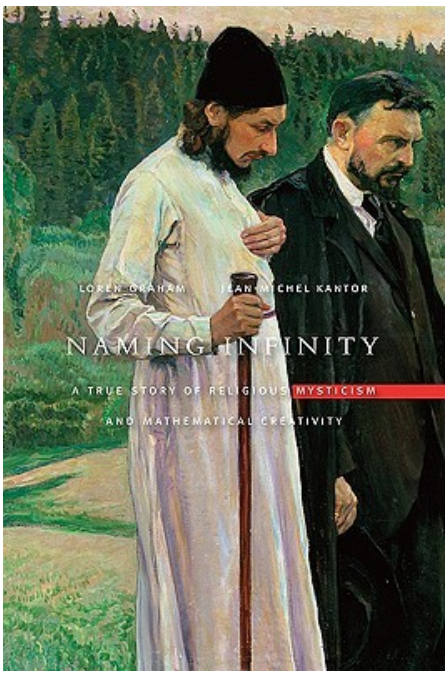

Naming Infinity: A True Story of Religious Mysticism and Mathematical Creativity

Loren R. Graham , Jean-Michel Kantor

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In the early 20th century, Russian mathematicians had a breakthrough in set theory. The authors argue this happened because of their religious beliefs. A fascinating episode in the history of mathematics that raises profound questions about the nature of inspiration and the role of religion in science.

Naming Infinity: A True Story of Religious Mysticism and Mathematical Creativity Details

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From Reader Review Naming Infinity: A True Story of Religious Mysticism and Mathematical Creativity for online ebook

Joel says

Kind of a peculiar book. It primarily concentrates on the lives of three Russian mathematicians and to a lesser extent three French mathematicians, though many others are discussed as well. It looks at how the French mathematicians hit a roadblock with set theory and how the Russian mathematicians were able to develop it to new heights. The authors, non-religious men by their own account, attribute the Russians' advancements and breakthroughs to a religious belief/practice called "Name Worshipping." In some ways the book meanders a bit and kind of ends abruptly, but it is fascinating seeing this story unfold against the back ground of turn of the 20th century liberal France and a repressive and increasingly conservative Soviet State of the same time.

Nemalevich says

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Ben Peters says

Naming Infinity, a book on early Soviet mysticism and mathematics, is a misunderstood book. It risks broad surface appeal because it promises to treat a fascinating association: both God and infinity can be named but not measured; thus the evocation of the ultimate name, in mysticism as in set theory, is power. This association drove a few powerful Russians mathematicians into new mystical sets and cultic combinations, Orthodox name worshipping, and eventually the oppressive grip of the early Soviet censors--what could be sexier than that?

But there the sexiness ends, and most misunderstand what they are getting with the book. The volume, like most history worth its weight, is careful enough to not oversell its merchandise. Instead Loren Graham, a leading American historian of Soviet science, pulls his weight in delivering humanizing biographies of a fragile network of Russian mathematicians and their opponents. What emerges are eclectic and often invigorating portraits befitting a Greek play--the defeated dreamer, the zealous felon, the tired hero. Herein lies the value of the book. Its deft and swift reliving of early Soviet circles that just happen to be composed of once influential mathematicians. The court inquisitions make at times for darn good drama.

Meanwhile, Jean-Michel Kantor, a senior French mathematician and Graham's coauthor, provides archival access and a perspective on the French origins of set theory. However one hopes in vain for Kantor, if not

Graham, to sketch even loose connections from the workings of set theory to the peculiarities of Russian mysticism. Every book concerning mathematical topics must walk the fine line between, on the one hand, providing too much technical detail and thus overwhelming the lay reader and, on the other hand, disappointing the reader who wants backlighting and coloring to otherwise dry technical questions. Naming Infinity is no exception. It leans toward the latter option: "it would be impossible," they write almost dismissively, "to explore here all the varieties of links among religion, mysticism, and mathematics. There is an enormous literature on the subject, both good and bad. Our concern in this book is the role of mysticism in the reception and development of set theory in Russia, and therefore we will concentrate on our Russian Trio [Dmitry Egorov, Pavel Florensky, and Igor Luzin]" (96). And with that the focused history continues. The pair of Andrei Kolmogorov and Pavel Alexandrov, together with the Stalinist critic and ideological hitman Ernest Kolman, also receives prominent vignettes.

This approach, however lovely for the Russian studies specialists, will not satisfy the many readers with a hankering for some meaty ligamenture between Orthodox mysticism and Russian mathematics. Perhaps the non-technical route is enough for their historical argument that the Moscow School of Mathematics was influenced by early mathematicians who, for reasons not really discussed, found religious meaning in their work. This argument demands no more than suggestion. "It could have been otherwise," Graham writes, "but it wasn't." A description more than an explanation, the most telling part of the book's title--Naming Infinity: A True Story of Religious Mysticism and Mathematical Creativity--is also the least noticed part: the "and." The "and" here is a logical, not a literary, conjunction. The two subjects of the history, mysticism and mathematics, never meet on the same page.

Still, none of this diminishes the fact that the human stories alone make *Naming Infinity* an incredible conversation starter. Great for soirees, good for armchair historians, risky for philosophy conferences.

BlackOxford says

A Badly Hidden Agenda

Professional mathematical competence has no obvious link to religious conviction; nor does religious conviction often depend on scientific analyses. Nonetheless, at the turn of the twentieth century, a crisis in worldwide Christian theology and in mathematics was brought about, at least in part, by advances in mathematical set theory. These advances shed new light on what had been a persistent mathematical surd and a traditional theological meme - the concept of infinity.

Naming Infinity purports to tell a story about the interaction of theology and mathematics at the turn of the twentieth century. In fact, it is a subtle polemic masquerading as a history of science. The implicit purpose of the book appears to be the promotion of a rather nasty intellectual and political prejudice. Graham and Kantor are pros in providing extraneous and excessive biographical detail, but fairly light on comprehensible mathematical explanation. Worse, they have very little understanding of theology and no comprehension of the sociology of organizations that is relevant to their principle narrative.

In the eleventh century, a theologian and philosopher, Anselm of Canterbury, inspired by the pagan philosopher Plotinus, formulated a somewhat novel argument for the existence of God. Instead of making assertions about reality and then trying to demonstrate that these assertions imply a divine being, Anselm took a different approach. He simply defined God as “that which nothing greater can be thought.” That’s it, a neatly concise statement. This came to be called the Ontological Argument because it has to do with the necessary existence of God as a concept.

The Ontological Argument has fascinated philosophers ever since Anselm's formulation. The range of opinions about its validity is extreme - from those who find it completely meaningless to those who believe it to be brilliantly definitive. But not one of Anselm's opponents or defenders would ever seriously contend that Anselm believed he was creating God through his definition; he was merely providing a positive specification. Anselm was a philosophical Realist who considered the connection between words and things - metaphysics in modern language - were problematic but subject to analysis and improvement.

The authors of *Naming Infinity* make a brief derogatory reference to Anselm using a jocular comment by a nineteenth century philosopher. But they simply ignore the fact that the Russian mathematicians at the centre of their story, also inspired by Plotinus, followed Anselm in his philosophical realism. Rather Graham and Kantor choose to make the absurd claim that these respected scientists were devotees of a mystical cult which sanctioned 'naming' as a virtually magical act which conjured up the reality from the name. The Russian mathematicians, they contend, considered they were making God as well as numbers real by their linguistic representation. At best this is a pathetic misinterpretation; at worst it is a purposeful slander of a group of mathematical realists, as well as a group of mystically-minded monks with whom they were associated

Graham and Kantor supply no credible evidence for their contentions. They claim, for example, that the Russians were motivated by an offhand quip of the mathematician Georg Cantor, the inventor of set theory. Cantor had remarked that by naming mathematical sets he created them. However it's highly unlikely that Cantor intended the remark in the way presented by the authors, and certain that the Russians, through their own denials, didn't interpret it to mean what the authors suggest.

Graham and Kantor also use the Russians' religious links to the so-called Name Worshippers in the Orthodox Church, whom they think believe in the mystically creative power of the divine name, to accuse the mathematicians of some sort of spiritual black magic. The implication made by the authors is that the mathematicians had compromised their science through their religious beliefs This is simply untrue and a fundamental distortion of the mystical practices involved, which are very similar to other Christian as well as Jewish, Islamic and Buddhist forms of prayer. These forms, although clearly mystical, are not considered by any faith-group of which I am aware to be generative of reality in the sense used by the authors. Even at their most radical, for example in the Zohar of medieval Judaism, they are merely poetic interpretations of what is considered a pre-existing metaphysical reality.

Finally, the authors dwell on the condemnation of the so-called Name Worshippers by the Orthodox hierarchy as evidence of the superstitious character of both the mystical practitioners and the mathematicians. This is simply absurd and demonstrates the authors' lack of understanding of both theology and hierarchical organizations like the Orthodox Church. What the members of this sect, largely Russian monks resident on Mt. Athos in Greece, threatened was not the introduction of magic into Christian practice, but like all mystics, the authority of the Orthodox hierarchy and, eventually, the Soviet state. Because mysticism is an entirely subjective experience which is usually independent of credal or doctrinal assertions, it is literally beyond the reach of authority seeking to maintain orthodoxy. All mystical practices are therefore considered suspect by religious hierarchies.

The only plausible reason I can surmise for Graham and Kantor's contentions is that the authors are themselves hard and fast nominalists. For nominalists, all use of language, including mathematical and religious language, is a kind of creative fiction. The elements of nominalist fictions are presumed to be 'real' to the extent they are useful in inquiry. But they have have no more ontological status than any other fiction. Nominalists solve the metaphysical issues of the connection between words and things by simply ignoring these issues. The authors obviously have a gripe with philosophical realism that they don't make clear at any point in their exposition. But it is an opposition to philosophical realism which constitutes their main agenda, and fatally undermines the credibility and wider usefulness of their narrative. Their conflation of philosophical realism with a sort of primitive theological idolatry through their nominalistic presumptions is

inexcusable.

The debate between nominalism and realism is perennial and has taken place for centuries with no clear intellectual outcome, in either theology or mathematics. Who knows, we each may be born with a dominate gene that determines our preferences. But what is certain is that nominalism is the option of choice for those with dictatorial ambitions from Pericles to Trump. Nominalism implies that, lacking any reliable connection between words and things, language means what authority says it means. Orwell's novel 1984 represents a nominalist paradise in which meaning is a coercive tool employed by those in power who want to stay in power. When Margaret Thatcher claimed that there was no such thing as society, when Trump denies any knowledge of fascist support, they are using rhetorical tactics typical of philosophical nominalism.

So, the Orthodox Church, and the Soviet state, condemned the Name Worshippers for precisely the same reason that the Roman Catholic Church was simultaneously condemning the so-called heresy of Modernism, and during the same period when the American Fundamentalists were criticizing the loss of 'correct' belief among liberal Protestant churches. Yet Graham and Kantor fail to see these wider connections. In every one of these cases the maintenance of hierarchical, nominalistic control over language was the primary objective. The issue in these cases is not the literalness of the interpretation of creeds and doctrinal pronouncements - subjective meaning of such things is not public - but the formulae of words themselves and their 'correct' use in public ritual and liturgy. The exercise of church authority is a tribal rather than a spiritual event which re-establishes both tribal membership and the submission of members to the leaders of the religious group.

By turning infinity into an analyzable component of the mathematical repertoire, set theory undermined mathematical certainty about its own foundations. By demonstrating that there were many different kinds of infinity, and in a sense therefore 'taming' the traditionally dominant concept of the divine, set theory also compromised an implicit presumption of Anselm's Ontological Argument - perhaps there is no limit to that which could be thought by the human mind; perhaps there were an infinity of conceivable infinities, and therefore deities; or none at all. Over a century later, neither mathematics nor theology has recovered from the paradoxical shocks to their traditional foundations. And the problematic ontological status of both God and numbers shows no prospect of being settled.

The intellectual and spiritual drama sparked by set theory is, therefore, a worthwhile subject of historical and philosophical research. And there has been little written about the mutual implications of crises in mathematics and theology. The mere simultaneity of their crises is sufficient to justify inquiry. But *Naming Infinity* does not make a contribution to documenting this drama. It is tendentious, mis-guided, and simply wrong. One can only hope for further effort to fill the considerable hole left unfilled by this book.

A Digression on Systems Theory

There is a sense in which naming is a creative act, but which doesn't involve any magical bringing into existence. For example, the selection of any arbitrary segment of the infinite Continuum (that is the set of all numbers) results in an infinite set which can be named. That set is identifiable by the name. The selection, of course, does not bring the set into existence, it merely distinguishes it from the rest of the Continuum. The selection, nevertheless, is aesthetically creative; it creates a 'form'. It also establishes the selected set as a newly discovered whole which can be described and analysed to determine its unique properties. This kind of selection is the basis of what would eventually be called Systems Theory, the analytic/aesthetic discipline of studying parts and wholes simultaneously.

Postscript: for an interesting fictional account of the relevance of advances in mathematics to American fundamentalism see: https://www.goodreads.com/review/show.... For an analysis of the metaphysical import of the Jewish mystical language of Kabbalah, see https://www.goodreads.com/review/show...

Alger says

Will not rate, because I simply could not get past the halfway point.

This should have been a home run: I love the very idea of the intersection of mathematics and mysticism and have read widely on both topics. But the writing, oh the writing... There is an academic flavor to the book that I can forgive, because, really, who else would be writing a book like this? But I maintain that a straight academic treatment would be preferable to the clumsy pop-sci polish the authors gave to this book which only obscures the story and traps it in a weird recursive here-is-what-we-are-going-to-tell-you-now-we-tell-you-now-we-tell-you-what-we-told-you format that is simply numbing. Then there is the problem of organization. The book opens with a too-detailed description of their pursuit of members of the name cult in the present day that tells you nothing about what they believe or their importance. Then it shifts to a short intro to the early 20th century set-theory logjam and drops some names, hinting constantly about the importance of the name cult, then drops into a description of the Russian assault on a monastery on Mt Athos, then goes back to France. This summary of the opening chapters is much clearer than the actual experience of reading those pages because the authors include a surplus of unnecessary detail and make constant attempts at foreshadowing in order to build a sense of tension.

The kind of rotating narrative employed here is always a pain, although it can be done well and there is an actual structural reason for changing viewpoints. Instead what we have is a non-fiction tale of persons with difficult names that have to be kept straight in order to follow the chain of events, the connection of which is in no way evident until far into the book even though we are told constantly how critical these connections are. So the effect is just deadening right from the start and although details emerge along the way that are interesting on their own, the book does not add much beyond presenting the facts.

I carried this for a week and only made it half way because I kept falling asleep reading it. I suppose there is value to the book because the reviews are solid, but it just did not work for me.

Dyche Mullins says

Here is a rare thing: the cultural history of a problem in mathematics. And not just your garden-variety unproved theorem, but a crisis that faced people interested in the foundations of mathematics in the early 20th century. Not interested? What if I told you that the preface opens in a dark corner of the basement of St Tatiana's cathedral in Moscow, a corner where heretical Russian mystics with an interest in mathematics come to recite a forbidden prayer? Still skeptical? What if I told you that the first chapter flashes back to an amphibious raid in 1913 by tsarist marines on an orthodox monastery on Mount Athos and that these events are directly connected to the birth of descriptive set theory and modern topology? Did you know that Kolmogorov and Alexandrov were lovers? Neither did I.

This book ties together so many of my own disparate personal interests/obsessions that I occasionally have to double-check that it actually exists and didn't come to me in a dream. How can a book connect Russian mysticism, Stalinism, and the axiom of choice? Read it and find out.

Although I did love the book, I found the writing a bit uneven. The final chapter, in particular, is repetitive and comes across as a bit defensive. I also wish that the authors had spent more time with Pavel Florensky and wallowed around a bit more in the weirdness of the Luzitania mathematical group in Moscow. The

appendix with materials from Luzin's personal archives, however, is well worth reading.

Leonardo Duenas-Osorio says

This is an overall good book that presents the human side of important French and Russian mathematicians of the early 1900’s in a frank and interesting way. The intellectual drama around set theory and the socio-political and religious contexts that accompany the creation and evolution of the Moscow School of Mathematics are breathtaking. I enjoyed the details on how professors and students worked together inspired by challenging questions and thoughts, mostly sparked by their shared vibrant intellectual and cultural university environment, although some of these professor-student relations evolved into disappointing academic jealousy episodes. It is also enlightening to see that the right mixture of total immersion in mathematical thinking with nature, mysticism, and self-reflection can become powerful enablers of creativity. All this interesting material is mostly contained within the inner sections of the book. However, the first and last sections are a little bit disappointing in that their linkages with the rest of the book are not too strong, thus the four stars. The last section in particular is also too vague, and the efforts of the authors to highlight the impact of set theory developments on modern mathematics and future research are insufficient.

Despite the sense of disconnection between the first and last parts of the book with the rest of the rich narrative, the book is a worthwhile reading and I will recommend it to my students. However, I also will recommend them to find the mathematical details that should have been included in the book, maybe as an appendix. The basics of set theory, descriptive set theory, Markov chains, and other topics could have been part of the book to make it more self-contained.

In terms of personal learning, through historical examples, the book teaches the importance of continuously asking deep questions, being surrounded by thinkers, and remaining engaged with academic and intellectual discussions. Dedication to reading, writing, and sharing of ideas jump as key factors for pushing the boundaries of knowledge. I liked the Luzin’s approach where students are treated as intellectual equals, so that they feel empowered and creative, as well as the Alexandrov’s approach to work on difficult problems for months as long as it is within enjoyable environments.

W.C. says

Graham and Kantor take several interesting subjects--the development of set theory; religious strife in early 20th century Russia; and the persecution of mathematicians by the Soviets---and try to put them together. The connections are flimsy (two dissimilar meanings of "naming" treated as one, for example), and the book never coheres. It appears that they came by notes from a Russian archive and tried to figure out how to make a book out of odd pieces that interested them. Perhaps would have been better to write the three as independent parts of a trilogy...? Read the first sixty or so pages of this with the first half of Amir Aczel's THE MYSTERY OF THE ALEPH (an only slightly better-written book) and you'll get a fuller picture of set theory and those involved. There's a lot of info to be mined here, but the book itself is a shambles.

Ginny says

Very interesting and thought provoking book, one I should read again in the hope I would better understand it the second time through.

Chris says

Monks and math!

William says

Kudos to whomever came up with the cover design for this book, which bills itself as "A True Story of Religious Mysticism and Mathematical Creativity." I might never have come across this had it not been for the subtitle and a gorgeous cover painting. A robed religious figure, holding a cane, walks alongside a scowling, pensive man who looks vaguely academic. They are in a wooded setting. The scene calls to mind perhaps Russia, perhaps some other place, but the picture immediately made me pick it up.

"Naming Infinity" is non-fiction, but it touches briefly on the world of literature, as I'll come to in a moment. The book chronicles the unlikely connections between Russian mathematicians specializing in set theory, and an enigmatic group of Russian mystics called "Name Worshippers." This sounds like the stuff of a Borges' story, with a seemingly unlikely connection between two disciplines that seem miles apart in the modern world.

About the book itself - I am no mathematician, and I have the feeling that a closer investigation of set theory would find me lost and quickly losing patience. It's a testament to both the story and the storyteller that I learned just enough to keep me interested without losing the basic narrative line. The writers wisely began with the religious side of the equation, since it is easily more accessible. (At least to this reader - to some mathematicians, it's possible the practices of the Russian Orthodox Church will seem just as indecipherable as theoretical numbers are to me.)
Name worshipping itself will be familiar to readers of J.D. Salinger's collection "Franny and Zooey," which dealt with "The Jesus Prayer" - "Lord Jesus Christ, Son of God, have mercy on me, a sinner." The idea behind the prayer is to repeat the words relentlessly until the one saying the prayer attains a bodily harmony, matching heartbeat and breath with the prayer, and one finds oneself literally "praying without ceasing." There could have been a discussion in the narrative about the similarities between this practice and Eastern mantras, but that might have easily diverted a reader already struggling with two diverging disciplines. This practice was deemed heretical by the Russian Orthodox Church, and the pre-Revolutionary Russian government moved to stamp it out.

The naming concept, the authors tell us, later was taken up by those working in set theory - literally categories, or sets, of theoretical numbers. The idea that by naming something it is given form and substance is as old as recorded history. The Egyptians, for example, felt the dead lived on as long as their names were spoken. Moses famously asked for God's name when they met at the Burning Bush, leading to God's mysterious reply, which seems to indicate that a proper name for God only serves to illustrate the awesome potentials of His existence.

But the concept mathematicians wrestle with between the covers of this book is infinity, into which our numbers as well as our imaginations ultimately stretch out. How to give a name, or a value, to something that may only be a potentiality, not an actuality? The rationalist mathematicians, acting solely within the bounds of their experience, struggled with the concept. It was only in Russia, where the lines between math, science and religion were culturally blurred, that such a concept could be made understandable.

If the book has a limitation, it is that there are the bare bones of a much longer, more engrossing story here that are never fully given form and flesh. We learn the names of the players, are given some anecdotes about their lives, some indication of their faith or their lack of it, but only enough to frustrate our curiosity. And we must take it on faith, frankly, that a connection existed in their lives between the religious and the rational, and that connection led to their breakthroughs. The authors don't do nearly enough to forge that link with supporting evidence - say diary entries, letters, or anecdotes. This may be because they were dealing almost a century later with scrupulous men who held intense, private beliefs, and later were forced by the Tsarist and the Soviet governments to forsake those beliefs, or keep them silent.

Still, a host of interesting personalities take shape between the pages of this short, bewitching book. And a host of interesting ideas. Early in the story, the authors recount the medieval notion, put forward by Gregory of Rimini, that "something that was infinite could be equal to a subpart of the whole infinite." Could such an equation yield forth ...Jesus?

Richard says

Thick and difficult to interpret. However the insight is relevant to such discourse as the physical law of nature and accommodation.

Caroline says

I'm pretty sure *Naming Infinity* covers the most niche and obscure subject matter of any book I've ever read. I don't remember how I stumbled upon it. In the Venn diagram of books about religion and books about math, the overlapping section has to be pretty small. For my part, I can confirm that it contains at least one book.

I'm not sure *Naming Infinity* holds universal appeal, but I sure found it interesting. Broadly speaking, It tells the the story of the French Mathematics School, the Russian Mathematics School and the beginnings of descriptive set theory in the first couple decades of the 20th century. While mathematicians in the French School made initial progress in the field, they ended up abandoning their research, authors Graham and Kantor argue, because the rationalism that shaped their worldview limited their ability to deal with the inherent abstractions of aspects of set theory, including (and primarily) the idea of infinity.

Enter the Russian School mathematicians. In Russia, religion, philosophy, and mysticism were much more closely linked to the study of mathematics. According to Graham and Kantor, the Russians relied on insights gained from a heretical practice called Imiaslavie, or "name worshipping" to punch through some of the stumbling blocks tripped over by French School mathematicians. There's an entire Wikipedia article devoted to Imiaslavie, which is pretty fascinating, but to sum it up briefly, name worshipping involves the idea that the name of God is God himself. This goes back to the Platonic idea that the name of an object exists prior to the object itself, which suggests that the name of God preexisted before all and is thus God himself.

So how does this tie into mathematics in general and descriptive set theory in particular? Transfinite numbers, which are basically infinite sets that aren't absolutely infinite. Confusing? Yes. It's super abstract and it has always made my brain hurt. There's a reason I majored in applied and not pure math. That aside, what's relevant to this book is the following line from the Imiaslavie Wikipedia article: "the mathematics of continuous functions is like rationalism while some concepts, such as transfinite numbers, can be explained only in the framework of the Imiaslavie philosophy, where the Name of God is God Himself."

Wild! Interestingly, the book's authors are self-described secular rationalists, so much of this psycho-spiritual bent to mathematics is not exactly in their wheelhouse. It's not mine either, but the concept of religion influencing math makes a certain amount of sense to me when you figure at an axiomatic level (literally), there's a belief system involved in math, with whatever axioms you're using setting the rules of the universe in which you are playing. There are similar situations in both philosophy and religion. Is it so surprising that one could influence the other?

For the six of you still reading, I'll wrap this up. Graham and Kantor made a pretty noble attempt of attempting to explain some seriously high-level pure mathematics to a layman audience. They didn't always succeed, but I think most non-mathematician readers are able to have an adequate understanding of both the math and religious concepts to discussed to appreciate the story at the center of the book. In addition to math and religion, this is also a human story of a bunch of brave people striving against incredible odds, as many of the Russian mathematicians at the center of the story were harshly persecuted by the Soviet state. All in all, a story worthy of being told.

NoOneTheBookWorm (Narges Chinichian) says

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Ali Zarezade says

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