
Igor Demchenko, MIT

restoration it is important, which of the aspects of historic value will dominate the restoration project. The lack of clarity in this question usually results in grave restoration mistakes. It is relatively easy to explore and define the memorial value of architectural monuments; the architectural value is established by a fairly narrow circle of publications. However, the study of buildings as the monuments of the history of material culture requires detailed and profound on-site research, which can reveal material traces of the past; in many cases, this is supported by literary and archival sources. Thus, the most important thing is the discovery and continuous preservation of the revealed material traces.

As for the term “architectural monument,” its meaning has already took a definite shape; however, it is necessary to understand clearly that the architectural monument is a monument of architectural history – but not the monument of art recognized by the contemporaries. Moreover, it should be taken into account that not every ancient building can be a monument of architectural history; some buildings (especially ruined ones) can be quite important as the monuments of the history of material culture (i.e. in accordance with English monument or French monument historique). In the Lenin’s decree from the 6 October

<1> It should be remembered that the notion object of art, recognized as such by contemporary society, is not equivalent to the notion monument of art history; the latter could have no artistic value in the eyes of contemporary society – however, this only testifies to the certain stage of development of art in general.

<2> Unfortunately, in our practice, we do not distinguish these concepts: the historic monument is often understood as memorial. However, this distinction is useful and essential; this is supported by the practice in a number of countries: in English, monument and memorial; in French, monument historique (the monument of the history of material culture) and simply monument (memorial), etc. At the same time, architectural monuments are often understood not as the objects of architectural history; they are perceived as the work of art – and, as we have already mentioned, this qualification is hard, or even impossible, to prove.

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1918,\textsuperscript{284} architectural monuments were defined by the precise and comprehensive term \textit{monumental memorial}\textsuperscript{285}, which was alas later forgotten and replaced by the term \textit{architectural monument}\textsuperscript{286} \textsuperscript{287}.

When we talk about the restoration of “architectural monuments”, i.e. the restoration of buildings as monuments, we should have in mind that these are always the monuments of the history of material culture. Some of them have primarily archeological value, others primarily architectural-historic value, memorial value, or some other historic value.

The principles of scientific restoration of architectural monuments, formulated by the Venice Charter and in the theoretical writings of I. Grabar, are the result of almost a century of their practical approbation. They were tried and proved valuable in the dozens and hundreds of carefully conducted restoration projects.\textsuperscript{288} In the first half of the twentieth century, these principles coalesced into the original theory of scientific restoration, which apparently has a universal significance and could be applied to all possible restoration cases. \textsuperscript{<1>}

During the last decade, the notion of an “architectural monument” has extremely expanded: now it includes large urban complexes, as well as whole cities. Therefore, restorers have encountered new and unexpected problems, for example the restoration of ordinary urban fabric, which often does not include any outstanding monuments of the history of material culture or other types of significant historic monuments. At the same time, in many cases the goal of restorers was not “to reveal the aesthetic and historic value”\textsuperscript{289} of the buildings, but to reconstruct their previous (or original) image.

\textsuperscript{285} \textit{Monumental’nyi pamiatnik}, “монументальный памятник”.
\textsuperscript{286} \textit{Pamiatnik zodchestva}, “памятник зодчества.”
\textsuperscript{287} Ibid, p. 35.
\textsuperscript{288} \textit{La Conservation des Monuments d’Art et d’Histoire} (Paris, 1933).
\textsuperscript{289} The Venice Charter, Article 9.
To understand the resulting discontinuity, one should remember that during the prewar period, the restoration was perceived as homogeneous, uniform, integral process; the main principles of this process comprised the theory of scientific restoration.

When during the postwar period the impossibility of applying the theory of scientific restoration to all possible cases has been realized, attempts were made to replace it with a new theory. Among the new theories were R[oberto] Pane’s (Italy) “critical restoration,” C[esare] Brandi’s (Italy) “potential unity,” and N[icolae] Pruncu’s (Romania) “informative restoration.” However, all of them perceived restoration as a homogeneous process; some attempted to solve the emerging contradictions through the absolute “freedom of restoration” (R. Pane), others limited the liberal approach only by available data (N. Pruncu).

However, restoration is a discontinuous process, which consists of separate activities, different in their essence. Thus, already in the first quarter of the twentieth century, specialists recognized the existence – within the notion of restoration – of the following types of separate activities, which are essentially different from each other: conservation, revealing, reconstruction, and recreation. In certain cases, these activities are combined into a one process, within which they exist as separate specific forms: for example, conservation of some elements of buildings can be combined with revealing of their other parts, as well as with the reconstruction or recreation of yet another parts. In other cases, these activities can turn into separate isolated processes. For example, this happened during the conservation of the Golden Gates (11th cent.) in Kiev or the reconstruction of the church of the Saviour on Nereditsa in Novgorod. In these cases, space is left for applying other additional types of restoration.

290 Here and below prewar and postwar means pre- and post-World War II.
292 Tserkov’ [church] Spasa na Nereditsa, церковь Спаса на Нередице.
Contemporary theoretical conceptions of restoration are characterized by the idea of discontinuity of restoration process, which is split into different and – in many ways – equal types of restoration, as well as by the idea of separate restoration methods applicable within each of the restoration types. Altogether, this approach can be defined as a separate theory of discontinuous restoration, \(^{293}\) which most perfectly fulfills the demands and requirements of contemporary restoration practice. \(^{294}\)

The notion of the \textit{restoration method} began to take shape already in the first decades of the twentieth century; however, none of the scholarly publications of that period has it in the developed form. The famous scholar and historian of restoration in France P[aul] Leon applied the notion of \textit{empirical restoration method} to the maintenance activities at architectural monuments that predated classic French restorations of the mid-nineteenth century. \(^{295}\) The curator of monuments of the Athenian Acropolis N[icolaos] Balanos also defined his principles of restoration as a certain restoration method. \(^{296}\) In Soviet restoration practice of the last decades, the term \textit{restoration method}, together with the relevant notion, has become common. \(^{297}\)

\(<1>\) These principles became the foundations of the Italian Restorers’ Charter, which was approved by the state and presented as an official instruction. \(^{298}\)

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\(^{293}\) \textit{Teoriia diskretnoi restavratsii, теория дискретной реставрации.}
\(^{294}\) E. V. Mikhailovskii, “Osnovy sovremennogo podkhoda k restavratsii pamiatnikov kul’tury” [The foundations of contemporary approach to the restoration of cultural monuments], in \textit{Metodika i praktika sokhraneniia pamiatnikov kul’tury} [The Methods and Practice of the Preservation of Cultural Monuments] (Moscow, 1974), p. 47.
\(^{295}\) P. Leon, Chef des Services d'architecture au sous-secretaire d'Etat des beaux arts, \textit{La vie des monuments fransais} (Paris, 1951).
The restoration method is defined as a manner and a mode, in which restorer — using different restoration techniques (their combination depends on the characteristic features of a monument) — achieves certain goals. The specific goal of the restoration process and — more important — methodological foundations of the accepted reconstruction define the implemented method of restoration. However, the goals of restoration can be diverse — that was established already at the beginning of the twentieth century. 299

The abovementioned quote from the founder of the Soviet restoration school I. Grabar, together with his other statements (which are in agreement with the Venice Charter definition of the goals of restoration) could be interpreted as the description of a certain restoration method. This method could be called archeological (because the study of Italian archeological monuments triggered its development; it was also propagated and defended by archeological societies), or — even better — analytic. In fact, its main goal is not only to reinforce the monuments, but also to analyze them and to read them as the documents of ancient history and the history of material culture of the country. 300 Within this interpretation, the instructions of the Venice Charter, as well as the scientific principles of the prewar Soviet restoration school, do not contradict the everyday practice of the postwar period; they just define one of the actual and permissible (main!) methods of restoration.

The goals of restoration are defined by the restorer (it should be defined by official institutions responsible for the preservation of architectural monuments) 301 not in an abstract way; they should not be based on the personal desires and aspirations of the restorer. They should be — and

299 Riegl, Der modern Denkmalkultus.
301 The phrase in bold seems completely unrelated to the rest of the paragraph. An editor or a censor could have included it right before the publication.
in practice usually are – a response to public claims and demands related to specific architectural monuments. At the same time, the public value of architectural monuments varies. 302 Within the scope of this short manual, written for architect-restorers, we cannot discuss and analyze the whole range of these questions. In short, the essence of public value of architectural monuments can be reduced to the following four requirements: first, the authenticity of monuments (the documents of the history of material culture, in some cases other categories); second, reliability (the monuments of general culture, the monuments of architectural history, memorials); third, representativeness (particularly important memorials); and forth, rarely, when contemporary society recognizes an architectural monument not only as the monument of art history but as an object of art, the requirement of the artistic completeness could be applied to the restoration. The first three requirements exclude each other; therefore, at the beginning of restoration, it should be decided (and the decision should not be made by a single individual), which of them is the most important. The forth requirement is incompatible with the first and the second ones; however, it could be combined with the third one.

The choice between authenticity and reliability is of the greatest difficulty. It could be considered the main, or one of the main problems of restoration.

Architectural monuments in the course of their existence are often subjected to considerable transformations, which can be caused by a number of factors, including atmospheric, or other natural forces; natural disasters, or fires; the changes in maintenance, or altogether inadequate maintenance; alterations resulting from the changes of tastes or environment; repairs or

renovations. As a result, architectural monuments lose the characteristic features of their original epoch (in other words, of the *optimal* epoch). However, they undoubtedly maintain their authenticity because all the transformations comprise specific historic documents of the corresponding epochs. If a restores want to reconstruct a monument to its original image, they naturally have to sacrifice the elements of its authenticity, which are often very significant, and to replace them by forgeries. And vice versa, when restorers preserve the authenticity, they lose the opportunity to express the characteristic features of the specific epoch.

The authenticity is essential for the monuments of the history of material culture. In these monuments everything is important, everything is significant and historically valuable: not only architectural forms, but structures, building materials, the techniques of stonework and of laying the blocks, mortars, which keep together different parts of the building, etc. Thus, the famous Russian archeologist and historian I[van] E[gorovich] Zabelin [1820-1908] said about archeologically valuable objects that with them “nothing can be unimportant or less important, nothing can be unworthy or less worthy... Here every small detail or minor element is the thread of a certain knot; if such a detail remains undiscovered or neglected, it can complicate the study or research of the whole knot.”

Every building is the monument of the history of material culture. From this point of view, only conservation of monuments should be permitted; in exceptional cases, the fragmentary restoration could also be allowed if it aims at the preservation of a disappearing form, or at the “revealing of the aesthetic and historic value” which is required by the Venice Charter.

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304 The Venice Charter, Article 9.
However, it often becomes necessary to restore the monument, which is important for the history of architecture, has original or rare forms, or is otherwise significant; then the question of complete restoration is unavoidable. Authenticity gives way to reliability (if the restoration has scientific basis). In this case, the monument of the history of material culture gets largely destroyed: it is replaced by the monument of architectural history. After that, many – if not everyone – believe that the monument of the history of material culture could have been preserved, and the resulting reconstruction of the monument of architectural history should have remained in drawings or in a model.

However, when an architectural monument is characteristic of an important stage in the history of common national culture (especially when it was altered or destroyed quite recently!), it is a more complicated issue. In such cases, it is sometimes necessary to recreate the monument even as a copy (of course, a scientifically valid copy). It is important for society to retain in its memory the phase of cultural development emblematized by this building; a spectator should be able to learn about this phase of national life not just from books but also from the immediate experience. Thus, sometimes a monument of the history of material culture has to be sacrificed and replaced by the reconstruction of the **monument of cultural history**. Many postwar projects are typical examples of such complete restorations; within these restorations, it has become necessary to break with the ideas of the Venice Charter (Stare Miasto in Warsaw, the palace complexes in the suburbs of Leningrad, etc.).

Finally, in the third case, disfigured or destroyed monuments of the history of material culture, due to their location within the city, have a specific, and often very high, urban significance. In these cases, the public demands the recreation of destroyed monuments (especially, if the destruction has happened recently). Then, the lost urban dominant is reconstructed, or the
emphasis of urban landscape reappears; however, the monument of the history of material culture (and we should not forget that even the remains of the foundations belong to that type of the monuments) is replaced by the monument of architectural history. Under such circumstances, the Campanile of San Marco Square in Venice, which collapsed in 1902, was reconstructed. Later, the Golden Gates in Vladimir located on the main street of the city have also gone through the complete restoration; at the same time, the Golden Gates in Kiev, which already lack urban significance, were preserved as the valuable monument of the history of material culture. In the similar vein the buildings on Razin Street in Moscow went through the complete restoration; they have become the important emphasis in the urban landscape that surrounds the contemporary building of the hotel “Russia”.

Choosing between the preservation of a monument of the history of material culture and the reconstruction of a monument of architectural history, one should have in mind that for us the latter have the equal value, regardless of their style or the period of origin (with the exception of the monuments that have the key significance for history of architecture). In principle, the monument of the Empire style should not be preferred to the monument of sixteenth century Novgorod architecture, or Paestum temple to Amiens Cathedral (of course, here we are not talking about personal tastes).

The situation with the monuments of the history of material culture is very different. Regardless the level of preservation, the more ancient these monuments are, the more valuable they are. Thus, in case of the nineteenth century buildings, their public value as the monuments of

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305 Eventually they also went through the “complete restoration”, i.e. were built anew, in 1982.
306 At present, Varvarka Street.
307 Hotel “Russia” was demolished in 2006.
308 Imported from France, Empire or Ampir style occupied a significant place in the Russian architecture of the early nineteenth century.
architectural history is almost equal to their value as the monuments of the history of material culture; however, in case of the buildings predating the seventeenth century, their value as the monuments of the history of material culture prevails. As for the monuments of Antiquity, their value as the monuments of the history of material culture is so high that it overshadows everything else. That is why, at the beginning of the twentieth century, the long international discussion resulted in the decision to preserve the remains of the Parthenon in Athens as the monument of the history of material culture, despite the fact that restorers possessed almost all the data they needed for the complete restoration of this masterpiece. However, it was recognized that such a reconstruction would produce only partially authentic monument of architectural history. Due to the same reason, Acropolis Propylaea

(p. 14)

in Athens were only partly rebuilt (from the surviving authentic parts). The same reason underlies the preservation of Clifford’s Tower in the center of York as a ruin (England, 11-13 cent.).

Structures build from ephemeral materials, for example the buildings of “plastered” neoclassicism, could not be considered the monuments of the history of material culture. Therefore, the method of complete restoration is usually applied to wooden buildings – similarly to the monuments of architectural history.

Finally, if the destruction of a monument seems unavoidable, and it cannot be prevented by the available technologies, the construction of its copy could, in fact, save the famous but disappearing peculiar features of original architecture.

In many cases, memorial buildings are particularly important. If a memorial complex is in a good state of preservation, the requirement of authenticity applies to it. However, in most cases, its
memorial value is considerably reduced by different alterations and losses. Since memorial value dominates the public significance of the building, the main goal is to reveal and to restore it. In this case, reliability (or even plausibility) could be the only requirement. In this case, buildings lose their significance as the monument of architectural history; they are restored to the optimal date (which is defined according to the needs of memorial complex).<1>

In all abovementioned cases, the reliability is preferred to authenticity; thus, the synthetic method is applied instead of the analytical method. This happens because the main goal of restoration in these cases is to achieve complete integrity of the original image of the building, or to return the building to the optimal era of its existence.

The theoreticians of the analytical method of restoration – [Gustavo] Giovannoni, [Cornelius] Gurlitt, as well as Russian scholars P. Pokryshkin and I. Grabar’ – introduced the principle of the least possible alterations to the scientific method of architectural restoration. It is impossible to apply this method to complete restorations; thus, complete restorations obviously require another method.

The Venice Charter has formulated another fundamental principle of the analytical method; according to it, the restoration “must stop at the point where conjecture begins.”[9] Within the analytical method, this principle is the most important foundation because the reconstruction should be based on the precise data derived from the on-site study of the monument.

During the complete restoration, when the reconstruction of the building has to be accomplished at any cost, certain hypotheses concerning its lost or altered parts are unavoidable; it is also impossible to avoid the analogy in the recreation of lost parts. However, any analogue, in its very essence, is based on the conjecture.
The comparison between fragmentary and complete restoration shows that they are two fundamentally different methods. In the contemporary conditions, it is impossible to limit the restoration to any of them: we have to acknowledge their relative equality. However, the analytical method together with the conservational method remains the main approach, which is used for the most significant monuments of the history of material culture. At the same time, synthetic method is allowed as an exception, with all abovementioned reservations.

It remains to discuss briefly the conditions, which call for the reconstruction of monuments to their artistic perfection (should not be confused with the aesthetic expressiveness).

First, we come across the most complex and exiting question of the discipline of Kunstwissenschaft: can the lost object of art be restored? Of course, we are not talking about the copy. Even a very mediocre copy is often useful for art historians: it conveys, at least, a vague idea of the lost object. However, is it possible to restore the lost object of art to the completeness of its phenomenality? The answer of the leading art historians, critics and theoreticians is negative.

Already in the middle of the nineteenth century, some believed that it is impossible to reconstruct anything great or beautiful in architecture.\(^{309}\) This idea has become the basis for the rejection of complete restorations and for the development of the analytical method.

Already by the end of the third decade of the twentieth century, I. Grabar' has said, "It is absolutely clear that the true reconstruction of the objects of art, altered in the course of the centuries, is out of the question."\(^{310}\)

At present, even the advocates of the theory of complete restoration, which interprets restoration as a creative process, recognize that “it is impossible to reconstruct the object of art. The expression ‘the reconstruction of an art object’ is self-contradictory because the creative work of an artist is impossible to recreate...”\(^{311}\) Yet another example: “Even the most capable and skillful restorer, using the most contemporary techniques, cannot reconstruct the object of art...”\(^{312}\)

Let us analyze one simple and specific example from this point of view. Suppose that an architectural monument is the most precious object of art; it is damaged or altered to such an extent that it cannot be recognized. However, society wants a restorer to reconstruct the lost masterpiece. Suppose that the restorer has obtained the documentary materials that allow him to repeat the interpretation of the author’s idea (the drawings of the project are preserved, etc.). Moreover, suppose that the restorer himself has the subtle perception of art, and that he perfectly mastered the crafts of the certain age; he also taught these crafts to the workers, who will be restoring the object. Also all necessary materials and instruments are available. In this case, the restorer will give a new valuable artistic interpretation of the author’s idea, in which he will definitely do his best to approach original spirit and meaning. Still, in fact, the restorer will create his own object, which will be as unique as the first one. However, we should not forget that “the new montage cannot repeat the process of creation in all nuance and details.”\(^{313}\)

The conditions described above outline the idea regarding the only thinkable possibility for practical reconstruction of architectural monuments as objects of art. It is clear that even a very

\(^{310}\) Igor Grabar’, “Restavratsiia” [Restoration], p. 560.
\(^{313}\) Ibid.
experienced restorer should not be allowed to do this kind of restoration; the exception could be made only to the artist with developed and perfect taste, who is recognized by the public.

The cognitive comprehension of an object inevitably results in the confusion of chronological, aesthetic, and practical logics, i.e. it will not be satisfactory.

It should not be forgotten that new interpretation in architecture – unlike, for example, music – persists for many years; thus, it should be permitted with great caution. <1>

To a certain extent (or even to a significant extent), the restorer’s interpretation will reflect the tastes of the contemporary epoch; it will be a modern product.

Therefore, we come to an idea that an architectural monument could be restored as an object of art only in very rare, exceptional cases. But what are these cases?

The answer to this question is intimately connected to the recognition of the monument specifically as an object of art. If the monument is significant as the object of art history but society does not recognize it as such, if its style is alien to the spirit of the age, then this monument should not be restored as an object of art. In this case, a restorer, who always unintentionally reflects the tastes of the age in his artistic interpretation, will treat the object antagonistically; he will unavoidably disfigure the object and will not preserve it for the following generations.

However, if the public has already recognized an architectural monument as an object of art, then its restoration as such becomes meaningless.

A restorer would not be able to add anything good to this object of art. He will only disfigure or spoil it; he will replace the original with his own interpretation, which, however, can be of artistic significance (if the restorer is a talented artist). Thus, the significance of a monument as
an object of art will not disappear – although it will decrease. At the same time, in most cases its significance as a monument of art will be completely lost.

In such cases, restorers have to pursue a very demanding goal: they have to ensure the optimal conditions for exhibiting the recognized monument of art. For example, the restoration of the Parthenon on the Athenian Acropolis, which from the beginning of the eighteenth century was in a ruined condition, resulted in the second wave of its recognition as a masterpiece of the global architecture. The restorers of the Parthenon (the last of whom was N. Balanos) have limited their work to anastylosis, i.e. to the re-erection of the fallen parts and to the cleaning of the territory.

According to another important principle of the scientific method in restoration, restorers should always ensure the subsequent easy reversibility of their addition to the monument.

As mentioned above, at the beginning of the twentieth century, the possibility of the complete restoration of the building was suggested; however, it was rejected on the reasonable basis.

In other words, if an architectural monument, already recognized by the public as an object of art, requires the intervention of restorers, they should obviously limit themselves to conservation, or to the restoration based on the analytical method, i.e. to the fragmentary restoration with minimal additions and revealing. The only type or restoration, which is applicable here, is the one described by academician I. E. Grabar’ in his Lectures on Restoration.314

The restoration of architectural monuments as objects of art can be discussed only when they are not widely recognized as objects of art – however, a restorer himself recognizes them as such objects. He has all reasons to believe that, after of the restoration, the public will recognize the monument as an object of art. (However, he should take into account not only the objective

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qualities of the monument, but also the general opinion of the public regarding the architecture of
the relevant period.)

At the same time, it is, in fact, important to observe the following conditions: first, the restorer
should have an artistic taste and should be a recognized artist; second, the recognition of the
monument as an object of art, proposed by the restorer, should be supported by competent
specialists; third, it should be clear that the restoration will result in the [creation of the]
outstanding monument of art, which will enrich the artistic treasury of the nation.

The example of such a reconstruction is Viollet-le-Duc’s restoration of Notre Dame Cathedral in
Paris. This cathedral was partially destroyed during the Great French Revolution; it lost its
decorations and statues and was not recognized as an object of art. It was perceived as the “dark
and gloomy reflection of the barbarous Middle Ages.” The already famous artist Viollet-le-Duc
discerned an outstanding object of art in the cathedral. After the restoration, the public also
recognized it as the masterpiece of architecture. Many admire not only its general image, but also
the details, knowing that Viollet-le-Duc designed some of them based on documentary
evidences, whereas others, including the famous chimeras, were generated by the creative
imagination of the restorer.

Generally, the restoration of architectural monuments as objects of art destroys their significance
as monuments of the history of material culture. Therefore, the artistic (but not aesthetic)
perfection of the restored architectural monument can be required only in exceptional cases.
Sometimes, this requirement can stem from the specific location of the monument. The classic
example is the restoration of Maison du Roi in Brussels [restored] at the end of the nineteenth
century. This was a liberal interpretation, which was brilliant and possessed high artistic merits.
Equally liberal was the restoration of Nikol’skaia tower of Moscow Kremlin in the first half of
the nineteenth century. However, presently, liberal artistic interpretations of this kind are considered inappropriate.

When artistic perfection is a requirement, the analytical method cannot be applied to the restoration any more (possibly, except for the cases when artistic expressivity is inherent to the object before the beginning of restoration works). The synthetic method also cannot be used because complete restoration – strictly speaking – requires scientifically demonstrated reliability, but not artistic perfection. Obviously, these requirements are different, and usually it is impossible to combine them. <1>

Therefore, in this case a special method should be used – the method of interpretation. This method is based on the new artistic comprehension of the architectural image of a building (it should be as close to its previous interpretation as possible) and on the compilation of forms that belong to the architecture of the corresponding epoch or period. Although in this case, architects also rely on scientific research, their restorations could not be called scientific. However, in practice it is possible to encounter such restorations.

During the postwar period, the special attention and interest of the public to the history and culture of the nation in general and to its monuments in particular has become one of the factors that influenced the preference of different restoration methods. At the same time, during the last decade, tourism (and especially tourism enriched by intellectual goals) has reached an unprecedented scale.

In the process of conservation, scholars were usually satisfied with a less expressive image of a historic monument; even in fragmentary restorations they could ignore the aesthetic factor. On the contrary, visiting the monument the general public expects a certain level of aesthetic
expressiveness on top of the scientific value. “The appearance (but not the artistic image) of the monument should correspond to the contemporary aesthetic norms,” said R. Pane. The Italian Restorers’ Charter also insists on returning the aesthetic functions to the monument. Thus, all what we have said above can be interpreted as theoretical conceptions of yesterday and of today. As for the conceptions of the future, their main element is the requirement of aesthetic expressiveness of restored buildings.

Contemporary Kunstwissenschaft distinguish between the aesthetic experience, which produce sublime, noble, or pleasant feelings in an individual, i.e. a certain complex of emotions, and the artistic experience per se, which contains an accomplished image. It is impossible to recreate the artistic image of an architectural monument; at best, one can reinterpret the lost artistic image in a new way. However, it is always possible to increase the aesthetic expressiveness of restored architectural monuments – and it should be done. At the same time, it obviously should be done with great caution and artistic tact: the attempt of aestheticization should not result in the decrease of historic and scientific value of the object.

This is the basis for the conceptual development of a new method: the method or revalorization.

<1> This method should not be perceived as a completely separate restoration method.

Essentially, it is the same analytical method (or conservation) with an expanded range of possible operations, which are applied to return the aesthetic (but not necessarily artistic) function to the monument. At the same time, after this type of restoration, monuments become

315 The note of Evgenii Mikhailovskii.
actively engaged in the structure of the contemporary city and in the urban landscape.

Simultaneously, aesthetic expressiveness, returned to the object, attracts the spectators; it makes the monument interesting and significant not only to the scholars and few connoisseurs of art, but also to broad layers of the population. Even more important, such restorations are the evident demonstration of universal care [about the monuments]; they confirm better than any memorial plaques that the building is protected, and is valued by society.

Thus, the revalorization method is the analytical method of restoration, which allows three categories of aestheticization of the object.

The first (and the highest) category of aestheticization is accomplished through the proper organization of the territory adjacent to architectural monuments. Sometimes it can be achieved through the revealing of their historic and artistic peculiarities; this should be done in the form accessible to the perception of poorly prepared spectators. Examples of this category are the Golden Gates and the church of the Savior on Berestov in Kiev, Kirby Muxloe Castle or Clifford’s Tower in York, England. It is interesting to mention that in the restoration of Savior on Berestov church, P. Pokryshkin managed to achieve the considerable aesthetic effect without the reconstruction.

<1> Revalorization means the returning of the lost value, in this case, of the aesthetic expressiveness.

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of the original image of the monument: he simply revealed the monument but did it with great artistic tact. It should be emphasized that Pokryshkin has done it intentionally, because in his reports to the Archeological Commission he indicates that he is doing it “in the name of beauty.”

Within the second category of aestheticization, the aesthetic perfection is achieved both by the abovementioned method and through infilling the lacunas, i.e. by fragmentary restoration based

317 The church of Spas na Berestove, церковь Спас на Берестове.
on the analytical method, which relies on uncontestable on-site data. Thus, not only aesthetic qualities are returned to the monument, but also artistic qualities per se; the house of Anna Mons and the chambers of Troekurov in Moscow are examples of this approach.

The third category of aestheticization only allows the recreation of lost parts of the object together with the organization of the territory and with revealing and infilling of lacunas; these new parts reinforce and intensify the perception of the ancient artistic image of the building (restorational reconstruction). The vivid examples of this type of restoration are the church of the Nativity of Our Lady in Putinki, the Savior’s Cathedral of Andronikov monastery, and the Dormition church in Krutitsy. Of course, these additions should be based on uncontestable scientific data; at times, they can also be based on scientifically proved analogy. However, the additions should not exceed 10 to 20% of the preserved structures, which otherwise are restored according to the analytical method.

The categories are ranked according to the decrease of their value because the foundational principle of the analytical method, which is the basis of revalorization, is the requirement of the “least possible amount of restorers’ intervention.” Therefore, if restorers have managed to return the lost aesthetic function to the monument through minimal intervention, which essentially has not affected the monument at all, this is the most valuable aestheticization –the highest category should be assigned to it. With the increase of intervention, the category decreases.

Since the theory of discontinuous restoration takes the specific social functions of the object into account, it allows the application of two other methods of restoration: the method of interpretation and the synthetic method (complete restoration and reconstruction).

318 Palaty Troekurova (Troekurovykh), палаты Троекурова (Троекуровых), 16th and 17th cent.
319 The church of Rozhdestva Bogoroditsy v Putinkakh, церковь Рождества Богородицы в Путинках, Moscow.
320 Spasskii sobor Andronikova monastyria, Спасский собор Андроникова монастыря, Moscow.
321 ‘Uspenskaia tserkov’ [church] v Krutitsakh, Успенская церковь в Крутицах, Moscow.
It should be emphasized that the method of interpretation is used when the architectural monument is restored as an object of art (with all precautions, which were mentioned above). The method can be applied only in exceptional cases with the permission of central authorities in charge of the protection of monuments. These works can be entrusted only to architect-restorers of the highest category.

The synthetic method is used for the reconstruction of destroyed or considerably altered monuments; its goal is not to restore monuments as the objects of art – but to restore them as the objects of the general history of architecture. Essentially, this method results in full-scale models, for which only reliability – but not authenticity – is required. As well as the previous method, the synthetic method can be used only as a rare exception from the general practice of restoration, and it requires special permission.

To sum up, we should set aside the exceptional cases, when the restoration of buildings as objects of art could be permitted. The main basic goal of all other practical types of restoration works should be the careful preservation of all elements and individual features of restored buildings; the other goal is to insure the clear and easy reading of architectural monuments not only by the specialists, but also by ordinary visitors of organized exhibitions.
Certain patterns of ageing of Central Asian architectural monuments

Engineer A. A. Asanov (Tashgenplan\(^{322}\))


Analysis of stability of the dome, Samanid Mausoleum in Bukhara.\(^{323}\)

\(^{322}\) Tashkent Institute of Master Plan.

\(^{323}\) From A. A. Asanov, “Analiz prochnosti i usiochivosti konstruktsii mavzoleia Ismaila Samanida v gor. Bukhare” [The analysis of durability and stability of Ismail Samani Mausoleum in the city of Bukhara], Tashkent, 1962, Archive of Uzbekistan Ministry of Culture, Department of Heritage Preservation, B\(_{2693}^A\) 90, fig. 3.
In compliance with a general law of nature, architectural monuments – like everything created by human hands – fall apart with a course of time. Despite the fact that our country allocates and spends large amount of funding to guarantee the preservation of monuments of material culture, and despite all our experience in architectural restoration accumulated during half of a century, the actual conditions of many monuments force specialists to question the efficiency of the expenditures, techniques, and methods of stabilizing the main part of any monument, i.e. its basic structure.

This question is relevant because – with all the diversity of Central Asian monuments and the need to use {p. 45} individual approach in each and every case – the spectrum of available means is limited; usually they include repair, reinforcement, and replacement of damaged parts without taking into account the conditions of other elements of the building or the structure as a whole. At that, the appropriateness and durability of adopted solutions rely exclusively on experience and intuition of their authors and thus cannot be objectively evaluated.

Graph 1. Theoretical curve of general pattern of monuments destruction

\[ V = \text{the relative mass of a building, \%}, \]

\[ T = \text{time (Vn = 0.4 ÷ 0.5V; t_1 = 0.3 ÷ 0.1t_2; } \frac{dv}{dt} = V, \text{ the speed of destruction)}. \]
But how can we objectively estimate whether the undertaken measures were necessary and sufficient and whether the proposed methods of reconstruction and strengthening were expedient from technical and relative economic perspectives?

Obviously, if we want to answer this question, first of all we need to establish the general patterns in the process of damaging and destruction of monuments. On the other hand, we need to establish scientifically and technically valid criteria that would allow us to quantify those patterns, since at this moment even the main concepts, including ‘architectural monument,’ ‘restoration,’ ‘conservation,’ etc., have only descriptive definition, which result in misunderstanding and confusion.

This problem itself is not new and there is a special branch of building science dedicated to finding the solution: the science of durability. At that, durability is defined as a period, during which a structure deteriorates to the extent that it cannot be occupied, and its repair and reconstruction become economically inexpedient. In the case of architectural monuments this concept is hardly applicable since the reason for their existence in not purely pragmatic but they constitute a source of historic and aesthetic information. It is also impossible to define the economic expediency of their existence because their value cannot be expressed in monetary terms. On top of that, the goal of the science of durability is to guarantee the future preservation of contemporary building materials and structures, whereas if we want to establish the patterns of destruction of architectural monuments we need to study the properties of ancient materials and constructions as well as their behavior in the past; therefore, the methods and conclusions of this science cannot be simply transferred into the domain of restoration works.

We believe that one needs to begin the study of the process of destruction of architectural monuments from reviewing the process of their ageing. The term ageing was borrowed from
biology and has acquired wide currency in the technological domain; it denotes the natural
process of fading or the irreversible process of qualitative change that define the properties of
substance or artifact. From this definition it’s clear that the notion of ageing has mostly technical
meaning. However, due to the dual essence of architectural monuments their moral ageing
should also be taken into account.

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Physical ageing primarily depends on the construction solutions of a building as a whole and of
its separate parts, its construction materials, conditions of structural thrust, as well as the
significance, scale and general composition of the object, the technology of construction process,
etc. (It should be noted that the relatively little solidity of building materials and – at the same
time – comparative durability of structures are both peculiar to Central Asian monuments.)

An important condition that strongly influences the process of physical ageing is the
environment, in which monuments exist. On the scale of measurable historic time the
environment itself is quite stable; however, it is defined by a whole number of natural and
climatic factors, including varying temperature, the humidity of air and soil, the presence of salts
in soil and building materials, wind erosion, earthquakes, etc.; those factors can have different
influence depending on the region and time, and can work in different combinations and order.

Hence, the accumulation of irreversible transformations or the process of ageing and destruction
of monuments can take difference courses. Therefore, the general pattern of ageing can be
determined by revealing the patterns, in which different combinations of those factors influence
the buildings or constructions. It is entirely possible to determine these patterns with a certain
level of precision but that can require a lot of labor.
One of the factors that influence the preservation and ageing of monuments is human activity, starting from the amount of care that people invest in the maintenance of monuments and ending up with the consequences of historic cataclysms. There are certain patterns here as well, but it’s much harder to quantify them.

The main value of every monument of material culture is defined neither by its absolute size nor monetary cost; it depends on the amount of information that it contains. Naturally, with the decrease of the physical size of the monument, the amount of information is also decreasing; and this is the essence of moral ageing. In particular, alterations, rebuilding, arbitrary repairs, and unjustified restorations contribute to monuments ageing and the loss of value; besides decreasing the amount of information, those changes also complicate the perception of preserved parts.

Thus, even a cursory examination of the question demonstrates that it has a complex multileveled structure and in practice constitutes a problem – that of the ageing of monuments, which requires a deep and through study.

Graph 2. Possible ways of prolonging the life of monuments. Unbroken curve is the main, original pattern; the dotted line is the new pattern. Thin tangent lines are the speeds of ageing in
the moments $t$; thin dotted lines are the general average speeds of ageing. $\Delta t$ is the increase of the monument’s longevity in the condition $V_2$.

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In our preliminary study of this problem, we explored some of its aspects. In particular, we tried to establish – at the first approximation – the general (total) pattern of monuments destruction in time, and to reveal the structural features of Central Asian monuments that relate to this pattern. We established erosion [unos] as a basic variable in our analysis and, based on the actual condition of several monuments, we assigned different laws of erosion to certain standing parts of buildings; thus, we managed to obtain a series of theoretical curves that express possible patterns of ageing of buildings. It turned out that despite the differences in the general composition and the scale of buildings, dissimilar laws of erosion, etc., the curves of general pattern have definite and relatively characteristic shape (graph 1). Thus, in the beginning (1) the process of destruction speeds up, and then (2) slows down. At the same time the transitional segment (3) features a clearly expressed fracture that has a very specific physical meaning: it is the moment when the general stability is lost and the monument turns from the building into the ruins.

The calculations of destruction levels for separate monuments during different periods of their existence (Bibi-khanym mosque in Samarkand, Toprak-kala [fortress] in Khorezm, and several minarets) confirmed the deduced general pattern of ageing; those calculations also allowed us to define the timescale and the speed of destruction (the speed is defined by the angle of tangent to the curve in the point corresponding to the moment in history of the monument). Strictly
speaking, this speed is different for different types of monuments; for the monuments of Central Asian architecture it can be as high as 5% per century.

Reviewing the curve, or rather its first segment (1), we discovered at least four methods of reducing the general speed of destruction and, consequently, the ways of prolonging the monument’s life:

a – in general the lower speed of destruction corresponds to the decrease in the inclination of the curve – in practice it is impossible to achieve this, because we don’t have access to previous periods in the history of the building, while for subsequent sections this would mean the replacement of the real monument by a different one, which would have different qualities and relation to the environment (graph 2, a);

b – if in the moment $t_1$ we begin to protect the monument, this would not change the patterns of destruction; instead this will – sort of – slow the effect of the pattern for the period $\Delta t$ – on the graph this is equivalent to the shift of the next segment of the curve to the right (graph 2, b);

c – partial or complete reconstruction up to the point $V_3$ - on the graph this is depicted by the upwards shift of the curve; it also results in the time increase $\Delta t$ (graph 2, c), however the amount of increase is different;

d – reconstruction of the original qualities of the monument and the conditions of its existence to the moment $t_1$; graphically this corresponds to the transposition of the beginning of the curve from point A to point B (graph 2, c), resulting in increase of monument’s life and – on top of that – guaranteeing the lowest speed of destruction in the condition $V_2$.

Obviously, other ways and combinations of above-mentioned methods are also possible; however, the fact that in each of those cases the temporal gain $\Delta t$ is connected to the condition $v,$
while the latter can be expressed in certain numerical, technical and economic parameters, demonstrates the possibility of conscious control over the process of ageing. The analysis of the structures of ancient buildings from the perspective of the processes of ageing allowed us to reveal certain previously unknown peculiarities. Thus, Central Asian monuments, as monumental and massive as they obviously are, strictly adhere to the following pattern of material distribution: more material at the bottom and the minimum at the top. At that, the perceived wastefulness and the excessive margin of safety are in fact thoroughly justifiable due to the changes in the properties of materials and the conditions under which they work, as well as the calculation scheme of different structures and junctions.

Ancient masters had a good knowledge of thrust forces in structures and strictly adhered to certain margins of safety. Thus, in brickwork the thrust did not exceed 3-5 kgf/cm².

We discovered a very important and generally known fact, which however is not taken into account in the study and restoration of Central Asian monuments: besides its low strength, the high level of deformation in ancient brickwork is mainly explained by its elastic and plastic qualities that become apparent in the course of time.

Thus, from all above-mentioned we can make the following theoretic and practical conclusions: in theory, even currently damaged monuments can still exist for a substantial amount of time; moreover, it is even possible to ascertain the potential longevity of a monument;

it is possible to consciously regulate the speed of destruction and the process of monuments’ ageing using available technical and economic means as well as some other criteria;

since the patterns of monuments’ destruction directly depend on time, this factor should never be ignored in the study and – even more so – the restoration of ancient buildings. In
particular, the analysis of ancient structures and materials should not be shaped as a frontal attack, which doesn't take into account their previous and possible future conditions; in the study and exploration of architectural monuments, it is absolutely inadmissible to rely on current standard norms, not simply because their parameters do not correspond to those of ancient buildings, but because the formal methods imbedded in current norms often ignore conditions and factors inessential for contemporary structures, while their neglect in the analysis of ancient buildings could result in grave faults and mistakes.

Finally, it should be mentioned once again that these are only preliminary conclusions, which, in general, emphasize the importance of the question formulated in this article and point at the potential benefits of this new approach for the study of Central Asian architectural monuments.
Mitkhat Sagatdinovich Bulatov

Proportional Systems in the Architecture of Central Asia


(p. 226)

Summarizing the materials for the analysis of commensurate values observed in architectural monuments that we have selected [for our study], it could be ascertained that – similar to the heptachord musical scale that underlies the infinite variety of musical forms characteristic of immortal classical oeuvres of musical art – numerous logical combinations of derivative
geometrical figures had become a foundation of geometric harmonization of tectonic structures in architectural and spatial forms of medieval Middle East. [Our] studies in complex ... allow us to argue that geometrical figures, which became the basis of harmonization in the creative work of the architects, are elementary and they include:

1) a square and its derivatives;
2) an equilateral triangle and its derivatives;
3) semisquare and its derivatives;
4) extreme and mean ratio and its derivatives.

Let us review each of these statements.

**Approaches to constructing architectural forms based on the square and its derivatives**

According to Muhammad al-Khwarizmi (8th – 9th cent.) a square [kvadrat] is a measurement union of area [ploshchad']. “It should be known that the expression ‘one [unit] by one [unit]’ means the measurement; it means cubit by cubit.”\(^{324}\) The side of a square is its root, *jidhr* [جذر]. The diagonal of a square multiplied by half a diagonal equals its area. al-Khwarizmi’s book on calculation of algebra and muqabala\(^{325}\) begins from these definitions.

The square as a unit of area was very important in the building industry [stroitel'noe proizvodstvo], [e.g.] square tile bricks

\{p. 227\}

used in building, square spaces covered with domes, etc. Square, its side, diagonal, and their derivatives were used in design of architectural forms and for establishing the proportions of the

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\(^{325}\) In English academic tradition known as *The Compendious Book on Calculation by Completion and Balancing*. 276
buildings. It should be noted that an octagon inscribed in the square must in be included in the list of the derivatives of the square.

In the design of architectural forms, the need to commensurate parts [of the building] and the building as a whole, the correspondence and the similarity of geometric shapes were all taken into account. Let us provide some examples of the approaches to the design of architectural forms based on the derivatives of a square. For instance if there is a need to cover a square space with a dome, an octagonal space should be constructed over the square. The angles of the octagonal space were defined by half-diagonals drawn from the angles of a square. Thus, a side of the octagon equaled

\[ \sqrt{2} - 1 = 0.414. \]

The height of the interior square space was defined by the half-diagonal of the square. At that, the wall of the square space was a rectangle with a following ratio of sides (fig. 129a):

\[ 1 + \frac{\sqrt{2}}{2}, \text{ or } 1 + 0.707. \]

{Figure from p. 228:}
Fig. 129 (a, b, c, d, e, f, g, h). Analytical drawings based on the square and its derivatives
Igor Demchenko, MIT

The sum of the height of the square space and [the height of] the octagonal space was defined by the side of the square, while the height of the octagon equaled the deference between the side and the half-diagonal of the square (fig. 129a):

\[ 1 - \frac{\sqrt{2}}{2} = 0.293 \]

(... proportions of Samanid and Tekesh\textsuperscript{326} mausoleums)

In other cases the height of the square space was defined by the side of the square. Then, it produced the complete cube, and the total height of the square space, and the octagonal space was defined by the diagonal of the square (\(\sqrt{2}\)). At that (fig. 129b), the height of the octagonal space equaled its side (...).

It is not hard to guess that in both cases the rectangles of the walls of the square space and the walls of the octagonal space were similar with a ratio of sides \(1 + \frac{\sqrt{2}}{2}\) in the first case and \(1 + 1\) in the second case.

The height of the square space is commensurate with [its] side minus the difference between the diagonal and the side of the square, i.e.

\[ 1 - (\sqrt{2} - 1) = 2 - \sqrt{2} = 0.586. \textsuperscript{327} \]

The ratio of the sides of the rectangle is

\[ 1 ÷ 2 - \sqrt{2}, \]

or

\[ 1 ÷ 0.586. \]

\textsuperscript{326} 13\textsuperscript{th} century, Konye-Urgench, Turkmenistan.

\textsuperscript{327} It becomes hard to follow Bulatov here. I assume that “the height of the square space is commensurate with [its] side,” however in Bulatov’s text it is unclear which side he is talking about. It seems to be just one of the possible geometric designs that he generates through applying the compasses to the square. At the first glance, the text might produce the impression of a mathematical treatise but in fact it is just a description of Bulatov’s essays in squeezing the highly schematized plans of architectural monuments into different geometrical shapes generated by the ruler and the compasses.
The height of the octagonal space is commensurate with the half of the side of the square, while the sum of the heights of the square and octagonal square is (129c):

\[
2 - \sqrt{2} + \frac{1}{2} = \frac{5-2\sqrt{2}}{2} = 1.086
\]

(… proportions of Arab-Ata Mausoleum\textsuperscript{328}).

The height of the square space is commensurate with the doubled difference between the side and the half-diagonal of the square: \(2-\sqrt{2}\).

The height of the octagonal space is commensurate with a difference between the side and the half-diagonal of the square: \(\frac{2-\sqrt{2}}{2}\).

The sum of the height of the square and octagonal spaces is commensurate (fig. 129d) with \(\frac{3(2 - \sqrt{2})}{2}\).

\{p. 229\}

The height of the square space is commensurate with the difference between the side and the half-diagonal of the square \(1-\frac{\sqrt{2}}{2}\), while the height of the octagonal space [is commensurate with] the height of the side of the square (fig. 129e). The sum of their heights is \(\frac{3-\sqrt{2}}{2}\) (… proportions of Babaji-Khatyn Mausoleum\textsuperscript{329}).

The height of the square space equals \(\frac{\sqrt{2}}{2}\) while the height of the octagonal space is commensurate with the half of the side of the square (fig. 129f). The sum of the height of square and octagonal spaces [equals] \(\frac{1+\sqrt{2}}{2}\).

Besides [architectural] forms, structural elements were also defined by geometry. Thus, the thickness of the walls of the square compounds was often determined by the difference between

\textsuperscript{328} In the village of Tim, Uzbekistan.
\textsuperscript{329} Same as Aish-Bibi Masuleum, 11\textsuperscript{th} century (?), near Taraz, southern Kazakhstan.
the side and the half-diagonal of the square (fig. 129g). At the same time the exterior size of the square space equaled \(3 - \sqrt{2} = 1.586\) (… proportions of Babaja-Khatyn, Tekesh, and Sultan Sanjar\(^{330}\) mausoleums…).

If the exterior perimeter the “half-cube” with a square plan equaled \(3 - \sqrt{2}\), its height is commensurate with \(2 - \sqrt{2}\). Those values and their ratios are extracted from the octagonal inscribed in the original square, while the side of the “half-cube” at its foundations is bigger than the side of internal square by \(2 - \sqrt{2}\) (… proportions of Tekesh Mausoleum).

The thickness of the dome at the foundation or the drum is defined as half of the difference between the diagonal and the side of the square (fig. 129g): \(\frac{\sqrt{2} - 1}{2} = 0.207\) (… proportions of Tekesh and Gur-i Amir mausoleums).

The rectangle with a ratio of wall equaling \(1 + 2\sqrt{2} - 1 = 1 + 1.828\) (fig. 129h) is common in the design of both large architectural forms and the ornament ([proportions of the] plan of Chashma-Ayub Mausoleum\(^{331}\) and the ornament of Tuman-aka [Mausoleum]\(^{332}\)).

In the explications presented above, the values \(\frac{1 + \sqrt{2}}{2}, \frac{2 + \sqrt{2}}{2}, \frac{3 - \sqrt{2}}{2}, \frac{4 - \sqrt{2}}{2}, \text{ and } \frac{5 - \sqrt{2}}{2}\) are characteristic of the architects’ ability to combine prime numbers with irrational values.

In the design of architectural forms, Central Asian architects were not limited to the side and the diagonal of the square; they also continuously divided them in half that resulted in the progression with denominators \(\sqrt{2}\) (increasing) and \(\frac{\sqrt{2}}{2}\) (decreasing): \(\sqrt{2}, 1, \frac{1}{\sqrt{2}}, \frac{1}{2}, 2\sqrt{2}, 4, 4\sqrt{2}\).

Since the value of \(\sqrt{2}\) was approximated to \(\frac{7}{5}\), the increasing row took the following shape: 5, 7, 10, 15, 20, 28, 40, 56.

\(^{330}\) 12th century (?), Merv, Turkmenistan.

\(^{331}\) 13th century, Bukhara.

\(^{332}\) Beginning of the 15th century, part of Shakh-i Zinda complex, Samarkand.
Design of architectural forms based on the combination of the square and the equilateral triangle

The rectangle with the ratio of sides $\sqrt{2} + \sqrt{3}$ is present in the proportions of the plan of Ishrat-khana\(^{333}\) (fig. 111 and 130a). The approach to defining the ratio of the niches of the square compound by constructing equilateral triangles with the apex [located] in the center of a square had also become widespread (130b). Examples: the small mosque of Bibi-khanym [complex], {p. 230}

Ishrat-khana Mausoleum, Ak-Sarai in Samarkand, Baryk-khana madrasah,\(^{334}\) etc.

\{Figure from p. 205:\}

Fig. 111. Ishrat-khana Mausoleum. Plan. Proportional analysis.

\(^{333}\) Mausoleum in Samarkand.

\(^{334}\) Medrese Baryk-khana; possibly Barak-Khan Madrasah in Tashkent.
Fig. 130 (a and b). Analytical drawings based on the combination of the derivative of a square and an equilateral triangle.

**Design of architectural forms based on the equilateral triangle and its derivatives**

Triangular spatial structures, i.e. polygonal pyramids and cones, are highly stable. They were broadly used in medieval architectural practice; yet, no spaces triangular in plan were ever constructed. Nevertheless Central Asian architects were attracted by equilateral triangles and their derivatives, which were used to establish the proportions of structures in all three dimensions.

The question arises: what is in common between the rectangular plans of buildings, rectangular enclosing structures, polyhedral prisms, and cylindrical drums – all represented in the architecture of Central Asian, and the equilateral triangle with its derivatives? And why were [the latter] used?

It is possible to answer this question by investigating at least two examples.

The rectangular space of Khoja Ahmad Yassawi complex in the town of Turkestan (end of the 14th century) is covered by the hexahedron cloister vault supported by six intersecting bridge arches that constitute a fragment of a six-pointed star in a horizontal projection. The bridge
Arches are connecting walls at the angle of 30 and 60°. Due to this solution, the biggest space between walls covered by the domed roof is limited to a half, while the architecture of the interior features the original structural interpretation of a plafond (fig. 59, room 11; fig. 131a).

{Figure from p. 139:}
Fig. 59. Khoja Ahmad Yassawi Mausoleum in the town of Turkestan (end of the 14th century). Plan. Proportional analysis.
Rectangular and somewhat elongated space of Imam-zade Mausoleum in Kirovabad (Azerbaijan SSR) is roofed by the dome [supported by] a high drum that has a round basis. 

This structure had become possible because five squinches in the corners of the room are connecting walls at the angle of 30° and 60° rather than 45°, which is common in the square spaces (fig. 60 and 131b).

335 Currently Ganja, Azerbaijan.
Fig. 60. Imam-zade Mausoleum in Azerbaijan (14-15 cent.). Plan and section. Proportional analysis.

{Figure from p. 231:}

Fig. 131 (a and b). Analytical drawings based on the equilateral triangle.

In both cases the correct solution of the problem, which consists in building a dome over an elongated rectangular space, had become possible because the ratio between the sides of the rectangle [equaling] $2\sqrt{3}$ is [at the same time] the parameters of the equilateral triangle, i.e. its base and altitude. If we double the height of a rectangle drawn on the parameters of the equilateral triangle the result will be a new [rectangle] with the ratio of sides $1\sqrt{3}$.

The development of the system based on the parameters of an equilateral triangle leads to the proportions expressed by the series of triangles inscribed at the angle of $60^\circ$. The sides and the altitudes of these triangles decrease and produce a geometric sequence of $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots, \frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{4}, \frac{\sqrt{3}}{8}, \ldots$, which was traced in the analysis of Törebeg-Khanym Mausoleum.\(^{336}\)

However, in the design of architectural forms this system was not further developed, while in the ornamental art of Central Asia it had become exceptionally common.

\(^{336}\) 14\(^{th}\) century mausoleum in Konye-Urgench, Turkmenistan.
Approaches to constructing architectural forms based on the derivatives of the semisquare

As we mentioned above, architects, who used skilful geometric methods in the design of architectural forms, were obviously not limited to the derivatives of the square and the equilateral triangle; they also used the value of \( \sqrt{5} \), i.e. the diagonals of two squares or the diagonals of a semisquare \( \frac{\sqrt{5}}{2} \). This claim is based on a whole range of data that we discovered in available medieval textual sources.

In al-Buzjani’s book on those geometric constructions which are necessary for a craftsman we find a drawing of a square with four mutually intersecting diagonals of the semisquares (fig. 132a). The small square formed in the core is five times smaller in area than the original one. If we take the side of the original square for a [single] unit, than the side of the small square will constitute \( \frac{1}{\sqrt{5}} \). And vice versa if we take the side of the small square for a [single] unit, than the side of the small square equals \( \sqrt{5} = 2.236 \).

{Figure from p. 232:}
Fig. 131 (a, b, c, d, e, f, and g). Analytical drawings based on the semisquare and its derivatives.
The treatise On Interlocks of Similar or Corresponding Figures includes a drawing (page 185a) of a right triangle with a leg equaling two and a hypotenuse equaling three. In this triangle the other leg will equal $\sqrt{5}$ (fig. 132b).

Another case: a semicircle is drawn on the diameter equaling three [units] (page 185b). One end point of the diameter is taken as a center; the compass leg is set in this point, the compasses draws a radius of two [units]. By connecting the latter point with the ends of the diameter, the right triangle is produced with the following ratio of sides: $2 + \sqrt{5} + 3$.

The third case: the rectangle on page 189a with the ratio of sides [equaling] $2 + \sqrt{5}$.

The fourth case: on the page 188b we find a composition that includes squares with sides [equaling] $2 + \sqrt{5}$ and $4 + \sqrt{5}$.

On pp. 180a, 186b, 193a we find the division of a circle into ten parts by the method of auxiliary triangle with a ratio of sides [equaling] $1 + 2 + \sqrt{5}$. The side of a decagon inscribed in the circle equals $\sqrt{5} - 1$, while the radius of the circle equals two [units].

Architects used the schemes presented in the treatises, which included the value of $\sqrt{5}$, i.e. the triangles with a ratio of sides $2 + \sqrt{5} + 3$ and $1 + 2 + \sqrt{5}$ as well as their derivatives. Thus, for instance, the portals of the mausoleums Arab-Ata (10th c.), Fakhr al-Din Razi (12 c.), and Ishrat-khana (15th c.) constitute slightly elongated rectangles. If we take the width of the portal for two [units], the diagonal of the rectangle equals three [units], then the height of the portals will be defined as $\sqrt{5}$.
The height of the square compound of Gur-i Amir Mausoleum as well as [the height] of the small mosque of Bibi-khanym [complex] is slightly bigger than the side of the square under the dome. If we take the side of the square for two [units], while the diagonal of the rectangular wall of the square space equals three [units], then the height of the compound would equal \( \sqrt{5} \), which is supported by the evidence in the measurements. The same skilful geometric methods are used in the proportions of Mazlumkhan Sulu,\(^{343}\) Shirin-beg-aka\(^{344}\) and Tuman-aka mausoleums, Bibi-khanym mosque, Ulugh-beg madrasah in Bukhara, Mir-i Arab madrasah\(^{345}\) and in other monument, yet in different interpretation.

It should be noted that \( 1, \frac{1}{\sqrt{5}} = 0.447 \) and their difference \( \left(\frac{\sqrt{5} - 1}{\sqrt{5}} = 0.553\right) \) were used for establishing proportions of the symmetrical compositions. At that, the need emerges to divide in half the segments [equaling] one [unit], as well as 0.447 and 0.553 [units].

Let us review several characteristic cases.

In the square we draw two mutually intersecting diagonals of semisquares. The segment located on the axes of the composition is defined by the value of \( \frac{1}{\sqrt{5}} \), which equals the side of the small square; two symmetrical segments are located at the ends of the axial segment, they equal half of the side of the square. The result is the articulation (fig. 132c) with a ratio of 0.500+0.447+0.500 with a total length of the line [equaling] \( \frac{\sqrt{5}+1}{\sqrt{5}} = 1.447 \) (... proportions of Shirin-beg-aka Mausoleum).

\(^{343}\) First half of the 14th century, Khorezm region, Uzbekistan.
\(^{344}\) 15th century (?), part of Shakh-i Zinda complex, Samarkand.
\(^{345}\) 16th century, Bukhara.
The width of the niches in the walls of the square compound of Gur-i Amir Mausoleum is commensuration with $\frac{1}{\sqrt{5}}$ if we take the side of the square under the dome for one [unit]. The practical method of defining the width of the niches was simple (fig. 132 d and e). This scheme results in the location of $\frac{1}{\sqrt{5}}$ on the axis of the composition and $1 - \frac{1}{\sqrt{5}}$ divided in half at its ends.

At that, the ratio of the segments is as follows:

$$\frac{\sqrt{5} - 1}{2\sqrt{5}} \div \frac{1}{\sqrt{5}} \div \frac{\sqrt{5} - 1}{2\sqrt{5}},$$

or

$$0.2765 + 0.447 + 0.2765.$$  

[Here is] another case of proportions, which was spread more widely:

$$\frac{1}{2\sqrt{5}} \div \frac{\sqrt{5} - 1}{2\sqrt{5}} \div \frac{1}{2\sqrt{5}},$$

or

$$0.2235 + 0.553 + 0.2235.$$  

Its graphic representation is simple; see fig. 132f.

The other variant is simpler. The segment is divided to the ratio of $0.447 + 0.553$, which was used to draw a rectangle with two sides of a ratio $1 + 0.553$ (fig. 132g).

[Proportional] relations based on the $\sqrt{5}$ and its numerous interpretations were used in the design of architectural forms starting from the 11th and until the 17th century. We discovered them in the proportions Chugundor-baba mausoleum (11th c.), in the ornamentation of the palace of the rulers of Termez, in Mazlumkhan-Sulu, Buian-Kuli-khan, and Shirin-beg-aka mausoleums, in Bibi-khanym and Kalan mosques, in Ulugh-beg madrasahs of Bukhara and Gi’jduvon. in

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346 in Turkmenistan; currently demolished.
347 in Bukhara, constructed in 1358.
348 Beginnings of the 16th century, Bukhara.
the grave of Shirvanshahs in Baku,\textsuperscript{350} in Mir-i Arab madrasah, in Nadir Divan-begi khanaqa,\textsuperscript{351} etc.

The above-mentioned systems of proportioning based on the mean proportional diagonal of the square ($\sqrt{2}$), the altitude of the equilateral triangle ($\sqrt{3}$), and the diagonals of two squares ($\sqrt{5}$) were related to the practical methods of constructing architectural forms and were theoretically conceived. This is confirmed by al-Farabi, al-Buzjani, Ibn Sina, and al-Baghdadi who interpret the [square] root as the mean proportional between the one and [other] numbers.

**Approaches based on the dividing the line in extreme and mean ratio**

After we established that in the design of architectural forms the architects of the medieval Orient, besides the derivatives of the square and the equilateral triangle, could have used two squares including [the squares] with a measurement of $\sqrt{5}$, we are facing the question of whether the use of extreme and mean ratio can be attributed to them as well.

Our interest in the extreme and mean ratio did not result from the fact that Leonardo da Vinci (1451-1519) called it the “golden ratio” or from the fact that during the last century the “golden ratio” attracts the attention of art historians and the theoreticians of architecture; rather we are interested in this ratio because it is necessary to evaluate objectively all the systems of geometric design conceived in the lands of the Near and Middle East since the times of al-Farabi as the basis of architecture.

\textsuperscript{349} Ulugh-beg Madrasah in the Uzbekistan was built in the first half of the 15\textsuperscript{th} century.

\textsuperscript{350} Azerbaijan.

\textsuperscript{351} Built in 1619-20, this khanaqa is located in Bukhara.
In the definitions of the *Elements* Euclid mentioned “that the line is divided in extreme and mean ratio if the whole is related to the larger segment in the same way as the larger segment to the smaller [segment]”\(^{352}\) (fig. 133a), i.e. \(\frac{a}{b} = \frac{b-a}{a}\).


Fig. 133 (a, b, c, d, and e). Analytical drawings based on extreme and mean ratio.
Owing to the Arabic translations of Euclid’s *Elements* and to numerous (more than thirty) commentaries [produced] in the Near and Middle East people who practiced geometry knew the extreme and mean ratio; besides this ratio was reflected in a number of geometric schemes provided in the treatises, which were specifically written for architects and craftsmen.

Al-Buzjani in the book on those geometric constructions which are necessary for a craftsman as well as [the author of] “On Interlocks of Similar or Corresponding Figures” use the extreme and mean ratio of a radius to construct the pentagon and the decagon.

Ibn Sina in the mathematical chapter of *Donish-nama* pays special attention to dividing line in extreme and mean ratio.

[Ghiyath al-Din Jamshid] al-Kashi (14th – 15th cent.) in his treatise *The Key to Arithmetic* refers to Euclid and deduces a rule for calculating the parts of a number divided in extreme and mean ratio: “We would like to divide a number in extreme and mean ratio, so that it would relate to the bigger part in the same way that the bigger parts relates to the small part and it is required that the smaller part relates to the bigger part in the same way as the bigger part relates to the whole. Here is the method: multiply the number by itself, add the product to the quarter of the product, take the root of the sum, and deduct half of the number from the product,” i.e. the bigger part [equals]:

\[ b = \sqrt{a^2 + \frac{a^2}{4}} - \frac{a}{2}. \]

Al-Kashi continues: “If the bigger part is known, while the smaller part and the sum of the bigger and smaller parts are unknown, apply the same method and the result will be the smaller part,” i.e.

\[ c = a - b = \sqrt{b^2 + \frac{b^2}{4}} - \frac{b}{2}. \]
"If only the smaller part is known, apply the very same method and add to the result the known smaller part. The result is the bigger part," i.e.

\[ b = \sqrt{c^2 + \frac{c^2}{4} - \frac{c}{2} + c}. \]

"Another approach: Multiply any number by 0.61803399 and subtract the product from this number. The product and the remainder are the parts of this number divided in extreme and mean ratio. If the bigger part is known, divide it in 0.61803399. The quotient is the number; if we multiply the bigger part by the same number, the product is the smaller part. If the smaller part is known, divide it in the difference of those numbers and the one, i.e. 0.38196601; the quotient is the bigger part. It should be known that if one of the three values is rational, the other two are irrational."\(^{353}\)

Based on all said above it is possible to assume that educated architects could not remain ignorant about the distinctive feature of proportions related to the extreme and mean ratio.

Moreover, they could have been acquainted both with the geometric method of calculating the size of the sections [divided according to extreme and mean ratio] and with the methods of calculating the length of the parts in the contemporary units of measurement.

Extreme and mean ratio, covered in the treatises, is equally well elaborated in the skilful geometric methods of architects.

Let us provide several typical examples.

Line AB is divided according to extreme and mean ratio in point C. A perpendicular is drawn from point A; its length equals the length of the bigger segment AC. A rectangle ABDE is drawn (fig. 133b); the ratio of its sides is \(1 + \frac{\sqrt{5}-1}{2}\) or 1+0.618 (… proportions of Samanid and Sultan

\(^{353}\) Quoted from al-Kashi, *Kliuch arifmetiki* [The key to arithmetic], [Russian translation] (Moscow, 1956), p. 211.
Sunjar mausoleums, Bibi-khanym [mosque], Gur-i Amir mausoleum, Ak-Sarai palace in Shahrisabz, etc.).

Line AB is divided in point C according to extreme and mean ratio. A perpendicular is drawn from point A with a length of the double bigger segment AC. A rectangle ABED is drawn; the ratio of its sides is $1 + \sqrt{5} - 1$ or $1 + 1.236$ (fig. 133c) (... proportions of Khoja Ahmad Yassawi complex in the town of Turkestan, Tuman-aka and Ishrat-khana mausoleums, Nadir Divan-begi khanaqa, etc.).

Line AB is divided in point C according to extreme and mean ratio and extended by its smaller segment to the point D. A perpendicular is drawn from point A with a length of AD equaling $\frac{5-\sqrt{5}}{2} = 1.382$. A rectangle is drawn (fig. 133d); the ratio of its sides is $1 + \frac{5-\sqrt{5}}{2}$ or $1 + 1.382$ (... proportions of Ulugh-beg madrasah in Samarkand, in the grave of Shirvanshahs in Baku, etc.).

Line AB is divided in point C according to extreme and mean ratio and extended by its smaller segment twice to the points D and E (fig. 133e). The length of DE equals $4 - \sqrt{5}$ (... proportions of Tuman-aka Mausoleum).

A diagonal of the semisquare AC is drawn in the square with a side AB (fig. 133f); the line BC is extended by the length of this diagonal. A rectangle ABDE is drawn; the ratio of its sides is $1 + \frac{\sqrt{5}+1}{2}$ or $1 + 1.618$ (... proportions of Bibi-khanym mosque, Tuman-aka, Gur-i Amir, and Bibi-khanym mausoleums, etc.).

{Figure from p. 237:}
Fig. 133 (g, h, i, k, and l). Analytical drawings based on extreme and mean ratio.

Line AB (fig. 133g) is divided in point C according to extreme and mean ratio and extended by its bigger segment. The result is the [segment] AD. Point E is produced by the compasses of the radius AD from points A and B. Points G and K are produced by the compasses of the radius AB [from points A and B]. Points ABKEG are the angles of the
pentagon. To find its center a circle is drawn through the points ABKEG. Perpendiculars are
drawn from points A and B; they intersect with the circle in points L and M. The ratio of the
sides of the rectangle ABML is $1 : 1.376$.

The corresponding rectangular spaces actually exist in Ishrat-khana Mausoleum (15th c.). They
are covered with domes that produce ten-pointed stars in the horizontal section.

The achievements of Central Asian architects in the development of skilful geometric methods
for the design of architectural forms consist in the fact that they adapted the extreme and mean
ratio for symmetrical compositions. Fig. 133h is an example of such a design.

Line AB is divided in point C according to extreme and mean ratio. The bigger segment is
divided in half and the halves are added to the ends of the given line [AB]. The result is the
symmetrical solution based on the ratio

$$\frac{\sqrt{5} - 1}{4} + \frac{\sqrt{5} - 1}{4},$$

or

$$0.309 \div 1 \div 0.309;$$

while the total length of the line is

$$\frac{\sqrt{5} + 1}{2} = 1.618.$$

Next (fig. 133i), the line AB is divided in point C according to extreme and mean ratio. The
bigger segment is divided in half and the halves are drawn symmetrically on the line AB from
the points A and B. This articulation is expressed by the ratio:

$$\frac{\sqrt{5} - 1}{4} \div \frac{3 - \sqrt{5}}{2} \div \frac{\sqrt{5} - 1}{4},$$

or

$$0.309 \div 0.382 \div 0.309.$$
On the fig. 133j, the line AB is divided in point C according to extreme and mean ratio. The smaller segment is divided in half and the halves are drawn on the line AB. Thus the line AB is split in two sections in ratio:

\[ \frac{3-\sqrt{5}}{4} + \frac{\sqrt{5}-1}{2} + \frac{3-\sqrt{5}}{4}, \]

or

\[ 0.191 + 0.618 + 0.191. \]

On the fig. 133k, the line AB is divided in point C according to extreme and mean ratio. The smaller segment is subtracted from the bigger segment and the remainder is drawn symmetrically on the line; the resulting articulation of the line has a ratio of

\[ \sqrt{5} - 2 + 5 \cdot \sqrt{5} + \sqrt{5} - 2, \]

or

\[ 0.236 + 0.528 + 0.236 \]

(… proportions of Mir-i Arab Mausoleum, etc.).

On the fig. 133l, the line AB is divided in point C according to extreme and mean ratio. The smaller segment CB is also divided according to extreme and mean ratio, and the result is its smaller segment equaling

\[ \frac{7-3\sqrt{5}}{2} = 0.146, \]

which is the fifth member of the decreasing progression with a denominator \( \frac{\sqrt{5}-1}{2} \). At the same time the value of 0.146 is close to [the fraction of] one

{p. 240}

seventh with a deviation of 0.003, which results in the seven-partite division of the given line. This seven-partite division was actually used in the construction of architectural monuments,
including the portal of gur-khana of Khoja Ahmad Yassawi [Mausoleum], the portal of the main
mosque of Bibi-khanyym [complex], the portal of the courtyard of Ulugh-beg madrasah in
Bukhara, the gable wall of the portal of Ak-Sarai palace in Shahrisabz, etc.

To complete the review of the question regarding the proportional systems it should be noted that
medieval architects carefully coordinated the proportions of the building in all three dimensions
(table 13).

Table 13

<table>
<thead>
<tr>
<th>Architectural monument</th>
<th>Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>width</td>
</tr>
<tr>
<td>Khoja Ahmad Yassawi complex without domes and portals constitutes a parallelepiped</td>
<td>1</td>
</tr>
<tr>
<td>Bibi-khanyym mosque</td>
<td>3</td>
</tr>
<tr>
<td>Ulugh-beg madrasah in Bukhara</td>
<td>1</td>
</tr>
<tr>
<td>Ulugh-beg madrasah in Samarkand</td>
<td>1</td>
</tr>
<tr>
<td>Grave of Shirvanshahs in Baku</td>
<td>1</td>
</tr>
<tr>
<td>Ulugh-beg madrasah in Gi’jduvon</td>
<td>1</td>
</tr>
<tr>
<td>Ishrat-khana mausoleum</td>
<td>$2\sqrt{3}$</td>
</tr>
<tr>
<td>Mir-i Arab madrasah</td>
<td>1</td>
</tr>
<tr>
<td>Nadir Divan-begi khanaqa</td>
<td>1</td>
</tr>
<tr>
<td>Abd-ul-Aziz-khan madrasah$^{354}$</td>
<td>4</td>
</tr>
</tbody>
</table>

$^{354}$ Mid-17th century, Bukhara.
In the architectural monuments of Central Asia, the multiplicity of proportional schemes is not limited to the systems reviewed above because besides the geometric systems, simple numerical ratios also existed there.

Modular relations in the architecture of Central Asia developed on local soil during the periods of [Classical] Antiquity and Oriental Hellenism; they can be easily traced in the goffered adobe buildings, which were widely spread in the early medieval period. However, in general the module equaling a goffer defined the basic dimensions of a building. It is hard to tell whether it influenced the proportions of separate elements and parts of the building because this question was not studied yet.

The existence of numerical relations in the architecture of the High Middle Ages, when the skilful geometrical methods dominated the theory and the practice, can be explained by the following circumstances:

1. The module coordinated the geometrical ratios, when irrational values were substituted by approximated whole numbers.

2. Numerical relations acquired the theoretical basis because they were related to geometrical proportions.

3. Numerical relations are, in a sense, an echo of [Classical] Antiquity and Oriental Hellenism; back then the numbers and the module had more importance than in the era of developed feudalism in the lands of the Near and Middle East.

Reviewing the facades of the portals and the interior walls of square compounds we discover the horizontal articulations of the following ratios:
The question emerges: why did the architect, who used geometrical methods in the design of architectural forms, employed the abovementioned numerical ratios?

To answer this question, one should consider that in geometrical schemes irrational values could be replaced by simple numerical relations with the smallest error. This approach was widely used in calculation techniques since the times of the Babylonians. Regarding the medieval epoch, one could remember the recommendations of Muhammad al-Khwarizmi, who approximates all irrational values, as well as the information of the author of "On Interlocks of Similar or Corresponding Figures" (page 187b)\textsuperscript{355} that the complex geometrical methods, which he recommends for defining certain proportions of a triangle, "some craftsmen don't use, instead they replace them with a triangle, the legs of which are in a ratio of 6:7."

This allows us to propose a hypothesis that irrational values in the skilful geometrical methods, which we reviewed above, were in certain cases replaced by close numerical relations (see table 14).

\begin{table}[h]
\centering
\begin{tabular}{|l|l|}
\hline
\textbf{Process} & \textbf{Relation} \\
\hline
Articulation of the walls of the square compound and the façade in $3+4+3$ is related to the derivative of the square & $\frac{2-\sqrt{2}}{2} + \sqrt{2}-1 + \frac{2-\sqrt{2}}{2}$  \\
& $0.2929+0.4142+0.2929$  \\
Deviation & $3+4+3$  \\
& $0.0071 - 0.0142 + 0.0071$  \\
\hline
\end{tabular}
\caption{Replacement of irrational values by numerical relations}
\end{table}

\textsuperscript{355} of the Paris manuscript.
<table>
<thead>
<tr>
<th>The same related to the extreme and mean ratio</th>
<th>( \frac{\sqrt{5}-1}{4} + \frac{3-\sqrt{5}}{2} + \frac{\sqrt{5}-1}{4} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.039 + 0.382 + 0.039)</td>
</tr>
<tr>
<td></td>
<td>(3 + 4 + 3)</td>
</tr>
<tr>
<td></td>
<td>(-0.009 + 0.018 - 0.000)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The articulation [based] on the ratio 1+3+1 could be a result of the geometric schemes based on the derivative of the square</th>
<th>(\frac{\sqrt{2} - 1}{2} + 2\sqrt{2} + \frac{\sqrt{2} - 1}{2})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.2071 + 0.5858 + 0.2071)</td>
</tr>
<tr>
<td></td>
<td>(1 + 3 + 1)</td>
</tr>
<tr>
<td></td>
<td>(-0.0355 + 0.071 - 0.0355)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The same could result from the drawing of four equilateral triangles in apexes in the center of the square</th>
<th>(\frac{\sqrt{3} - 1}{2\sqrt{3}} + \frac{1}{\sqrt{3}} + \frac{\sqrt{3} - 1}{2\sqrt{3}})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.2115 + 0.577 + 0.2115)</td>
</tr>
<tr>
<td></td>
<td>(1 + 3 + 1)</td>
</tr>
<tr>
<td></td>
<td>(-0.0575 + 0.115 - 0.575)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The same [could result] from the extreme and mean ratio</th>
<th>(\frac{3-\sqrt{3}}{4} + \frac{\sqrt{3}-1}{2} + \frac{3-\sqrt{3}}{4})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.191 + 0.618 + 0.191)</td>
</tr>
<tr>
<td></td>
<td>(1 + 3 + 1)</td>
</tr>
<tr>
<td></td>
<td>(+0.045 - 0.09 + 0.045)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The articulation [based] on the relation 2+5+2 is a result of the geometrical schemes based on the derivative of the semisquare</th>
<th>(\frac{1}{2\sqrt{3}} + \frac{\sqrt{3}-1}{\sqrt{3}} + \frac{1}{2\sqrt{3}})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.2235 + 0.553 + 0.2235)</td>
</tr>
<tr>
<td></td>
<td>(2 + 5 + 2)</td>
</tr>
<tr>
<td></td>
<td>(-0.0115 + 0.023 - 0.0115)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The articulation [based] on the relation 5+8+5 is a result of the geometrical schemes based on the derivative of the semisquare</th>
<th>(\frac{\sqrt{5}-1}{2\sqrt{3}} + \frac{1}{\sqrt{3}} + \frac{\sqrt{5}-1}{2\sqrt{3}})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.2765 + 0.447 + 0.2765)</td>
</tr>
<tr>
<td></td>
<td>(5 + 8 + 5)</td>
</tr>
<tr>
<td></td>
<td>(+0.023 - 0.046 + 0.023)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seven-partite division of 1÷5+1 and 1÷1÷3+1÷1 could have been based on the geometrical scheme based on derivatives of the square and the circle</th>
<th>(\frac{2-\sqrt{2}}{4} + \frac{\sqrt{2}}{4} + \frac{2-\sqrt{2}}{4})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.1465 + 0.7070 + 0.1465)</td>
</tr>
<tr>
<td></td>
<td>(1 + 5 + 1)</td>
</tr>
<tr>
<td></td>
<td>(-0.0255 + 0.051 - 0.0255)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The same [could result] from the extreme and mean ratio</th>
<th>(\frac{7-3\sqrt{5}}{2} + \frac{3\sqrt{5}-6}{2} + \frac{7-3\sqrt{5}}{2})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation</td>
<td>(0.146 + 0.708 + 0.146)</td>
</tr>
<tr>
<td></td>
<td>(1 + 5 + 1)</td>
</tr>
</tbody>
</table>

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356 This result is achieved by multiplying the upper row of number in two, which is neither mentioned nor explained in Bulatov's text.

357 It is extremely hard to follow Bulatov in this example; the numbers he provides hardly correspond at all.
However, it would be incorrect to attribute the provenance of all numerical relations in architecture exclusively to the modular coordination; numerical relations were used in the projects of architects, they were theoretically conceived as harmonic proportions, which — as we mentioned above — were thoroughly developed in the works of medieval scientists. In reality, harmonic proportions were more related to the theory of music, while they could have influenced the theory of proportions in architecture only to a certain degree.

In relation to that, we should mention that Abd ar-Rahman Jami named the octave, the fifth, the fourth, the major, and the minor whole tones, and the minor simitone among harmonic intervals and provides the following numerical values: $\frac{2+1}{3+2}, \frac{4+3}{9+8}, \frac{10}{9}, \frac{16}{15}$.

Proportional systems in the architecture of Central Asia did not remain unchanged in the course of the ages. Upon careful inspection, one could notice formation, development, and disappearance of some skilful methods of proportioning; the emergence of the new methods, their parallel existence with old obsolescent methods; the replacement of some methods by the others. The development of the systems of architectural proportioning resulted in the universal system that is represented in the proportions of architectural monuments [built in] the 14th and 15th centuries.

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358 Same with this example.
359 No references to that in medieval textual sources.
The Design Process in Architecture

The architect conceptualized the design of a building project using two processes simultaneously. One was analytic, the other geometric. He was given certain parameters to work with: the function of the building, its budget, often a schedule and the scale of its most significant parts. In describing the buildings ordered by Timur at the tomb of Shaykh Ahmad Yasavi in Turkestan, Yazdi gave the following specifications, adding that the project was to be completed within two years: “a great lofty portal, two minarets, and a domed room with a square base, whose sides of 30 gaz. Behind the large cupola should be another domed room with sides 12 gaz in the form of a chahar suffeh for the tomb of the Shaykh; on the sides, two other chahar suffeh, each 13.5 gaz wide and 16.5 gaz long for arranging gatherings. In addition, still a few rooms for visitors for worship and other needs.”
Whether Timur himself dictated such precise orders or this was done by the superintendent, the insight into the design process that this unique passage gives us is invaluable. The measurement named in the passage, the gaz, a cubit based on the distance between the shoulder and the end of the clenched fist, has been studied by Soviet scholars. During the early Timurid period there was an unusual consistency in the dimensions of the gaz, unexpected in a standard of measure that is anthropometric. In Turan it ranged from 60 to 66.18 cm. averaging 62-63 cm.\textsuperscript{360} Equivalent figures are not available for Iran.

Once the architect and patron had come to an understanding on the equivalent of the gaz\textsuperscript{361} and the general needs and scale of the building, the architect could proceed to work out the details on his own. The actual designing of the building was done theoretically to some extent regardless of the given scale. After the design had been drawn up on the basis of geometric proportions, the architect returned to the analytic process. He selected one dimension within the design to serve as a module, which was either equivalent to, or commensurate with, the gaz.\textsuperscript{362} Most often in Timurid buildings, the thickness of the walls served as the module.\textsuperscript{363} The module was then subdivided into smaller units, commensurable with it, and the minor details of the plan could be blocked out. These smaller units corresponded to the size of the brick plus a rising joint, so that the architect could transmit measurements in real numbers, or even in terms of numbers of

\begin{footnotes}
\item[360] This is the estimation of Bulatov and his circle. In 1950 Shalva Ratiia believed that the module for Bibi-Khanym mosque was 0.73. See: Sh. E., Ratiia, \textit{Mechet’ Bibi-Khanym. Opyt restavratsii pamiatnikia architektury} [Bibi-Khanym Mosque: Essays in the Reconstruction of the Architectural Monument] (Moscow: Gos. izd-vo arkhitektury i gradostroitel’stva, 1950), p. 90.
\item[361] There is no evidence in medieval textual sources about the process of the “architect and patron coming to an understanding on the equivalent of the gaz.”
\item[362] There is no textual evidence for that as well.
\item[363] This is another guessestimate. In Soviet proportionalist literature all kinds of measured parameters were proposed as modules of Central Asian monuments, including the diameter of the minaret, spans of entrance arches, distances between the columns of the courtyard, the side of square/rectangular plans of interiors.
\end{footnotes}
bricks, even though these measurements may have been worked out theoretically and often had irrational values.\textsuperscript{364} Approximations of irrational numbers were also used.\textsuperscript{365}

That the two systems, analytic and geometric, were in fact used by Timurid architects is borne out by the analyses of actual buildings, for which both the proportional and modular systems have been deduced, and by the testimony of a rare series of drawings made by a sixteenth-century architect of Bukhara. These drawings show a variety of complex buildings, geometrically proportioned,\textsuperscript{366} set out on a modular “graph paper.” Assisting in the analytic calculation of dimensions were a number of mathematical instruments, which are mentioned and described in treatises: set-squares, the adjustable set-square, and a device for drawing ellipses. Although it was possible to derive most angles from triangles related to circles, these devices greatly facilitated the designer’s work, providing shortcuts in some instances, and unusual angles that would otherwise be difficult to compute.\textsuperscript{367}

The existence of two such systems, the geometric and the analytic, does not appear unique if one considers Vitruvius’ theory of proportions, as explained by [Richard] Scholfield.\textsuperscript{368} Vitruvius speaks of “symmetries and proportions” that must suit each other: “Proportion must be adjusted to symmetry” and “symmetry depends on proportion.” “Symmetries” are worked out in terms of

\textsuperscript{364} No textual evidence for that as well.
\textsuperscript{365} This claim is supported only by Bulatov’s theory of geometric harmonization.
\textsuperscript{366} Even if we assume that these drawings are authentically dated to the 16\textsuperscript{th} century, they do not contain any explicit evidence of geometric proportioning and harmonization. The tracing lines were superimposed on the drawing only in Soviet studies to prove that they were geometrically harmonized. For the publication of the drawings and their highly questionable dating to the 16\textsuperscript{th} century, see: N. B. Baklanov, “Arkheitekturye chertezhi ubezskogo mastera XVI veka” [Architectural drawings of the 16th century Uzbek master], Soobshchenia Instituta istorii i teorii arkheitektury, Akademiiia arkheitektury SSSR [Communications of the Institute of history and theory of architecture, USSR Academy of Architecture] IV (1944): 1-21. Before the new independent analysis conducted by a laboratory outside Uzbekistan and the former Soviet Union, the author of this dissertation assumes that these drawings are either produced in the late 19\textsuperscript{th} / early 20\textsuperscript{th} century or constitute a forgery of the Stalinist era.
\textsuperscript{367} There are no textual evidences for the use of these devices by medieval Central Asian builders.
\textsuperscript{368} Vitruvius’ “The Ten Books on Architecture” were not known in pre-modern Islamic world, including Iran and Central Asia.
the module, while "proportions" figure the parts in terms of the whole. It is not unlikely that the
Islamic system has roots in the same classical tradition upon which Vitruvius drew.  

The system described by Bulatov required the identification by the architect of a single
measurement in the projected building that would serve as a generative unit. All important
dimensions in both plan and elevation would be based on this entity and be commensurable with
it. Generally, the architect selected the most prominent feature. If a large dome chamber were
planned, the length of its side would be the generative unit. This was, of course, true of all
single-chamber mausoleums, but also for more complex structures that had one chamber larger
than the others, such as the shrine at Turkestan. It was this dimension that Yazdi, or perhaps
Timur, specified in the orders. In the case of peripherally planned buildings (with court), often
the length of the exterior facade served as the generative unit. The masjid-i jami’ of Timur [i.e.
Bibi-Khanym mosque] in Samarkand is an exception, with its mammoth dome chamber serving
as the generative unit. For the radially planned building, the central dome chamber served to
generate the dimensions. In each of these situations, however, secondary generative units were
constituted, which themselves dictated the dimensions of the features closest to them. While a
façade might consist of measurements made up from the dome chamber the elements of the
façade, such as the height of its iwan, would be in proportion to the length of the facade itself. Its
relationship to the original generative unit was still proportional but this relationship was
extremely complex.

The architect had at his disposal four systems of proportion, or sets of ratios, which he could mix
as he wished although generally one system predominated. It is convenient to think of these
systems as scales in music which repeat as they are run through geometric progressions. Each

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369 In Soviet scholarship this argument was first proposed by A. V. Shchusev in “Arkhitektura sovetskogo Vostoka
system is based on an integer, but modulated through the root of that integer in accordance with geometric principles. The integers 2, 3, and 5 are each associated with geometric figures that define the other members in the “scale.” The kinship of architecture and music, in fact, noted by Farabi and is discussed by Bulatov. The nature of the system is well elucidated by Farabi’s statement that the side of the square, the segment of a circle, serve in architecture as measuring instrument, and are analogous to the syllogism in logic, the strophe in poetry, and the foot in metrics. It is precisely a statement such as this that gives credence to the approach of Bulatov. The geometric basis of design was therefore not comparable to Western notions of proportion, which are concerned with the repetition of similar or related forms. The Islamic system, aside from its practical value as a working method, ensured a harmony of all parts, whereby all parts were related to a single entity, as the parts of the square, triangle, and the pentagon are related to each other.

Timurid architects utilized all the geometric systems that had been in use since the tenth century. These are:

1. The square (Fig. 2) and its derivatives, most important of which were the diagonal ($\sqrt{2}$), its half and its double, and the side of an octagon ($\sqrt{2} - 1$).

2. The equilateral triangle (Fig. 3-4) and its derivatives, the side and the height ($\sqrt{3}/2$): Such triangles came into play in duodecagonal figures (side = 2 - $\sqrt{3}$). Sometimes the geometry of the square and the equilateral triangle were combined, as in rectangles of $\sqrt{2}$: $\sqrt{3}$. The side of and equilateral triangle, whose height is half the length of the generative square, was frequently used for the width of niches in dome chambers, with intersecting arches as support system ($1/\sqrt{3}$) (Fig. 4). This dimension can be drawn by inscribing a hexagon and extending its radials.
3. The *semisquare* (Figs. 5-8), usually formed by dividing the square of a room into halves: By drawing the diagonals of the two sets of semisquares, one arrives at a small square in the center, whose side is $1/\sqrt{5}$ (Fig. 5). The diagonal itself ($\sqrt{5}/2$) plays an important role, particularly in determining elevations (Fig. 8). Another method of obtaining a rectangle of the same proportions is with a triangle with ratio 2:3: $\sqrt{5}$ (Fig. 7). A common figure associated with the semisquare was the triangle formed by the diagonal and the two sides, which could be used to measure off proportional line segments of $1/\sqrt{5}$ and $(\sqrt{5} - 1)/\sqrt{5}$ (Fig. 6). This was done by marking off along the hypotenuse an arc, the radius being the height of the triangle, and then dropping a perpendicular to the base from this point. These proportions were sometimes used to design facades.

4. The *root five rectangle* (Figs. 9-11): Using the semisquare, the base could be divided in another way, known already to the Greeks as the “mean-extreme” ratio, which plays a part in constructing the “golden section.” This is done by marking off an arc, the length of the height, along the hypotenuse, as in the previous case, but then drawing a second arc, with its center at the smaller angle, through the point in the hypotenuse. Where this arc cuts the base of the triangle, it divides the line into two segments, one larger $[(\sqrt{5} - 1)/2]$ or $M$, and a smaller one $[(3 - \sqrt{5})/2]$ or $m$ (t Fig. 9). Multiples of both segments were commonly used in designing both interior and exterior facades, as well as in many other capacities. A series of diminishing inscribed triangles of the same form were used for the diameter of minarets $[(7 - 3\sqrt{5})/2; (7 - 3\sqrt{5})/4; ... ]$. A decagon inscribed in a circle with a radius of 2 has a side of $\sqrt{5} - 1$ (Fig. 11). The “golden rectangle” could be formed by adding the unit 1 to the larger section $M [(\sqrt{5} + 1)/2: 1]$. The rectangle is easily drawn using the semisquare as base (Fig. 10).
Students of Western architecture may note that the “golden rectangle” appears in many Timurid designs, but it is not clear whether it has any more significance than other rectangles that occur with the same frequency. Because it is of interest for Renaissance studies, it is noted here, when it occurs, by the abbreviation $\varphi$ as is the common convention. This sign refers to the ratio 1:1.618 (note: $M = 0.618$).

The following examples drawn from Bulatov’s study… will demonstrate how these four systems worked together to make a harmonious design.
2-7. Proportional systems: (2) the square, (3) the equilateral triangle, (4) the equilateral triangle, (5) the semisquare, (6) the semisquare, (7) the semisquare.
8-11. Proportional systems: (8) the semisquare, (9) the roof of the rectangle, (10) the roof of the rectangle, (11) two methods of constructing a decagon.

*Samarkand, Shah-i Zindeh, Mausoleum of 1361 (Figs. 12-14)*

Although the mausoleums of the Shah-i Zindeh complex appear to conform to a single design, geometric analysis indicates that various systems of proportions were utilized. The earliest Timurid building on the site, the mausoleum of 1361, provides a fairly straightforward example of the geometric system at the onset of Timur’s reign.

The generative unit is the side of the domed square ($a$), equal to about 6 m. (deformity in walls has resulted in none of them being the same length) (Fig. 12). The geometric system is based on the semisquare and its diagonal (Text Fig. 5). The walls of the dome chamber are equivalent to the small segment resulting from the division of the semisquare diagonal by other intersecting diagonals ($a/2\sqrt{5}$). In the drawing it is easy to see that this dimension, being adjacent to the walls,
was a convenient yardstick. The thickness of the portal was equivalent to the small segment of the side of the square divided in accordance with the mean-extreme ratio \((am)\) (see Fig. 9).

The height of the walls of the square are equal to half of its diagonal \([\sqrt{2}/2]\) (Fig. 14). The proportions of the sides of the octagon in the zone of transition are \(2: \sqrt{5}\) (cf. Fig. 7). Likewise are the proportions of the portal frame beginning at the level of the socle (Fig. 13). Measured from the ground, the rectangle of the portal frame is \(1: \sqrt{5} - 1\), or two \(\phi\) rectangles stacked along their lengths (cf. Fig. 9).

The system described above thus combines geometric relationships with simple arithmetic functions.


*Turkestan, Shrine of Ahmad Yasavi (Fig. 15)*
This building offers an excellent example of a complex structure based on the dimensions of its largest dome chamber. It is particularly important because it is the only Timurid building for which this measurement is given in gaz by a contemporary text. The numbered points in Man’kovskaia’s drawing (Fig. 15) indicate the order in which these points are to be used in drawing the next line.

Beginning with the central square, the width of its wall niches (considering the east and west pairs of rooms as occupying the space of a wall niche) equals the side of an octagon inscribed in the square. The determination of the depth of the east, west, and south niches is more complex. Bulatov has suggested the formula \(2m/\sqrt{5}\) (that is \(m\) being the small segment of the side of the large square, divided according to the mean-extreme ratio). Man’kovskaia arrived at the dimensions geometrically, as indicated in the drawing. Lines are drawn through points 4, intersecting at point 6. These lines also situate the square of the mausoleum, which has the same width as the niche (i.e., the side of the octagon within the large square).

The width of the structure flanking the large dome chamber on the east and west, according to Bulatov, is \(2m\) (not shown on Man’kovskaia’s analysis). The proportions of the outer rectangle are based on the width of the facade divided in accordance with the mean-extreme ratio (cf. Fig. 9). The length of the outer rectangle is thus twice the larger segment (\(2M\)). If the side of the dome chamber is \(a\), the width of the facade is itself in proportion to the central dome chamber: \(a(7 - 2\sqrt{5})\). The width of the corner minarets is also derived from the mean-extreme ratio, that is from the smaller segment, \(a(3 - \sqrt{5})/2\). The proportions of room 10 correspond to a \(\phi\) rectangle.

Room 11 is a rectangle of \(2: \sqrt{3}\), in order to accommodate the modified six-pointed stellate vault. Arithmetic relationships are found in the masjid (room 4). The height of the large dome chamber is twice its width. The diagonal gives the height of the commencement of the dome.
15. Turkestan. Shrine of Khvajeh Ahmad Yasavi. Geometric analysis of plan (after Man’kovskaia)
M. S. Bulatov

**Bibi-khanym Mosque (1399-1404)**


{p. 154}

The congregation mosque of Bibi-khanym is located in the center of Samarkand; it is a multipartite architectural complex with a rectangular plan of the courtyard surrounded by the arched gallery.

The immense entrance portal and the main mosque were erected on the longitudinal axis, while the small mosques were located on the transversal [axis] (fig. 71, 73).\(^{370}\) Despite the traditional [character] of their tectonic structure, each of these buildings present different ways of developing the same type of a single-chamber structure with a portal, i.e. including the square space, the octagonal space, and the double dome – with the latter installed on top of the cylindrical drum. In the corners of the complex four high minarets were erected.

The complex was built of baked brick and marble limestone (galleries). The walls of the building were dressed in the “shirt” of polychromous facing with geometric and epigraphic ornament. [The buildings] were decorated with the white, blue, light-blue, and turquoise glazed bricks of different hues, as well as with marble from local quarries. Only the ruins of Bibi-khanym mosque have survived to nowadays; however the remaining parts are of great intellectual interest.

\(^{370}\) For historic and contemporary photographs of Bibi-khanym Mosque see the main text of the dissertation.
Special studies are devoted to the architectural proportions of the mosque. Sh. E. Ratiia analyses the proportions of the building and arrives to the conclusion that they were designed according to the modular system, and the module equaled

\{p. 155\}

the diameter of the corner minarets of the main mosque.

However the scheme proposed by architect Sh. E. Ratiia cannot explain the patterns of tectonic system of the building; the module does not correspond to the square network of the colonnade of the arched galleries.

The author himself acknowledges that the proposed module – i.e. the diameter of the minaret of the main mosque – is “powerless” in explaining the proportions of the main portal.

K. S. Kriukov in his study devoted to the module in Central Asian monuments specifically analysis the proportions of Bibi-khanym mosque; he concludes that all the elements of its plan are proportionate with the module that equals 360 cm, which is the span between the columns [of the arched gallery].\(^371\) However in the case of the main mosque [Kriukov’s calculations] allow for an unacceptably high error, since, according to K. S. Kriukov’s graphical analysis, the width of the building in its eastern façade equals six modules (36 gazes = 2160 cm). Meanwhile the actual width of the building is 2330 cm; hence the deviation allowed by K. S. Kriukov equals 170 cm. Same

\{p. 156\}

with the width of the courtyard and the entrance portal.

The width of the entrance portal is 1880 cm, which is not divisible by the module, since

\[ 1880 \div 360 = 5.22 \text{ M}. \]

These examples – let alone the proportions of octagonal and decagonal minarets of the mosque – permit us to question the rigid conclusions of the author.

\[ \text{Figure from p. 157:} \]

Fig. 71. Bibi-khanym mosque. Plan of the complex. Proportional analysis.

\[ ^{372} \text{Where M is the module.} \]
Fig. 73. Southern small mosque of Bibi-khanym [complex]. Section. Proportional analysis.
We believe that the basic parameters in defining the proportions of Bibi-khanym complex were [1] the square under the dome; [2] in the case of the articulations of the portal of the main mosque – the width [of this portal]; in the case of the entrance portal – the rectangular plan of the arched and vaulted niche [of this portal]; all [three] are in proportional interdependence between each other.

The diagonal corresponds to the square under the dome of the main mosque with a side [of the square] \(a\) [equaling] 24 gazes or 1458 cm (one gaz equals 60.8 cm); the corresponding diagonal equals

\[
24 \times \sqrt{2} = 24 \times 1.4 = 33.6 \text{ gazes (fig. 74).}
\]

Fig. 74. The main mosque of Bibi-khanym [complex]. Section. Proportional analysis.
The double diagonal of the square under the dome \(= 2a42 = 2 \times 24 \times 1.4 = 67.2 \text{ gazes} \)

or \(2 \times 1458 \times 1.4 = 4082 \text{ cm} \), which is the width and the depth of the main mosque. The width of the façade is 4085 cm; the deviation is 3 cm.

The width of the whole complex without the corner minarets is commensurate with four sides of the square and its two diagonals: \(4a + 2a\sqrt{2} = 96 + 67.2 = 163.2 \text{ gazes} \), or \(4 \times 1458 + 1458 \times 2 \times 1.4 = 9912 \text{ cm} \). The actual dimensions are 9910 cm.

The ratio of the sides of the rectangle without the projections of the corner minarets and the entrance portal is \(3:4\).

The length \(B\) of the complex, including the projection of the entrance portal, is commensurate with the diagonal of the square drawn on its length \(A\):

\[ B = A\sqrt{2} = 163.2\sqrt{2} = 230.5 \text{ gazes}. \]

The span [between the columns] of the arched gallery can be expressed in 6 gazes: \(60.8 \times 6 = 365 \text{ cm} \).

The width of the portal has a seven-partite articulation: \(1+1+3+1+1\). One seventh of the width of the portal corresponds to the diameter of the corner minarets and the width of the pylon; there three seventh [correspond to] the portal niche.

Here we are facing an inevitable question: how can we explain the proportions of the main portal of the mosque used by the architects, i.e. its seven-partite division?
The analysis of proportions of the whole complex of Bibi-khanym mosque, and in particular the portal of the main mosque, allows us to propose a hypothesis regarding the existence of the geometrical proportional system [in this monument].

The diameter of the minaret of the main mosque could have been defined by the geometric scheme that consisted in the successive division of the portal’s width in extreme and mean ratio; at that, the fourth member of the progression with a denominator of 0.618 could have been taken as a diameter of the corner minarets, which resulted in the seven-partite division of the façade (table 5).

<table>
<thead>
<tr>
<th>Compositional elements</th>
<th>Members of the progression</th>
<th>Theoretical dimensions, cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of the portal</td>
<td>$M_0$</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>$M_2$</td>
<td>0.618</td>
</tr>
<tr>
<td></td>
<td>$M_3$</td>
<td>0.382</td>
</tr>
<tr>
<td></td>
<td>$M_4$</td>
<td>0.236</td>
</tr>
<tr>
<td>Diameter of the corner minarets</td>
<td>$M_4$</td>
<td>0.146*</td>
</tr>
</tbody>
</table>

* Diameters of the corner guldasta\(^{373}\) of Ulugh-beg madrasahs in Bukhara (1417 cm), Samarkand (1420 cm), and Gi’jduvon (1433 cm) are defined by the same method; however in those cases $M_4$ is divided in half, i.e. they are proportionate with 0.073 of the width of their facades.

The actual dimensions of the diameter of the minaret are 585 cm; the deviation equals 11 cm.

If we interpret the one seventh [fraction] of the width of the portal as the derivative of the side and diagonal of a square drawn on its width (fig. 74b), then the deviation equals almost the same value, since

\(^{373}\) The top element of the minaret in Central Asian architecture.
The depth of the portal niche of the main mosque is commensurate with a semidiagonal of the square under the dome:

\[ \frac{\sqrt{2}}{2}, \text{ i.e. } \frac{33.6}{2} = 16.8 \text{ gazes.} \]

The projection of the minaret equals

\[ a \left(1 - \frac{\sqrt{2}}{2}\right), \text{ i.e. } 24 - 16.8 = 7.2 \text{ gazes,} \]

while their total depth [equals] the side of the square under the dome, i.e. 24 gazes.

Presumably, according to the [original] project the eastern wall of the square under the dome divided the whole interior of the main mosque in half, while the transversal axis of the mosque’s interior was located 21.6 gazes away from the exterior line of the western wall, meanwhile the distance between the axis of the forth bay of the arched gallery and western edge of the complex was 23.5 gazes. In the process of design, the coordination of these axes that passed through the northern and the southern entrances required a shift of the square under the dome to the east. The distance of this shift equaled 1.2 gazes; the divergence of the axes remained at 0.7 gazes; yet now it was hardly noticeable.\(^{374}\)

According to the original design the width of the western and eastern walls were commensurate to \( a (\sqrt{2} - 1) = 33.6 - 24 = 9.6 \text{ gazes.} \) The corrections (i.e. the shift of the compound to the entrance group by 1.2 gazes) resulted in the width of the walls equaling 10.8 and 8.4 gazes respectively.

---

\(^{374}\) Cp. with Bulatov’s reasons to reject Kriukov’s scheme given at the beginning of the chapter.
The width of the lateral walls is commensurate with the difference between the side and the diagonal of the square, i.e. [equaling] 7.2 gazes, or 438 cm. The actual measurement is 435 sm.

The study of proportions of the interior articulations of the main mosque allowed us to maintain that their design consisted of two stages. The first project envisioned the maximum enlargement of the space under the dome; it included broad and wide niches in the walls of the square compound with beamed pendentives in the corners. The proportions of the interior were based on extreme and mean ratio of the side \((a)\) of the square under the dome; the bigger segment \((m)\) defined the width of the niches, while half of the small segment \((\frac{n}{2})\) defined the corner piers of the square compound and the depth of the niches (fig. 75).

{Figure from p. 161:}
Fig. 75. The main mosque of Bibi-khanym [complex]. Plan and size. Proportional analysis.
Let us no review the factual data related to the articulations of the southern wall of the square space with a length of 1442 cm. If we divide the length according to extreme and mean ratio, the result for the bigger segment [would equal] \( m = 1442 \times 0.618 = 891 \) cm, which equals the width of the niche. Its actual dimensions are 895 cm; the deviation [equals] 4 cm.

Half of the smaller segment [equals]

\[
\frac{h}{2} = \frac{1442-891}{2} = 275 \text{ cm}.
\]

The actual measurements of the piers are 272 and 275 cm.

{p. 163}

It is worth noting that these articulations are close to the ratio 1:3:1. However, in this case the deviation for the piers equals 13-14 cm; as for the width of the niches [it equals] 27 cm.

Apparently in the process of construction the builders began to hesitate about the feasibility of the structure and the soundness of beamed pendentives (the extreme maximum span [of which is] 6 m), as well as the equal durability of the walls of the square compound also weakened by the broad niches. They decided to fill in the niches with the brickwork to reinforce the bearing capabilities of the walls, which was ultimately done. This decision resulted in the traditional proportions of the walls of the square compound based on the derivative of the square; however, some proportions, which were designed earlier and express the extreme and mean ratio, were preserved.

The analysis of the articulations of the walls and the vertical aspect of the interior space of the main mosque are provided the following picture (fig. 75).

The height of the square compound (before the frieze) equals the side \((a)\) of the square under the dome.
The height of the panel and the frieze of the square compound is commensurate with \( \frac{a}{6} = 243 \text{ cm.} \)

The actual [height is] 250 cm.

The frame of the arched niches of the square compound produces a rectangle with a width of 895 cm. Its height from the floor level is 1450 cm, and therefore it is a rectangle of 1.618\(^{375}\) with a deviation of 0.002.

The height of the layer of pendentives is commensurate with the altitude of the equilateral triangle drawn on the side of the octagon, i.e.

\[
\frac{a (\sqrt{3}-1)\sqrt{3}}{2}
\]

The height from the floor to the basis of the dome in the interior is commensurate with \( \frac{a (\sqrt{3}+1)}{2} \).

The height of the drum relates to its diameter as \( 2 \div 5 \).

Finally we reconstruct the form of the lost dome of the main mosque of Bibi-khanym [complex] as two intersecting ellipses analogous to Gur-i Amir Mausoleum (…).

The proportions of the plan of the entrance portal of Bibi-khanym Mosque are also interesting (fig. 71 and 76); thus, the width \( L \) of the entrance niche corresponds to the half of the smaller segment if the width \( A \) of the complex is divided according to extreme and mean ratio:

\[
L = \frac{A (3-\sqrt{5})}{4} = 163.2 \times 0.191 = 31.2 \text{ gazes, or}
\]

\[
9910 \times 0.191 = 1893 \text{ cm.}
\]

The actual dimensions of the niche are 1880 cm; the deviation is 13 cm.

{Figure from p. 164:}

\(^{375}\) Golden ratio.
Fig. 76. Bibi-khanym mosque. Plan of the portal. Proportional analysis.

The width of the entrance portal [measured] between the axes of the minarets is commensurate with the width of the niche plus the diagonal of the semisquare drawn on this width:

\[
\frac{A(3-\sqrt{3})}{4} + \frac{A(3\sqrt{3}+5)}{8} = \frac{A(\sqrt{3}+1)}{8} = 163.2 \times 0.4945 = 66 \text{ gazes.}
\]

The deviation is 6 cm.

Correspondingly, the lateral bays of the main façade of [Bibi-khanym] complex equal half of a difference between the width of the complex (without the corner minarets) and the width of the portal:

\[
A \left(1 - \frac{\sqrt{3}+1}{8}\right) \div 2 = \frac{A(7-\sqrt{3})}{16} = 163.2 \times 0.2977 = 48.6 \text{ gazes.}
\]

If we take the rectangular plan of the entrance niche (semisquare) for the initial

{p. 164}
parameter and the span \((L)\) of the portal's vault-niche, which equals 1893 cm or 31.2 gazes, for the single unit, then the general dimensions of the plan will be commensurate with its
derivatives:

\[
1, \frac{1}{2}, \frac{\sqrt{3} - 1}{2}, \frac{\sqrt{3} - 1}{4}, \frac{3 - \sqrt{3}}{4}, \frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{4}.
\]

In practice this is reflected in the fact that the width of the niche [equaling] 15.6 gazes corresponds to half of the arch span.

The width of the walls of pylons (the distance between the edge of the niche and the corner minarets) equals the smaller segment if the span of the vault is divided according to extreme and mean ratio:

\[
\frac{L(\sqrt{3} - \sqrt{5})}{2} = 1893 \times 0.382 = 732 \text{ cm} = 12 \text{ gazes}
\]

The actual dimensions are 721 cm.

The thickness of the pylons is commensurate with \(\frac{L\sqrt{5}}{4}\), i.e. \(\frac{1893 \times 2.236}{4} = 1058 \text{ cm} = 17.5 \text{ gazes}\).

The diameter of the corner minarets and the depth of the small niche equal \(\frac{3L(\sqrt{3} - 2)}{2}\), i.e. \(1893 \times 0.354 = 670 \text{ cm} = 11 \text{ gazes}\).

The actual diameter of the minarets is 658 cm; the deviation is 12 cm.

The distance between the rear walls of the portal niche and the courtyard niche is commensurate with \(\frac{L(\sqrt{3} - 1)}{2}\), i.e. \(1893 \times 0.618 = 1170 \text{ cm} = 19.25 \text{ gazes}\).

\{p. 165\}

The depth of the niche, which opens in the courtyard of the mosque, equals \(\frac{L(\sqrt{3} - 1)}{4}\), or 9.6 gazes.

Its width is commensurate with half of a span of the portal niche, i.e. 15.6 gazes, while their ratio is 0.618.
The width of the pylons of the courtyard niche equals \( \frac{L(3-\sqrt{5})}{4} \), i.e. \( 0.191 \times 1893 = 362 \) cm, or 6 gazes; the deviation is 3 cm.

The depth of the entrance portal is commensurate with

\[
\frac{L\sqrt{3}}{2} + \frac{L(\sqrt{3}-1)}{4} = \frac{L(3\sqrt{3}-1)}{4} = 31.2 \times 1.427 = 44.52 \text{ gazes.}
\]

The diameter of the corner minarets of the entrance portal [equals] 658 (670) cm, or 11 gazes; each minaret is based on a decagonal socle, two sides of which are closed by the pylons. The contiguity between minarets and pylons is defined by the side of the decagon and the line of the façade joining at the right angle, which required [the builders] to find the center [of the decagon] by solving the triangle \( OPS \) (fig. 76) and drawing the right decagon.

The notable fact is the uniform principle of designing the whole complex. It can be easily established if we remember that the colonnade of the multi-nave arched gallery is built on the network of six gazes. This is commensurate with half of the smaller segment if the span (\( L \)) of the niche of the main portal is divided in extreme and mean ratio:

\[
\frac{L(3-\sqrt{5})}{4} = 1893 \times 0.191 = 362.
\]

The deviation is 3 cm.

The side of the square under the dome of the main mosque corresponds to the two smaller segments:

\[
L(3 - \sqrt{5}) = 1893 \times 0.764 = 1448 \text{ or 24 gazes.}
\]

The deviation is 10 cm.

The width of the western façade of the main mosque is commensurate with the two bigger segments:

\[
L(\sqrt{5} - 1) = 1893 \times 1.236 = 2340 \text{ cm.}
\]
The actual dimensions are 2330 cm; the deviation is 10 cm.

The width of the multi-nave gallery is 29 gazes:

\[
\frac{3L(\sqrt{3} - 1)}{4} = 31.2 \times 3 \times 0.309 = 28.92 \text{ gazes.}
\]

The deviation is 5 cm.

In the analyses [presented] above the deviations in the calculation of irrational values are insignificant; however, they increase in the measurements of the larger dimensions. For example the width of the entrance portal (including the minarets) in theory equals

\[
2L(\sqrt{3} - 1) = 2 \times 1893 \times 1.236 = 4679 \text{ cm or 77 gazes.}
\]

The actual dimensions are 4653 cm; the deviation is 26 cm.\(^{376}\)

Two smaller mosques create the perpendicular compositional axis of the ensemble; their facades orient inside the space of the courtyard. The difference between the two mosques is minimal; therefore, we’ll limit ourselves to only partial analysis of the proportions of the southern mosque. The design of the plan was not done with sufficient precision; however, the measurements allow us to reveal the general scheme of the methods used by the architects.\(^{377}\)

The sides \((a)\) of the square space contain wide niches and the arched opening. Their width is commensurate with \(\frac{a}{\sqrt{3}}\) (fig. 77).

\(^{376}\) In this case in particular it would be more rational to assume that the proposed proportions simply do not correspond to the actual measurements, if any proportional system was implemented at all.

\(^{377}\) Assuming that “design of the plan was not done with sufficient precision,” Bulatov explicitly subordinates the historic monument to his proportional schemes: if the monument does not correspond to the schemes, it is the fault of the builders rather than the inconsistency of his reasoning.
The width of the lateral niches and the thickness of the spandrel of the portal are commensurate with $\frac{a}{\sqrt{5}}$. The thickness of the rear wall is commensurate with half of the side of the square.

The thickness of the portal wall is commensurate with $\frac{a}{\sqrt{3}}$. The depth of the portal niche is commensurate with $\frac{a}{\sqrt{3}} - \frac{a}{\sqrt{5}}$.

The height of the square space is commensurate with $\frac{a\sqrt{5}}{2}$ (fig. 73).

The height of the octagonal space correlates to the side of the octagon inscribed in the square.

The height of the segment of the square compound [between the floor and] the beginning of the curve of the inner dome corresponds to half of the side of the square.
The curve of the inner dome equals the segment of the ellipse with the following parameters: the big semiaxis corresponds to the side of the square; the small semiaxis [corresponds] to the bigger segment of the side \((a)\) of the square divided according to extreme and mean ratio:

\[
\frac{a(\sqrt{3}-1)}{2}.
\]

{p. 38}
Mausoleum of Ismail Samani. Beginning of the 9th – end of the 10th cent.

Bukhara. Built in the end of the 9th or the beginning of the 10th cent., this mausoleum was a family burial site of Samanid dynasty.

In the history of the architecture of Uzbekistan and Central Asia this monument occupies the most important place. The architectural image of this outstanding oeuvre reflects all the most perfect achievements of building technology and artistic methods that still reflected the substantial pre-Arab traditions; in a way, it completes the architecture of the ancient period. The building is not yet a typical example of medieval architecture, but it already contains the methods that, in the 11th and 12th centuries, became the foundations of the medieval style.
The structure of the mausoleum is quite ordinary and simple: the square space is covered by the dome supported by eight trussed arches. Four of them traverse the corners of the square space and create pendentives. Eight arches are set on the thick wall reinforced by small vaults and surrounded by the exterior wall so that they could resist the thrust of the dome. The exterior wall leaves a narrow walkway around the arches; on each side, there are ten passages in the...
shape of the arcade, (p. 41) which encircles the mausoleum. There are walls between two main arches; those walls form an octahedron. Small columns are erected in the corners of the octahedron as if supporting the cornice of the dioctahedron located above the octahedron and the first stripe of the dome. The main structure is revealed to the utmost extent and is all covered by the decorative ornament. The arches located over the walls are covered with decorative lattices; the pendentives – like the pendentives of Kyrk-Kyz – have small windows.

*Kyrk-Kyz. The vault of the niche.*

The tracery belt of arches brings light inside the mausoleum. Internal structure is logically connected with the exterior forms. The general composition of the mausoleum consists of a simple combination of a cubic body with a half-dome; however, it is very elaborate from the architectural perspective. It does not camouflage the basic volumes or emphasize the main façade. The building is perceived evenly from all its sides. Very powerful columns are installed in the exterior corners; they support the rounded corners of the arcade gallery. There are entrance niches in the centers of each wall. They are covered with pointed vaults. All corners of entrance
arcs are decorated with columns. The ancient form of the dome has not survived. The general composition is supplemented by smaller domes in the corners; the form of these domes is typical for the 12th century.

The mausoleum is built of small square bricks (22.5-23.0×3.0 cm) with alabaster mortar. The outstanding decorative texture that covers all parts of the facades and the interior is made of the same bricks. Arches and domes are constructed of larger bricks; they are decorated by cuts and tracery brickwork with ruptures. The strong relieve of the facing uses the motives of webs, circles, and triangles. The arches of the gallery are covered by the interlacing ribbons. Some details and ornaments are made of plaster. The small columns under the dome in the pendentives layer imitate the ancient form of wooden columns in all their details. There is no specifically Muslim ornamentation in the decoration, or inscriptions.

The builder of the mausoleum brilliantly revealed the potential of brickwork in the structures, forms, and decorations; from this perspective the monument is the masterpiece of the brick architecture. During the restoration of 1937, a wooden board was discovered under the plaster over the door of the eastern wall; the board was attached by forged nails to the beam. An inscription is preserved on the board; it mentions the name of Ismail’s grandson Emir Nasr, who ruled between 918 and 943.
The Great October Socialist Revolution initiated the state preservation of monuments; this resulted in the growth of awareness in the problems of scientific restoration of monuments, which in turn provoked questions related to the methods of repair, restoration, specific technical problems, materials, mortars, etc.

Consequently the study of the monuments before the restoration and in the process of restoration was recognized as a scientific problem. This problem called for the development of methods and regulations for scientific-research works, measurements, and photographic documentation.

Before 1924, all these questions were explored and addressed by the special Division of Science Department at the People’s Commissariat of Enlightenment of Russian Soviet Federative
Socialist Republic [spetial’nyi Otdel Glavnauki Narkomporsa RSFSR]; starting from 1924, those questions were delegated to the Central State Restoration Workshops /TsGRM/ organized in the same year. The Workshops were responsible for listing, preservation, and restoration of architectural monuments on the territory of the RSFSR as well as — at times — in the Union-level republics.

On the practical level, methods of study and restoration have been developed by the best and the most experienced architect-restorers in the process restoring numerous monuments, including D. P. Sukhov [1867-1958], I. V. Ryl’skii [1876-1952], P. D. Baranovskii [1892-1984], E. V. Shervinskii [1878-1942], S. A. Toropov [1882-1964] and others. B. N. Zasypkin specifically focused on the questions of study and restoration of the monuments of Soviet Orient [Sovetskii Vostok]. It should be mentioned that Soviet methods were developed on the basis of the traditions of Russian architectural science and scientific restoration, which was established by architect P. P. Pokryshkin /died in 1918/. P. P. Pokryshkin developed methods of architectural measurements; in that he achieved the level of scientific precision.

379 Tsentral’nye Gosudarstvennye Restavratsionnye Masterskie.
380 Rossiiskaia Sovetskaia Federativnaia Sotsialisticheskaia Respublika [Russian Soviet Federative Socialist Republic].
381 i.e. the historically changing number of republics that constituted the Union of Soviet Socialists Republics, as opposed to autonomous republics and regions subordinated to the Union-level republics; e.g. Uzbekistan (Uzbek Soviet Socialist Republic/UzSSR) was a Union-level republic, while Karakalpakstan was an autonomous administrative unit (Karakalpak Autonomous Soviet Socialist Republic) and a part of Uzbekistan represented at the level of the Union through Uzbekistan.
382 Dmitrii Petrovich.
383 Ivan Vasil’evich.
384 Piotr Dmitrievich.
385 Evgenii Vasil’evich.
386 Sergei Aleksandrovich.
387 The author of this paper.
388 Piotr Petrovich.
389 Pokryshkin actually passed away on February 5, 1922. He was born in 1870.
[Soviet] scientific-research methods substantially differ from bourgeois methods of research and from formal methods practiced by Professor A. I. Nekrasov’s [1885-1950] Art History Department [kafedra iskusstvoznaniiia] at Moscow State University as well by several independent art historians including N. I. Brunov [1898-1971], etc. When formalist art historians studied monuments – if they ever did this at all – they approached them hastily and superficially, documenting only their own experience and feelings, which they described with enthusiastic pathos – or grieved, when monuments contradicted their speculative armchair theories. Attracted by the ideology of bourgeois art historians-idealists, formalists were mainly addressing general art historical problems; they degraded to idealistic opinions regarding the history of architecture or even to mysticism as in the case of N. I. Brunov’s Essays in the history of architecture. His analysis of monuments and the structure of his history of Russian architecture had nothing in common with immediate and serious study of actual monuments; it ignores the history of societal formations, the specific conditions of the construction of monuments; he disregarded the history of building technology as well as artistic and decorative techniques. All of this resulted in the anti-scientific conceptions and in architectural literature of worthless and harmful false-works. It is clear that the formalist methods, which in certain cases went as far as servility [nizkopokonstvo, literally: low-bowing] in front of the reactionary scholars of the capitalist West, and cosmopolitanism had nothing to do with the Soviet science, with Soviet methods in sciences and research. It is clear that idealistic, fantastic armchair theories cannot result in the correct knowledge of monuments, cannot lead to their correct understanding, and cannot provided documental material for their scientific restoration.

390 Aleksei Ivanovich.
391 Nikolai Ivanovich.
392 Ocherki istorii arkhitektury, Moscow: Academia, 1937.
393 i.e. Primitive, Slave-owning, Feudalist, and Capitalist formations – the necessary stages in the history of humankind defined as defined by the Soviet science of Historic Materialism.
One shouldn’t forget a notorious fact that architectural monuments reached us with large lacunas, alterations, changes and modifications and that the buildings constructed dozens and hundreds years ago were altered numerous times. Among repairs by plainly ignorant and uninformed people, the alterations that resulted from pretended “restoration” deserve a special mention. In the second half of the 19th century, the great interest and love for Russian antiquities became widely spread. However, numerous examples convince us that amateurish interest and simple love for antiquities just for the sake of them being old do not provide science with positive data, resulting in the huge – and sometimes irreversible – damage to the monuments. In this contest one should remember the story of important architect Sultanov, who – pretending to restore – disfigured the chambers of the ancient Terem palace in [Moscow] Kremlin, Saint Basil’s Cathedral, and other outstanding buildings of Old-Russian architecture. Sultanov fancied himself an expert in Russian architecture and wall-painting, and by inspiration [po naitiiu] invented details and designs for murals. When the scientific basis was developed for the study of Russian architecture, it turned out that Sultanov was a complete ignoramus in everything related to restoration.

It is possible to give numerous examples of similar “restorations” that obscured the study of Russian architecture for dozens of years and deceived inexperienced and superficial scholars. These restoration methods are still used in foreign capitalist countries, including Iran and Turkey; and only in the Soviet Union the study and restoration of monuments actually obtained scientific and academic foundations. Soviet methods will be discussed below, using the monuments of Uzbekistan as an example, but here it should be mentioned that their general fundamental goals and scientific requirements are shared [by all regions of the Soviet Union];

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394 Nikolai Vladimirovich Sultanov (1850-1908).
however, in special cases, Soviet restoration methodology accounts for the character of regional architecture and even for the character of single monuments and their state of preservation.

From left to right: B. N. Zasypkin, unknown, V. L. Viatkin, M. F. Mauer, Sosnovskii. Source: Burkhare Historic Museum

Apart from the author of this paper who works in this field since 1923, the following [cultural] workers participated in the development of the methods of study and restoration of Uzbekistan architecture from theoretical and practical perspectives: architect M. F.\textsuperscript{395} Mauer /from 1918 until 1938/, archeologist V. L.\textsuperscript{396} Viatkin /from 1918 until 1932/, archeologist \{p. 4\} Professor M. E.\textsuperscript{397} Masson /from 1918/, archeologist-historian Professor V. A.\textsuperscript{398} Shishkin /from 1925/\textsuperscript{399},

\textsuperscript{395} Mikhail Fedorovich (1866-1938?).
\textsuperscript{396} Vasilii Lavrent'evich (1869-1932).
\textsuperscript{397} Mikhail Evgen'evich (1897-1986).
\textsuperscript{398} Vasilii Afanas'evich (1893-1966).
\textsuperscript{399} "until 1967" – added in handwriting by the editor of the paper Sofiia Dmitrievna Shtange, who was preparing it for the publication around the late 1960s or the early 1970s.
architect N. M.\textsuperscript{400} Bachinskii /from 1927 until 1932/, architect M. M.\textsuperscript{401} Loginov / from 1927 until 1932/, architect P. S. Kasatkin /from 1928 until 1930/ and others.

Boris Zasypkin, standing in the center, surrounded by Uzbekistani traditional masters (photo 1946). Source: Burkhare Historic Museum

It should be mentioned that the practical study of architectural monuments of Uzbekistan and their specific technology, decorative methods, materials, and mortars only became possible thanks to old masters of building, the descendants of glorious masters of historic ages that have long passed; among them, in Samarkand: Usto\textsuperscript{402} Abdukadyr-Bakiev /passed away in 1935/, Usto Akram-Umurov, Usto Shamsiddin-Gafurov, Usto Mirkhamid Iunusov and others; in Bukhara: Usto Salam /passed away in 1928/, Usto Kurban Iuldashev /passed away in 1944/, Usto Ibragim Gafizov /passed away in 1943/, Usto Abdurakhman Khaiatov /passed away in

\textsuperscript{400} Nikolai Mikhailovich (dates of life unknown, active in Armenia around 1950).
\textsuperscript{401} Mikhail (?).
\textsuperscript{402} ‘Master’ in Uzbek.
1940/, Usto Madzhid Salekhov, Usto Shirin Muradov⁴⁰³ and others. From these masters we also learned a lot about special terminology and the theory of building art of Uzbekistan as well as about the matters related to the monumental architecture and ordinary dwellings.

Soviet methods of study and restoration are based on the conviction that no single monument is preserved to its original image; on the one hand we encounter destructions, on the other – repairs, alterations, and renovations. Our first goal is extremely difficult, important, and often very hard to achieve; it consists of establishing the authentic original parts and clarifying what remained from the original image of the monument and what belongs to later repairs, alterations, and additions. Then we establish the chronological sequence of repairs, alterations, and additions, as well as the dates of all other interventions. In the case of the monuments of Uzbekistan this goal is complicated by the lack of literary and archival materials that would contain information about the time of construction, rebuilding, {p. 5} and repairs. For the most part, the buildings are dated based on the inscriptions preserved on the monuments; more than half of all monuments protected by the state do not have an established building date, including such an important monument as Gur-i Amir mausoleum.

Vasilii Afanas’evich Shishkin, sitting on the right, supervises the excavations in Uzbekistan. Source: Burkhare Historic Museum

Archeologist Mikhail Evgen’evich Masson

⁴⁰³ "passed away in 1956" - added in cursive by Sofiia Shtange. The actual dates of his life are 1890-1957.
The obscurity of the monuments of Uzbekistan invited an active participation of archeologists, historians, and epigraphers in their study. Art historians with their general problems and formalist methods discussed above were the least helpful. Most helpful for dating of the buildings were V. L. Viatkin, V. A. Shishkin, and M. E. Masson, and later Ia. [G.]\textsuperscript{404} Guliamov and A. Nabiev.

A collective\textsuperscript{405} consisting of an historian, an archeologist, and an architect is essential for the study of monuments and in due time such a collective played a great positive role.

At the present stage in the study of architecture inherited from the past ages of Uzbekistan it is impossible to believe that one specialist can resolve all questions related to the study and – even more so – the restoration of architectural monuments. A collective is useful for historic or archeological study of monuments; however, when it comes to restoration, the architect’s voice is the most important. Yet this shouldn’t be just a regular architect, but rather a researcher, a specialist in the history of architecture of Uzbekistan.

After the original image of the monument is established – or rather what remained from that image – the following aspect should be studied: what are the technical conditions of the remaining parts of the original monument; which measures should be taken to preserve them; would it be possible to save them if we remove all the additions and supports; which of the lost parts can be restored with 100% precision based on available documentation and how can this be done, etc. Thus, we have to initiate a cycle of works that is supported \{p. 6\} by scientific and historic as well as engineering data.

Here I am not going to dwell on the general principles of restoration, which are codified in the instructions and rules; instead I will focus on several cases that shed light on the practical aspects

\textsuperscript{404} Iakhia Guliamovich (1908-1977); the second initial is added in pencil by Sofiia Shtange.
\textsuperscript{405} A group sharing the Communist values.
of Soviet methods of the study of monuments in Uzbekistan, on our mistakes and deficiencies as well as achievements in this domain.

RESTORATION OF ISMAIL SAMANI MAUSOLEUM IN BUKHARA /end of the 9th, beginning of 10th cent./
Samanid mausoleum in 1924, photo by Ernst Cohn-Wiener
Source: Archnet
Although Ismail Samani mausoleum is located in Bukhara, a broader circle of scholars learned about it only after the October Revolution. In 1929, historian Professor I. I. Umniakov [1890-1976], a student of Academician V. V. Bartol’d [1869-1930] found a waqf document and established on its basis that Ismail, the most outstanding ruler of the Samanid State/second half of the 9th and the whole of 10th cent./, built a mausoleum over the grave of his father.  

The wooden board with an inscription discovered by B. N. Zasypkin. 
Source: Igor Demchenko

Based on the dates of Ismail’s rule, the following construction dates were established: the end of the 9th or the beginning of the 10th century. In 1937, when I studied the monument by removing the admittedly late gypsum plaster, I found a board attached by forged nails to the beam, located over the eastern door; the board contained a part of inscription written in the most ancient Kufic script. In this inscription V. A. Shishkin read the name Nasr son of Ahmed son of Ismail. Nasr the grandson of Ismail ruled in Bukhara between 914 and 943. Based on that, the late Professor B. P. Denike [1885-1941] came to the hasty conclusion that the mausoleum was built between 914 and 943/B. P. Denike, Architekturnyi ornament Srednei Azii [Architectural ornament of Central Asia]; Moscow-Leningrad: Izdatel’stvo Akademii Arkhitetury, 1939, p. 8/. First of all,
the board was nailed, which could have been done many years after the construction of the mausoleum; second, the inscriptions over three other doors, which could support this hypothesis, are not preserved although they must have existed, because we have only a piece from the eastern side. {p. 7} At the same time no one can refute a historic statement that the mausoleum was built specifically by Ismail for his father. This is also supported by the fact that Ismail’s grave, which for some reason became popular as a Mazar or the sacred grave, is not situated in the center of the building but in one of its corners. Certainly a dozen of years are of little importance for the history of architecture; however, it is important to connect the building of the mausoleum to the time of Ismail’s rule, which is characterized by the flourishing of court culture, literature and art, sprouting from local traditions and language that developed in connection with the struggle of Central Asian population against the Arab oppression. It is also important because the monument is unique, and no similar monuments, in terms of architecture and decoration, are preserved either on the territory of Central Asia or within the borders of Afghanistan and Iran, i.e. on the lands that historically were part of Samanid, Kara-Khanid, Mongol, and Timurid states.
The mausoleum was located in the middle of ancient cemetery completely surrounded by residential quarters. One had to take a narrow and crooked dead end trail to reach darvaza-khane, a small entrance building, connected to the mausoleum by a rather narrow alley submerged three meters below the ground level of the cemetery. A framed structure was attached to the mausoleum from its northern side; it served as an auxiliary space for the sheikhs that were in charge of Pasha-Ismail’s cult.

Up to the middle of their height the walls of the mausoleum were covered with graves shaped in the form of brick vaulted crypts /sagana/; there were so many of them that in thousand years many layers had gradually accumulated elevating the ground level of the cemetery. The walls of the mausoleum were damaged to carve out space for some of the graves, particularly from its southern side. Walls were also partly damaged by the soil salts and by the time; the lower parts and the interior of the niches were covered with plaster. {p. 8} A cornice and four small domes
were completely covered with plaster. In 1923, still during the time of Bukharan People’s Republic and with no scientific supervision, the large dome was refaced with brick cladding; simultaneously triangular projections were constructed and the brick-and-gypsum lantern was installed on its top of the main dome. Inside the building, the walls with complex brickwork were covered with plaster up to the middle of their height. Other parts of the interior were fairly well preserved, with an exception of small damages in brick lattices that fill in the arches at the level of the pendentives. Such was the condition and the image of this outstanding monument before the excavations and the restoration.

In 1937, the dilapidated residential quarters were demolished and the Park of Culture and Leisure was laid out in their place. After the excavations the mausoleum, now located within the borders of the park, looked shabby and untidy; it was proposed to restore the monument and to take care

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411 Bukharan People’s Soviet Republic was a puppet Communist state created from the Emirate of Bukhara after the expulsion of emir Mohammed Alim Khan (1880-1944); it existed between October 8, 1920 and October 27, 1924.

412 In reality this repair of the dome was organized in 1925 by Musadzhan Saidzhanov.
of the surrounding territory. Between 1937 and 1939 a lot of work was done to study and restore
the mausoleum; the author of this paper was in charge of this work.

The ancient age of the monument, its tremendous historic and architectural importance, its
peculiar artistic brick texture, destructions of the facing and the generally neglected conditions –
all called for a prolonged study. Each ancient brick that still occupied its original place would
have to remain in place. Therefore, I was always personally present during all the removals of
the plastering and the brick patches. \{p. 9\} It was important for me to be sure that no single
ancient part, even the smallest one, was lost in the hands of a master; I needed to keep track of all
the vestiges and traces of lost details.

To illustrate the methods and the problems that I had to deal with, I will briefly focus on their
most important aspects. All arches, small and big, that cover internal and external niches and
doorways were supported by small columns in quarters; for the first time this was demonstrated
by the vestiges of such a small column on the southern side. To support this observation we needed to find more fragments or, in other words, documental evidences in other corners that were partially infilled and plastered. A very careful approach was required to consistently remove all of the plaster and the [brick] patches. This way we found more vestiges of columns on the western side and in other places.

Fragments of the cornice before and after restoration. Source: Archnet

The second complicated goal was to find the traces of the ancient cornice [karniz] – or rather the completing element of external walls, since the architecture of Uzbekistan never knew cornices in the Russian sense of the word. We already lost hope to find the traces of the ancient cornice when in the north-eastern corner along the northern wall, under the layer of bricks and plastering, very well-preserved traces and details were discovered. The cornice was shaped in the form of inlayed frieze all filled with circles that consisted of very small bricks arranged into the system of six-pointed stars and held in circles by gypsum. On the corners, where this cornice goes around the building along the circumference of the maximum diameter, it was impossible to have
the circles so the masters built the frieze by laying bricks on the edge. Several rows of brickwork survived above the frieze; they slightly hang over the surface of the frieze. Those documents [i.e. the traces of ornamentation] allowed us to reconstruct the cornice of the mausoleum with complete reliability. All ancient {p. 10} parts, as documents, were left in their place with no changes or alterations.

The study of small domes built above the corners of the mausoleum showed that the double-brick brickwork is preserved under the multiple layers of plaster; parts of this brickwork are in a good state of preservation /in the cylindrical part/, while the small domes are constructed in careless and shapeless way. The bricks of the small domes have different size and shape. The mausoleum and its outstanding brick facing is built of thin square tiles /22-23×22-23×3 cm/, while the bricks of the small domes belong to the 12th century. The same type of bricks is discovered in the upper part of the [main] dome. Therefore, the following conclusion is proposed: four small domes over the manholes that lead from the small gallery to the roof, as well as the upper part of the main dome, were rebuilt in the 12th century during one of the repairs. Small domes were left unchanged after the removal of the plastering; only the joints were refaced with a new mortar.

The cleaning the large dome did not show any ancient facing under the 1923 cladding. With no ancient data about the original historic image of the dome, we left it in the same condition as it was before the beginning of our 1937 restoration. The removal of plaster from interior walls was a difficult matter. The pure white gypsum [gul’ganch] contained sheresh glue, and therefore the plaster was so strong that it produced sparks when being knocked off. The plaster was applied to the brick relief and the bricks were partially damaged by salt and humidity /in the exterior, as we mentioned above, the walls were half-covered with the soil of the cemetery/; for

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413 A type of glue prepared from the roots of local plants.
that reason, the removal of plaster had to be done with utmost care to avoid damaging the bricks. When the plaster was removed, the ornamental brickwork and the low socle was discovered; the socle also featured the tracery brickwork but the bricks were still covered with thick coating. Hot water was used to remove this coating. Simultaneously, {p. 11} the later floor was removed; the ancient floor was discovered, which consisted of big bricks measuring 60x60x4.5-5 cm. Parts of the wall and socle brickwork were restored, and now the interior has the authentic ancient image.

Thus, we established that it is possible to reconstruct the lost and damaged parts of facings on exterior walls and to reconstruct small columns and lower parts of big corner columns, the cornice, and other details; however, when it came to the actual restoration, we encountered artistic and technical difficulties. Small bricks used in the facing of the mausoleum were shaped by the craftsmen; they did not have strict and regular forms or sharp edges. Their form can be compared with that of soft pillows. Therefore, the overall texture of the mausoleum has soft character; geometrically it is not particularly precise. The light-grey and yellow color of the bricks adds a soft tint to the mausoleum. The manufacturing of the new bricks was out of the question. But a successful solution was found. Under the supervision of V. A. Shishkin, archeologist S. K. Kabanov conducted excavations that broadened the trench in all directions, particularly in the southern one, reaching the ancient original ground level. This allowed us to establish the correct perspective on the mausoleum from its southern side. Excavations brought numerous Samanid bricks of the same size as in the mausoleum; this allowed us to use ancient bricks for all restoration works. The builders of the mausoleum used gypsum mortar with a small addition of thinly sifted loess. Ages passed and the dark-grey color of the mortar became even darker. If we used the pure white gypsum mortar for the restoration, our patches would become visible and would spoil the impression of antiquity. After the demolition of residential quarters

414 Sergei Kuz'mich.
and the cemetery, the ground was covered with pieces of old gypsum mortar. We collected those pieces, built a primitive furnace nearby, and used the burr that abundantly grows in Bukhara as a fuel. The resulting mortar had grey color; we used \{p. 12\} it for the restoration of the mausoleum. In some cases we added new gypsum to the mortar; we used pure gypsum in the parts that are not exposed to the public.

Muradov working. Source: Bukhara Historic Museum

Hand of Usto Shirin Muradov. Source: Bukhara Historic Museum
However, even after we resolved the problem of brick and gypsum, our difficulties only started. The famous Burkharan memoir \(^{415}\) Usto Shirin Muradov, currently the Honorary Member of Academy of Science of UzSSR \(^{416}\) and the Stalin \(^{417}\) Prize Laureate, became the head of the brigade of masters; already for fifteen years he was working in the restoration of architectural monuments in Bukhara. The brigade started from making several samples of the new facing. In one case the new brickwork was “better” that is more regular than the ancient; its inconsistency was immediately obvious. In the other case, when masters tried to imitate the manner of the old brickwork, the result was too rough and untidy.

The sample part was redone many times before masters could precisely grasp the manner of the original brickwork and the laying of joints, and before they understood what we want from them. Finally the correct way was established, and Usto Shirin took care of the most crucial parts selecting bricks in his skillful manner. In other monuments [of Central Asia], the restoration of brickwork in the manner of the original is not such a big problem; still the character of the brickwork and the laying of joints are always carefully studied and their restoration always requires scientific supervision.

Simultaneously we conducted the detailed measurements and the study of architecture of the mausoleum and its structures.

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\(^{415}\) Uzbek: architect.

\(^{416}\) Uzbek Soviet Socialist Republic.

\(^{417}\) Circled and handwritten “State” by Sofiia Shtange.
Despite the thick walls /up to 1.80 m/ and with the internal dimensions of 7.20 m, as a result of earthquakes mausoleum cracked along the niches, i.e. along the thinnest section [of the walls].

We observed the destructions in the ground part resulting from the inflation of the brickwork caused by the fluidity of the mortar under the pressure of the structure’s weight. However, in general the mausoleum is standing solidly on powerful brick foundations, the lower surface of which is two meters above the ground waters. We poured gypsum mortar into the cracks and repaired the facings where cracks destroyed them. I conducted the measurements myself, at times assisted by T. S. Stramstova, who prepared the drawings of plans, facades, sections, and details.

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418 Sofiia Shtange marked this passage “Isp,” meaning “correct the mistake.”
419 Tat’iana Sevast’ianovna (1911-?).
After three years of restoration, Ismail Samani’s or Samanid mausoleum, one of the most ancient architectural monuments, was almost returned to its original image, with an exception of wall tops /which could’ve had merlons and the parapet/ and the original image of the small domes as well as the large one. In fact those parts the ancient forms are lost forever.

Thus, we observe a strictly centrical type of the mausoleum with doors in all its sides. To prevent littering in the interior of the mausoleum we closed the doorways with simple and light metal bars; they don’t interfere with the architecture, and although those bars don’t comply with it as well they are indispensable for utilitarian purposes.

We studied the mausoleum in details, comparing its architecture, the structure of the dome, and the brick ornamentation with the monuments of Central Asia, Afghanistan, and Iran built approximately during the same time and in the same area – and we have come to the final conclusion that no similar architecture had ever existed in Iran, that the mausoleum was created by masters from Bukhara, and that on the one hand the mausoleum had concluded the Sogdian school of architecture but on the other hand it opens the new page in the history of Uzbekistan architecture of the Feudal Era.

The views of formalists and cosmopolitans, who denied the existence of an independent and original line in the history of culture, art, and architecture of the peoples of Uzbekistan, are now finally annihilated.

Samanid mausoleum, erected in Bukhara one thousand years ago, visibly demonstrates the great height achieved by the art of building, architecture, and artistic methods [during the Samanid era]; it also testifies to the naïveté of attributing this monument to “Arab,” “Iranian,” or “Islamic” art. Soviet science armed with the Marxist-Leninist theory has already discovered and will continue discovering the authentic history of Uzbekistan and the authentic ancient art
created by the masters of modest background – the art that embraces the progressive ancient traditions.
At the beginning of [our] study the southern portal constituted haphazardly preserved bodies of pylons surrounded by the dilapidated gallery in the south and the west. Our goal was to restore the portal; therefore we had to obtain and use all possibilities for acquiring the data that – at least to some degree – could help us in this task.

Our study included the demolition of the part of the gallery located in front of the portal; this resulted in the revealing of the lower façades of the pylons, which were severely damaged during the construction of the gallery. The cleaning of the pylons from the later layers provided the data for complete restoration – but only for the lower part of the portal /level = $+45.0 \text{ cm}$/.

Thus it was not possible to extract more extensive data from existing structures for the restoration.
We managed to discover in the archives three photographs taken during different periods, based on which it became almost completely possible to restore the portal in all its details /B. N.

Kastal’skii\textsuperscript{420} photographs, 1902-3; a postcard from “The Khanate of Bukhara” series, 1917; and a photograph of the [Moscow] M[useum] of [O]riental [C]ultures, 1926-7.\textsuperscript{421}

While the photographs were used in preparing the restoration project of the portal, we [also] measured the brickwork of its different preserved parts aiming at establishing

\{p. 2\}

the average size of ten rows [of brickwork] + ten layers of mortar.

The measurements gave the following result:

1. Western side, the eastern corner of the pylon:
   \begin{align*}
   10 \text{ rows} + 10 \text{ layers} &= 66 \text{ cm.} \\
   20 \text{ rows} + 20 \text{ layers} &= 135 \text{ cm.}
   \end{align*}

2. Western façade of the portal:
   \begin{align*}
   10 \text{ rows} + 10 \text{ layers} &= 64 \text{ cm.} \\
   20 \text{ rows} + 20 \text{ layers} &= 130 \text{ cm.}
   \end{align*}

3. Western pylon of the portal from the southern side:
   \begin{align*}
   10 \text{ rows} + 10 \text{ layers} &= 65 \text{ cm.} \\
   30 \text{ rows} + 30 \text{ layers} &= 200 \text{ cm.} \\
   40 \text{ rows} + 40 \text{ layers} &= 261 \text{ cm.} \\
   50 \text{ rows} + 50 \text{ layers} &= 329 \text{ cm.} \\
   61 \text{ rows} + 61 \text{ layers} &= 402 \text{ cm.}
   \end{align*}

\textsuperscript{420} Boris Nikolaevich Kastal’skii (1868-1943), Russian military engineer, archeologist, historian, major-general.

\textsuperscript{421} For one of the photographs see the main text of the dissertation.
From these examples we can see that the size of 10 rows + 10 layers in the basis of the portal under maximum load equals 64 – 66 cm. At the same time, in the upper parts of the brickwork, where the load decreases, the size of 10 rows + 10 layers increases, and when it comes to sixty rows

\[10 \text{ rows} + 10 \text{ layers} = 402 - 329 = 73 \text{ cm},\]

i.e. \(1 \text{ row} + 1 \text{ layer} = 73/11 = 6.65 \text{ cm}.

If we take into account the natural decrease of the load with the rise of the brickwork, this pattern is fairly well-grounded. Based on this statement, in the case the upper parts of the portal 10 rows + 10 layers at the level of twelve dozen rows of brickwork would equal 67-78 cm, since the added size

\{p. 3\}

for 60 rows + 60 layers constitutes 1-1.5 cm.

We calculated the number of brick rows and mortar layer on the photographs in different architectural articulations. The following data was obtained:
Based on these calculations we deduced the heights of the separate elements included in the project.

1. The height of the portal /without dandana\(^{422}\)/

\[98 \text{ rows} \times 6.8 = 666.0 \text{ cm} \quad 666 + 447 = +1113 \text{ cm}.\]

2. The height of the low small belt and the upper part of the niche of the tympanum:

\[79 \times 6.8 = 538 \text{ cm} + \text{layer of mortar}/2-3 \text{ cm}/ = 541 \text{ cm}\]

\[541 + 447 = +978 \text{ cm}.\]

3. The height of the keystone /exterior, the upper part of the archivolt/:

\[58 \text{ rows} \times 6.75 = 391 \text{ cm}.

\[391 + 447 = +838 \text{ cm}.\]

4. The height of the lateral façade of the portal /up to the upper projection of the lower arch/:

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\(^{422}\) Dandana is an architectural element, which consists of a layer of bricks in the top part of the cornice.
50 rows × 6.75 = 336 cm.

336 + 472 = 808 cm.

Using this method, we obtained all heights for all intermediate articulations [needed for the] project.

Simultaneously we deduced the basic points needed for defining the law of the design of the portal arch, which are:

- a/ the beginning of the decorative abutments of the arch-vault = +447 cm,
- b/ the height of the keystone of the arche-vault = +790 cm., and
- c/ the beginning of the curve of the arch at the gable wall = +613 cm.

Among numerous possible variants of the arch curve, we have chosen the one that better corresponds to the curve presented on the photograph, taking into account the foreshortening of the image in the photograph and the insignificant sag of the arch in the middle part of the slightly sloping curve. This variant also corresponds to the horizontal articulation that passes through the base of the window on the gable wall, the base that supported the abutment of the arch-vault.

The resulting curve is accurate; the character of the curve reflects the conditions of photographing and the deduced heights.

However, since we were not satisfied by the experimental data, the portal was subjected to proportioning, which unexpectedly supported the chosen design scheme of the arch-vault [making it] even more [convincing].

Proportioning allowed us to establish the module, the numerical value of which equals 96-96.5 cm; in its turn, the module proved to be commensurate with the brickwork, i.e. [it equals] three bricks with three layers of mortar lengthwise and fourteen rows and fourteen layer heightwise.
Proportions of the portal and the design of arches.
It turned out that all the main proportions of the portal as well as the geometry of the arches/diagonals, centers/ are derived from this module, which has the graphic form of a circle with a diameter of 96-96.5 cm.

Simultaneously we confirmed B. N. Zasypkin’s formula, which he deduced from the proportioning of Shah-Fazil; the formula defines the length of the brick with a mortar layer as

\[
\frac{\text{GAZ}}{5}\sqrt{3}
\]

Thus we obtained the date needed for the restoration of the southern portal of the Big domed compound in the ensemble of Hakim al-Termezi.

Notes regarding dandan:
As a result of proportioning, the module crossed the line of the upper horizontal small belt by half of a brick. In the project, this “surplus” was eliminated by adding the dandana. The remainders of the vertical brickwork, which consisted of half of a brick, in the lower part of the portal immediately adjacent to the dome indicated the possible existence of such a dandana.

To prevent the middle part of the portal over the niche from the collapse, it will be reinforced by rectangular frame [made of] reinforced concrete or wooden.

At the level of the keystone, the reinforced concrete belt will be installed; it will prevent the vault from the rapture in the keystone part, and will tie the two pylons.

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423 Shah-Fazil is an architectural complex in southern Kyrgyzstan that includes an 11th century mausoleum and numerous later structures.
Архитектор — Бакин.
/Филимонов/
K. S. Kriukov’s restoration of Kukeltash madrasah in Tashkent.
Visual and graphic documentation, 1870s - 1990s.

“To finalize the reconstruction project for the portal [of Kukeltash madrasah in Tashkent] we still have to define its upper part, which was lost before the time, when the façade was first photographed. In the architecture of Bukhara and other cities of Central Asia we have numerous similar buildings that will help us to arrive to the general understanding of the top of the portals.

Analyzing the preserved portals of the 15th and 16th centuries we pay attention to their following features:
1. Proportion-wise there are two types of portals – rectangular, with a smaller side as the base, and square.
2. The majority of portals obey to the laws of geometric composition, which are most often based on the square and its derivatives.

Proportion-wise the portal of Kukeltash madrasah is identical to the portal of Ulugh Beg madrasah in Samarkand [and] Sher Dor madrasah, [as well as] Chor Bakr khanaqah [and] Abdullah-khan madrasah in Bukhara, etc. …

The characteristic feature of all abovementioned monuments is the location of the impost of [portal] arch, which divides the height of the portal in two equal parts; the span of the arch equals half of the base of the portal.

424 L. I. Rempel’ in his article “Kriterii nauchnoi restavratsii pamiatnikov arkhitektury” [Criterion of scientific restoration of architectural monuments] is particularly critical of the “method of analogues” that “in practice resulted in the creation of copies and the loss creative originality in the monuments of art” (Stroitel’stvo i arkhitektura Uzbekistana [Building and Architecture of Uzbekistan] 3(1978), pp. 10-11).
The location of the imposts of portal arch of Kukeltash madrasah was defined from the photograph. The ratio between the imposts of the arch and the 16th century ground level is 1:2, i.e. it equals half of a square. The span of the arch consequently equals the side of an inscribed octagon. Thus we defined the height of the portal, which equals 19.73 m.\textsuperscript{425}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{kukeltash.png}
\caption{Kukeltash Madrasa in Tashkent before the earthquake of 1868; from Turkestan Album (1871-1872).}
\end{figure}

K. S. Kriukov’s reconstruction of the main portal of Kukeltash Madrasa in Tashkent based on the proportional analysis (c.1956).


K. S. Kriukov’s graphic reconstruction of the main portal of Kukeltash Madrasa in Tashkent (c.1956).

K. S. Kriukov’s graphic reconstruction of the main portal of Kukeltash Madrasa in Tashkent (c.1956).

Rebuilding of Kukeltash Madrasa by K S. Kriukov’s restoration team, c. 1956.
Rebuilding of Kukeltash Madrasa by K S. Kriukov’s restoration team, c. 1956.


Main portal of Kukeltash Madrasa in Tashkent after K. S. Kriukov’s restoration; photographed in 1987 (Archnet).
Kukeltash Madrasa in Tashkent after K. S. Kriukov’s restoration; photographed in 1990 (Archnet).
N. N. Kuz’mina et al.

Geometrical analysis of the design


A. Plan of the mosque

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Addressing of the plan of Bibi-khanym mosque it is important to keep in mind the early Islamic mosques that predate the investigated mosque [built] in the capital of the vast Timur’s state. The mosque of Damascus (8th c.) measured 177×180 meters; the mosque of Cordoba (8th – 10th cent.) [measured] 140×180 m, al-Azhar and Ibn Tulun (9th c.) mosques in Cairo [measured] 112×120 m and 120×138 m [respectively]; among the mosques contemporary to Bibi-khanym are Sultan-Hassan mosque in Cairo (14th c.) measured 60×120 and Jameh mosque in Isfahan that measured 115×125 m.

Jami mosque in Samarkand functioned already in the 14th century; its closed courtyard measured 54×36 m. Thus, by the time of the construction of Bibi-khanym mosque, Central Asia (and Islamic Orient in general) already knew a certain traditional type of a mosque with a closed rectangular courtyard, central domed mosque and light roofs around the courtyard that [protected visitors] from the sun in summer and precipitation in winter.

Bibi-khanym mosque was not an exception both from the perspective of its plan and its dimensions (the dimensions are given according to the architectural and archeological measurements completed in 1972-4 by the brigade of N. N. Kuz’mina). 426

Western wall of the complex = 98.50 m,

Eastern wall of the complex (main façade) = 99.40 m,

Northern wall = 131 m, and

Southern wall = 130 m.

426 Cp. the measurements in Bibi-khanym chapter of Bulatov’s Geometric Harmonization (see translation bellow and fig. 71 of the chapter) that have strikingly little in common with Kuz’mina’s measurements. Bulatov’s monograph was published after Kuz’mina’s group measured the mosque for the restoration project.
Here and below the photographic quality of restoration documentation from the Archive of Uzbekistan Ministry of Culture, Department of Heritage Preservation is low since taking photographs in the Archive is highly restricted.
The projecting part of the main portal including the corner minarets equals 15.80 m.

The dimensions of the courtyard are 76.50×63.20.

The average length of the north-south axis equals 99.0 m.

The average length of the west-east axis equals 131.00 + 15.80 m (projecting part of the portal) = 147.00 m.

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428 The authors of the project superimpose the proportional scheme on a highly normalized project of the monument. The basis of the proportional scheme is the conventional module (M) which equals the double length of the interior of the main mosque.
The ratio of the sides is $147:99 = 3:2$.

The width of the entrance portal, including the corner minarets, equals 48.85 m; it occupies half of the main façade of the complex (fig. 113, 114, 115, 116, 117).

Thus, Bibi-khanym mosque is rectangular in plan; the ratio of its sides is $2:3$.

The conventional module equals half of the eastern façade of the complex, i.e. $1M = 49.5$ (fig. 114).

The courtyard of the mosque, which measures $63.20 \times 76.50$, would have been almost square, if it wasn’t “torn” along the north-south axis by the square compounds, which we conventionally call “the small mosques.”

The projecting part of the entrance portal equals $\frac{1}{4}$ of the main façade of the complex, while the portal of the western mosque [equals] $\frac{2}{3}M\sqrt{5}$, if we take the portal of the main façade for $1M$.

On the attached drawing we see the proportions of all the spaces of the mosque, where the smaller articulations are derived from one conventionally accepted measurement unit.

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429 Or 48.35, the manuscript is unclear. This dimension is however different from the one presented on Fig. 113 that accompanies the text, i.e. 49.6 m.
Fig. 115. Plan of the western mosque.
B. Portals

Portals occupy a special position in Central Asian architecture. Since the mid-11th century portals emerge as a decorative frame of the main façade, the main entrance to the building. First it was a façade slightly elevated in the middle and projected forward from the façade line.

By the end of the 13th – beginning of the 14th century, portals survived a complex evolution and turned into an almost mandatory element of monumental structures. [Now] this is an independent
projected surface cut by a vaulted niche. As a rule, portals were covered by different types of architectural decorum.

Addressing the question of the original forms of Bibi-khanym mosque in Samarkand, we cannot but mention their graphic order, [which is reconstructed] based on the [analysis of] architectural and archeological data.

In his reconstruction, Sh. E. Ratiia does not have a solution for the façade of the entrance portal. Based on the traditional image of the portal, we can maintain that there was a tympanum over the vault [of the niche] (its traces are convincingly present on the photographs from Kun album\(^{430}\)), over which there was a line ktoba\(^{431}\) with an inscription mentioned by Babur,\(^{432}\) who said that the size of its letters was so big that it was possible to read this inscription from the great distance.

Fig. 118. Formulas for the calculation of the height of the arches in relation to the line of geometric abutments (for three-centered arches)

\[^{430}\text{Aleksandr Liudvigovich Kun/Kuhn (1840-1888). Most probably Kuz’mina et al. refer to the Turkestan Album: http://www.loc.gov/rr/print/coll/287_turkestan.html.}\]

\[^{431}\text{From Arabic كتوبا.}\]

\[^{432}\text{Zahir-ud-din Muhammad Babur, the founder of Mughal dynasty in India.}\]
Over the belt that framed ktoba there should have been a revaq\(^{433}\) (small arched gallery), which is traditional to the monumental structure of that period. We find the examples of this element both in the earlier and later buildings.

G. A. Pugachenkova in her article “Regarding the scientific and artistic reconstruction of Bibi-khanym mosque” writes: “The architectural motive of revaq in Central Asian architecture is profoundly traditional; it goes back to the crowning arcades of the early feudal fortified castles, or keshks; ... it was exceptionally widespread as an element on top of pishtaqs.”\(^{434}\) Thus, the original forms of the portals are beyond doubt. We can only discuss the vertical dimensions of the surface of the façade.

The abutments of the vault ([more precisely] the wooden projections, under-abutments) can be easily found on the main portal of the entrance part of the complex.

Based on the accepted scheme ([in cursive]: for this particular monument) of designing the vaults and the domes (fig. 118) we find that the vault of the entrance portal had three centers, where the two [secondary] centers were located on the basic line, i.e. in point “a.” There was a tympanum over the vault.

Based on the huge number of tympanums preserved in the monumental structures of Central Asia, as well as the fragments of the facing of [this] tympanum documented by the 19\(^{th}\) century photographs, we [re]construct the tympanum, taking into account the fragments of the brick facing preserved on the northern pylon. The framing belts of the brick mosaics of the pylons should be turned horizontal to frame the tympanum and the ktoba.

\[^{433}\text{From Arabic }\text{رواق.}\]
Fig. 119. Geometrical analysis of the entrance portal of Bibi-khanym mosque.
Fig. 120. Geometrical analysis of the portal of the big mosque of Bibi-khanym [complex].
Fig. 121. Afghanistan. Herat [over Herat an illegible word in cursive]. [In German:] Wallfahrtsort im Süden von Herat.

Unnamed. [Bibi-khanym mosque. Entrance portal. Geometric analysis.]
Fig. 121a. Anau mosque. The geometric analysis of the portal design.

Fig. 122. Balkh. Destroyed by the earthquake of 1948. The ruins are located in Turkmenistan near Ashgabat.
The segment Y is most portably the smaller segment of the radius divided according to the extreme and mean ratio.
Fig. 124. Southern small mosque. Geometrical analysis of the design.
The decorative arched panels of the northern pylon verify [the reconstruction]. The conventional size of the arches of the revaq equals the decorative aryks\textsuperscript{437} of the pylon panels.

Thus, we ended up with the portal, the height of which is 51.0 m from the level of floor paving near the portal. Geometrically the height of the portal relates to the length of the portal in plan

\textsuperscript{437} The word aryk, which in general means “irrigation channel,” here refers to a decorative element of the pylons.
Igor Demchenko, MIT

(from one guldasta to another) as $3 \div 2$. The diameter of guldasta is 7.8 m; the span between guldastas is about 34 m. (Fig. 119)

The portal of the western mosque is designed according to the same scheme. The vault is preserved; the decoration of the tympanum is [re]constructed based on the photographs from 1872. (Fig. 120)

The portals of Anau mosque (fig. 121a), the mosques of Herat and Balkh (fig. 121, 122), and of the later [monuments] – the portal of Seif-ul-Din Bokharzi Mausoleum are provided as the analogues [of Bibi-khanym portals].

Based on the preserved parts, the portals of the small mosques are in proportion of $A \sqrt{2}$ to the plan [of the mosques] (fig. 124). The same principle defines the design of the courtyard entrance portal, since its plan corresponds to the [plans] of the small mosques. Photographs from Kun album support this.

The small portals of the lateral passes of the gallery were built according to $A \sqrt{2}$ principle.

The plans of the small portals are preserved to the height of one meter. They are documented and conserved. The [size] of the doorway is assumed to equal the span of the gallery. All other articulations are [re]constructed in relation to the preserved size of the pylons and the gable wall of the small portals (fig. 125).

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C – Domes

In the architecture of Central Asia, domes occupy one of the most important places. In the single-dome structures, domes cover the spaces bellow.
The construction of a decorated shell dome has rather decorative purposes, which are not limited to the structure itself but are important for the silhouette of the whole city. Therefore, the building of domes was very important. During the 14th and the beginning of the 15th century, the inner dome was built over the octagonal layer of pendentives, the outer shell dome was supported by the drum.

The curves of the domes and vault of Bibi-khanym mosque were three-centered. The principle of constructing the vaults of the arches and domes is illustrated on the fig. 118, where Z is the distance between the supports.

From the first center in point “O” we draw circular lines to the line intersecting the axis at the angle of 45°; the two secondary centers are on the same 45° line. For the shell domes of the gallery the secondary centers were located in point “C”; for the arches and the vaults of the gallery the secondary centers were located in point “B”, while for the portal vaults and the shell domes the secondary centers are in point “A”.

The [re]construction of the domes of Bibi-khanym [complex] was based on the architectural and archeological study of the remaining drums and the fragment of the dome over the big western mosque.
Fig. 126. The preserved fragment of the dome of the big (western) mosque.

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Fig. 126 shows the sections of the preserved fragment of the dome with a part of the drum. Knowing the method of design for the 14th century domes, it is not hard to reconstruct the lost parts of the dome over the big mosque. We see that up until the point of +32.40 the fragment of the shell dome is vertical; above this point it follows the curve. Taking the point of +32.40 for the abutment of the shell dome and using the method described above, we [re]construct the lost part (fig. 127).
Igor Demchenko, MIT

The total height of the mosque (in section) is defined by the strict system. While the plan of the mosque corresponds to the proportion of 2+3, the ratio of the height is 2+4, i.e. the height of the western mosque is a double square (fig. 127).

The design order of the domes of the small mosques is assumed to be the same as in the big mosque. The vertical part of the external dome would equal “X” exactly as in the dome of the big mosque, i.e. the analogy of the dome design is preserved. The height of the small mosques (in section) relates to their basis as 2+4 (fig. 129).

We prepared the schemes of domes [built] over the big spaces (mosques, dars-khanas, mausoleums) during different [historic] periods for the purposes of comparing them [with the domes of Bibi-khanym complex]. Here we see Gur-i Amir Mausoleum, which was built simultaneously with the mosque (fig. 130), the dome over the Kalan mosque built ten year later than Bibi-khanym mosque (the design of the external dome is identical

[p. 183]

with the scheme of the domes of Bibi-hanym [complex]) (fig. 131). Here we also provide the schemes of the domes of Mir-i Arab and the Namazgah in Karshi (fig. 132, 133).

Figures 134 and 135 show the domes of the 16th century Abdullah-khan madrasah; here we see that the methods for designing the domes did not change with time: the same value of “X” is allocated for the vertical segment of the dome. In the very late dome over Magok-i Kurpa mosque (mid-17th century) the vertical part of the dome also equals ”X” (fig. 136).

Thus, there is no reason to doubt in the [theoretical] [re]construction of domes of Bibi-khanym [big and small] mosques as well as in the actual rebuilding. The height of the drums is known

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438 Study halls.
439 16th century, Uzbekistan.
440 in Bukhara, Uzbekistan.
441 in Bukhara, Uzbekistan.
from the ruins; the preserved fragment of the dome provides [enough data] for the easy geometrical reconstruction of the abutment point of the shell dome. We have not discovered any significant changes in the methods of dome design [practiced] in the course of the two [reviewed] centuries. We believe that it is possible to [re]built the domes; there can be an error in their height, which in this case would not exceed 20-25 cm. The [surface] of the dome of the western mosque [should be] smooth [rather than ribbed]; it should be faced with blue tiles of the ancient type.

The domes of the small mosques [should be] ribbed containing 48 goffers each without intervals. During the [archeological] cleaning we discovered a 40 cm fragment of the lower part of the goffer (fig. 137). The goffers were faced with majolica tiles. In the center of each goffer there were inserted rosettes with floral ornaments.

The present project takes into account the remaining fragments of the facing (fig. 138).
Fig. 127. Geometric design of the western mosque.

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\frac{AB}{CC} = \frac{2A}{4A}.
\]
Fig. 128. Samarkand. Bibi-khanym mosque. The drum and the dome of the small northern mosque
Fig. 129. Small mosques of Bibi-khanym complex.

Fig. 130. Samarkand. Gur-i Amir Mausoleum, 1404. The drum and the dome over the gur-khana.

Fig. 131. Kalan mosque in Bukhara. The drum and the dome.
Fig. 132. Mir-i Arab madrasah in Bukhara. The dome of the mosque.

Fig. 133. Karshi. The Namazgah, 16th century. The drum and the dome.
Fig. 134. Bukhara. Abdullah-khan madrasah, 1589-90. The drum and the dome of the mosque.

Fig. 135. Bukhara. Abdullah-khan madrasah, 1589-90. The drum and the dome of the dars-khana.
Fig. 136. Bukhara. Magok-i Kurpa mosque, 1637. The drum and the dome of the mosque.
Fig. 137. Fragment of the goffer facing, dome of the small mosque of Bibi-khanym complex.
D. Minarets

In the architecture of Central Asia minarets appeared long ago. Already by the 11th century minarets had conical trunks that were thickening towards the top. Minarets were constructed on the polygonal or circular bases, all of which always had horizontally articulated decoration. Since Central Asia is a seismic region and the minarets are generally high [structures], their upper parts did not survive to our days. On the photographs taken in 1872 we see that above the finishing part of the first segment of the north-western minaret there was the beginning of the
trunk of the second segment. The same remainders of the brickwork of the second segment can also be traced in the portal minarets of Ulugh-beg and Sher-Dor madrasahs [in Samarkand].

It is hard to tell whether the minarets consisted of two or three segments or what was on their top: a small dome or a lantern. Most probably it was a lantern. But we can be certain in one thing: the corner minarets and the minarets of the entrance portal consisted of several segments (two or three). This is also supported by oriental miniatures.

At the same time the minarets attached to the portal of the western mosque were polyhedral and most probably consisted of one segment; their prototype was, most probably, the minarets of Ghazna (Afghanistan).

We reviewed several types of minarets erected in the Orient earlier than Bibi-khanym mosque in Samarkand. One of them is the three-segmented minaret in Baghdad, rising behind al-Mustansiriya madrasah.
This minaret has three segments; the first segment constitutes two third [of the whole], two other segments comprise one third (fig. 139).
We take the lower diameter of the minaret for one [unit]. The next minaret from Afghanistan is a single-standing [structure]; [it is located] in Jam'; its height is about 60 meters. This minaret also consists of three segments (fig. 140). The first segment is divided into four parts; the second has two parts, and the third is one part.

The lower diameter of the minaret is also used as a measurement unit. The third minaret in our list is located in Herat. This is a very slender minaret; it is well-preserved; the proportions of the first segment of this minaret remind of the minarets in Samarkand (Ulugh-beg and Sher-Dor madrasahs). In this case, the measurement unit is the lower diameter of the minaret multiplied by its derivative of $\sqrt{2}$, i.e. $d\sqrt{2}$. The first, lower, segment contains five units; the second, or middle, segment [consists of] two units; and the upper one – if we account for the added brickwork - [consists of] one unit.

The proportions of this minaret are close to the minarets of Bibi-khanym mosque.

Fig. 142 demonstrates that the minaret in the north-western corner is preserved to the considerable height; we know the lost part of the first segment from the photographs and the written sources, it equals 26.2 m. If we accept the diameter $d\sqrt{2}$ as a measurement unit, the result is that the first, lower, segment of the corner minaret consists of five parts, same as in the case of the minaret in Herat. Therefore, by analogy with the previous minaret, two upper segments must equal

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\{p. 196\}
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three parts. In this project we suggest one [additional] segment equaling three parts; however, it can also be divided in two with a proportion of the heights $2:1$. 

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For the practical restoration we suggest to rebuild the corner minarets of the gallery to the height that wouldn’t exceed the preserved north-western minaret, i.e. to the point of +17 meters from the conventional zero [level].
Fig. 140. Afghanistan. Jam’. Big minaret, 11-12 cent. The height is about 60 meters.
Fig. 141. Afghanistan. Herat. Three-segmented minaret. 
[In German:] Minarett mit Kuppelbau (Musalla)
Fig. 142. Corner minaret of Bibi-khanym mosque in Samarkand (reconstruction project)

It should be noted that the diameter of the corner minaret at its maximum size equals 3.70 m.

The height of the whole minaret is about 42.0 meters.

Minarets adjacent to the portal of the mosques have somewhat different proportions: they completely depend on the height of the portals. Minarets adjacent to the portal of the western
mosque (fig. 120) depend on the decorative facing [of this portal] ([i.e.] the on the mirrors,\textsuperscript{442} five of which are preserved on the southern pier).

For the practical restoration, we propose to conserve the upper part of the southern minaret and add no more than 1.0 meter [to its height]; the northern [minaret] should be rebuilt to the levels of the southern one, all its facings should be restored. The diameter of this minaret at its maximum size is 5.9 m; the measurement unit is established at $d^{\sqrt{2}}$ that gives us its presumed height of 62 meters. The minaret at the entrance portal of the complex has the maximum diameter of 7.2 m.

For the practical restoration, we propose to keep the existing height of the minarets, to reconstruct the lost northern minaret in contemporary materials to the level of the southern (preserved) minaret, and to restore the facing that can be very well seen on the photographs taken in 1872 when the minaret still existed.

\textsuperscript{442} A decorative element.