

The Rhetoric of Calculus: History, Mathematics, Argument, and Art in *War and Peace*

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“Only by taking an infinitely small unit for observation—the differentia of history, that is, the homogeneous tendencies of men—and, attaining to the art of integrating them (taking the sums of these infinitesimals), can we hope to arrive at the laws of history” (*War and Peace* 986).

Tolstoy’s image of infinitesimally small units and their “integration” into genuine laws of history comes at the crux of a troublesome meditation on history in *War and Peace*. Despite the prescriptive tone in this passage, a working historian will strain mightily before finding Tolstoy’s “differentia of history,” or what it means to “integrate” them into laws in any way that mimics the procedures of calculus to which Tolstoy refers. I will argue here that calculus is more reasonably understood as a symbolic resolution to certain epistemological and rhetorical tensions inherent in the fabric of *War and Peace*. The

tensions themselves are essential to the novel, but Tolstoy feels compelled to insist on their solubility. Rather than a credible model for the derivation of historical laws, calculus serves in this book as an idealized model for the reconciliation of incremental reason with the sweep of absolute truth, and of the thinker’s right to criticize alien theories at any level of particularity, with the artist’s total sovereignty over the whole of his work.¹

The Tolstoyan Absolute

Tolstoy has little use for the equivocations that pepper the writings of Gogol and Dostoevsky; skeptical of the general claims of human knowledge, Tolstoy does not therefore stutter, hedge, or disavow. Readers may consult Tolstoy’s opus for the experience of a girl at her first ball, or of a horse, or a tree, not to mention all families happy and unhappy. The absolute assurance of his

voice makes him the ideal foil for Dostoevsky—"monologic," in Mikhail Bakhtin's terms, as opposed to the dialogic Dostoevsky.

Numerous and absolute, Tolstoy's claims also tend to suffuse the entire universe. When Marya receives a letter from her friend Julie in the beginning of *War and Peace*, she pauses to look at herself in the mirror. "... the Princess never saw the lovely expression of her own eyes, the look they had when she was not thinking of herself. As with everyone, her face assumed an unnaturally strained, ugly expression as soon as she looked in a glass" (127–8). This scene offers just the sort of glimpse into the human condition that one expects from a good novel, and *War and Peace* rewards its readers with many such observations.

But the lesson here is explicit, and it comes marked with a grandiose rhetorical tag. "As with everyone," says Tolstoy, generalizing Marya's experience. Here we have the explicit truth claim—another mode in which Tolstoy exceeds the norm. He will not risk the possibility that his readers may miss the lessons about happy and unhappy families, the impotence of leadership and strategy, or the distorting effects of self-consciousness. On the contrary, he labels them clearly: "as often happens," or "it could not be otherwise."

How does Tolstoy know this about a young woman whose experiences he has never shared? By what sanction does he turn this highly personal experience into a universal law, applying not merely to Marya, nor even to "many," but explicitly "everyone else"? And how do the profound, prodigious, prolific pronouncements fit Tolstoy's skeptical view of knowledge, a view more contra than pro? These sorts of questions do not visibly trouble the author of *War and Peace*, for whom on the contrary prose fiction seems to serve as a privileged source of knowledge. Thus, while Tolstoy began work on *War and Peace* in a mood of deep skepticism toward historiographical claims (Eikhenbaum 195), he seems to have taken

seriously the idea that a novel can be a means of knowing history.

Tolstoyan Skepticism and the Problem of Knowing History

In *War and Peace*, his claims happen to contradict those of, as he is fond of saying, "every historian." Of course, he need not argue with historians about the nature and experiences of Marya, a fictional character over whom he has, by definition, authority. But Tolstoy wants to reach past fiction into history; he wants the truth of individual experience alongside the truth of 1812. He must therefore engage the historians on their own terms, no longer relying only on the suspension of disbelief, but taking up logical implements as well.

As Tolstoy's interest in historiography grew during the writing of *War and Peace*, he came to side with S. S. Urusov not only in a general archaizing Slavophilism, but also in the conviction that the historian must seek laws rather than causes. The study of such laws avoids the metaphysical temptations of subjectivity, placing history instead on a footing with (or even of) science. Just as we do not ask *why* physical objects interact in a certain way, but rather try to generalize those interactions into laws, so too we should seek to uncover the impersonal laws that govern the course of human events. Eikhenbaum argues that Tolstoy served as "the main mouthpiece of [Urusov's] group" (222).

Tolstoy was not a reluctant spokesman, nor one afraid of courting controversy.

As it advances, historical science is continually taking smaller and smaller units for examination, and in this way strives to approach the truth. But, however small the unit, we feel that the assumption of any unit separate from another, or the assumption of a "beginning" of any phenomenon, or the assumption that the wills of all men are expressed in the actions of any one historical event, is inherently false.

It requires but little effort on the part of a critic to reduce to dust, leaving not a vestige behind it, any deduction drawn from history; he has only to select some larger or smaller unit as the subject of observation—as he has every right to do, inasmuch as any given historical unit is always arbitrarily selected (986).

Tolstoy is unstinting with the “little effort.” *War and Peace* is full of merciless demands that historians explain smaller and smaller phenomena, such as the actions of innumerable individual people; and the relation of apparent “beginnings” to what happened before and after. What he gives us in this passage is a *principle* of logical demolition, a formula by which any postulate of history may be torn asunder.

He couches the problem of historical knowledge in rhetorical terms: taken at face value, his “little effort” statement isn’t about what we can or cannot know, but about how we can win the argument. This does not mean, however, that for Tolstoy “rhetorically effective” is the same as “true.” The opposite is nearer the case: The skillful practice of rhetoric is seldom an occasion for praise in *War and Peace*. Indeed, the opposite is nearly true. As Saul Morson has pointed out (257–262) the most eloquent characters in—Bilibin is the prime example—come off as clever but empty and vain, and therefore contemptible. Rather, Tolstoy seems to appeal to a sense of public discourse as a proving ground—and perhaps especially as a *disproving* ground—for truth claims. His strength here is the same as Socrates’: showing how his opponents don’t make sense.

But Tolstoy gives one exception: The steward Alpatych, whose rhetorical tool is not beauty of speech nor intricacy of argument, but a claim of superior knowledge (playing on superstitions). “I can see right through you,” he says to the village elder Dron, “and not only that—I can see three yards into the earth under you” (868). In response, Dron falls to his knees in abject submission. Two things are notable about this episode: the claim to a

preposterous degree of knowledge, and the oppressive effect of this knowledge on those who accept it as true. We might surmise that if Alpatych ever took up pen and paper, he would write like Lev Tolstoy.

Tolstoy’s very conception of knowledge implies an encroachment on the freedom of others, as he points out near the end of *War and Peace*:

Every case, without exception, in which our conception of freedom and necessity is increased or diminished depends on only three considerations:

- (1) the relation to the external world of the man who performs the act,
- (2) his relation to time, and
- (3) his relation to the causes leading to the act.

The responsibility seems greater or less according to our greater or lesser knowledge of the circumstances in which the man was placed whose action is being judged, and according to the greater or lesser interval of time between the commission of the act and the judgment of it, and according to the greater or lesser understanding of the causes that led to the event. (1443–6)

In short, the more we know about an action, the less free it seems. If we could know everything about an action, that action would seem maximally unfree to us. Closer to the point, if Tolstoy knows everything about the rest of the world, the rest of the world seems unfree. Given these rules, one would hardly expect the rest of the world to agree that Tolstoy knows everything about it.

Nor do the rules of this zero-sum game apply to historic figures alone. When Tolstoy says a historical event happened in a certain way, for certain reasons and not others, he takes away all freedom the participants in that event, but he also takes away freedom from contemporaries and followers who might want to interpret the event differently. The more Tolstoy knows about

something, the less free I am to form my own interpretation.

Let us suppose I disagree with Tolstoy's version of events. In this case the lines of the epistemological game will shift, so that I am now the thing that needs explaining. That too may require little effort: Tolstoy will apply his authoritative knowledge to me, and my opinion will seem to him an entirely predictable result of laws that govern my behavior. Thus Tolstoy describes the wrongheaded views of preceding historians, not as plausible misinterpretations, but as an entirely predictable reflex to glorify themselves and their intellectual class. If merchants or soldiers wrote history, Tolstoy tells us, they too would place themselves at center-stage (1419–1420). Tolstoy takes opinions that run counter to knowable truths to be not only wrong, but also unoriginal and unfree.

War and Peace is full of scenes in which characters do not, and indeed cannot, fully understand their own actions. Yet this does not mean they are fools. In defending himself at his trial, Socrates denied that he had any special knowledge beyond a keen sense of what he did *not* know, and Tolstoy's wisdom is deeply Socratic in this sense. Tolstoy pushes this wisdom to the brink of formula in *War and Peace*, assuring us that unconscious activity alone bears fruit. However his reader may bristle at the bald assertion, Tolstoy gives a view of wisdom that rests on the ability to cope with a situation in which many important things simply cannot be known.

Both Pierre and Nikolai exhibit this sort of wisdom near the end of the novel. They can make decisions without an exhaustive degree of information, and without, indeed, knowing the reasons behind their own decisions. Nikolai “could not have said what this standard was by which he judged what should or should not be done, but it existed firm and inflexible in his soul” (1371). Pierre acquires a “judge within him who by some

rule unknown to him decided what should and what should not be done” (1324).

Pierre in particular has served as an emblem of the search for certain truths, and the hazards of such a search. Much earlier in the novel (and thus in his life), when Pierre approached his father on the sickbed, the latter

looked directly at him, but with a gaze the intent and significance of which no man could have fathomed. Either it meant absolutely nothing more than that having eyes one must look somewhere, or it was charged with meaning. (118)

Saul Morson takes this passage as an emblem of Tolstoy's belief that “our ignorance of how things happen is fundamental and without remedy” (86). The ignorance is especially acute in the case of human history. “The only laws of history advanced by Tolstoy in *War and Peace*,” according to Morson, “are negative laws: they are laws of ignorance describing inevitable fallacies and showing why historical research is doomed from the outset” (120).

As an initial response, we may wish to distinguish between characters and author, and to say that while the characters may never understand certain things, the author surely does. Yet Tolstoy does not display the inner compass, nor does he interpret the enigmatic stare. The fact that he may, in his private moments, have imagined them one way or another seems irrelevant to the book. In *War and Peace* the central fact about such moments—and there are many of them—is that they cannot be further analyzed. Their meaning, if meaning they have, is unavailable.

The need, therefore, for wisdom derives from a state of affairs where knowledge is never adequate and rarely (except in its negative form) sound. In the case of history, these limits to knowledge are demonstrated by the ease with which one can demolish any opponent's argument. Here Tolstoy appears to have a problem inasmuch as *any*

historical claim is apparently vulnerable to refutation by reduction. The whole (any given theory or account of historical causation) cannot withstand scrutiny to its parts.

The part-whole connection is thus both a methodological problem, and a rhetorical one. How can we identify relevant non-arbitrary units when all units can be subdivided into smaller units? Moreover, how can we make *any* historical claim without succumbing to the objection that *all* such claims are arbitrary and false? How can Tolstoy the historian make a claim that would withstand the attacks of Tolstoy the skeptic?

Calculus

By introducing the terms of calculus into his historical disquisition, Tolstoy is essentially asking his readers to imagine the flow of history as something that could be graphed as a smooth curve. Let us suppose that we wish to understand a given historical event. This task, adapted to Tolstoy's analogy, translates into announcing the slope of the curve at a particular point. Before Newton and Leibniz there were two options available to us. First, we could assert that the slope is, say, one-half (or whatever we think it is), and draw a fairly straight line that seems tangent to the curve at our point and has the slope we have announced. This is the normal method of historical fiction, which claims to capture the truth in a realistic sketch. Unfortunately, our only response to someone who draws a line tangent to the curve at our point with a different slope is to say that ours looks better or is more realistic. We can make a broad claim, we can make it look convincing, but we are hard-pressed to prove that our claim is truer than any other.

Our second pre-Newtonian/Leibnizean option is to break the curve into straight lines, whose slopes we do know how to measure. The smaller we can get our lines, the more accurate our result, and the less room for difference of opinion, though we will never know the curve directly. When our

opponent draws ten lines, we have only to draw twenty, as Tolstoy says, to make our units arbitrarily small. With two or three or ten lines, we might argue substantially about the nature of the curve: its slope at a given point, the area under it, and so forth. But with one hundred or two thousand lines, our disputes will become much narrower. On the other hand, our perspective will have changed, so that the disagreements we have at ten thousand segments per inch seem as important to us as those at five hundred per inch seemed to our predecessors.

Add to this the problem, which arises not in our example but in the discussion of history, that our own position *vis-à-vis* the curve is constantly changing. Can we ever get from the dissection of curves—ever smaller and smaller chords whose slopes we can measure—to the *real* slope of the curve at a point? It would seem not. No matter how small your segment, it would appear that some freedom of interpretation remains.

Such was the case, at any rate, until the invention (or discovery) of calculus, a technique by which one can speak directly and without fear of contradiction about the slope of the curve at any point. It tells you what those line segments will be like when they are infinitely small—hence Tolstoy's appeal to "infinitesimals," seemingly magical elements that are both knowable and non-distorting. Calculus is such a captivating metaphor for Tolstoy because it reconciles the straight lines of reason with the curve of Truth. It thereby offers a symbolic reconciliation of the two modes of thought and rhetoric that permeate Tolstoy's writings: rationalist criticism and direct, unmediated truth claims.

Tolstoy's approach in this regard can be broken into two steps. First he depicts a process of reasoning continuing with smaller and smaller steps, constantly falling back on itself. Recall his claim that the critic "has only to select some larger or smaller unit as the subject of observation—as he has every right to do, inasmuch as any given

historical unit is always arbitrarily selected" (986). One can demonstrate the inadequacy of any causal explanation by asking it to go one step further, a request Tolstoy often makes.

Tolstoy then switches perspectives, implying that the process has in fact gone to infinity, that he has seen the result, and that he is ready to describe the curve of truth. This truth is sometimes stated directly, more often sketched elliptically. In *War and Peace* it is the principle that history proceeds, not according to the will of great men, but rather by the aggregate spirit of all individual people. This insight is expressed most clearly in the narrated thoughts of Kutuzov.

Long years of military experience had taught [Kutuzov], and the wisdom of old age had convinced him, that it is impossible for one man to direct hundreds of thousands of men struggling with death, and he knew that the fate of a battle is decided not by the dispositions of a commander in chief, nor by where the troops are stationed, nor by the number of cannons or of men killed, but by that intangible force called the spirit of the army, and he took cognizance of that force and guided it insofar as it lay in his power. (967)

Having subdivided opposing arguments practically *ad infinitum*, Tolstoy announces their limit: Spirit. He has reached it through an act of the imagination. With the figure of calculus some twenty pages later, he suggests that logic would take us there as well.

Another example of this strategy of infinite regress comes from Tolstoy's *Confession*, in which he continually asks himself two questions: "Why? And what next?" (26). Tolstoy pursues these questions to the brink of suicide, vacillating between reason, which gives no satisfactory answers, and faith, which he cannot bring himself to trust: "I slipped into these situations not two or three times but tens and hundreds of times, now joy and vitality, now despair and a consciousness of

the impossibility of life" (73–4). These are processes of thought that can be pursued indefinitely without yielding any truth; the "infinitesimals" on which one might base one's knowledge are always just out of reach. The reader stands at the brink of despair.

At this point Tolstoy switches perspectives, imagining that the process has in fact gone to infinity, and that he has seen the result.

But at that point I took a closer look at myself and at what had been happening within me; and I remembered the hundreds of times I had gone through deaths and revivals... "What, then, do I seek?" a voice cried out within me. "He is there, the one without whom there could be no life." To know God and to live come to one and the same thing. God is life. (74)

God, Truth, Spirit and the Infinite are essentially the same thing here, and they are not the answer to any particular question but the limit of all questions.

Tolstoy engages in the rhetoric of epiphany: crisis followed by sudden knowledge, rather than a patient series of clarifying questions, answers, and subdivisions. Socrates, for example, might not approve, and Tolstoy might well not care. So much the worse for Socrates, perhaps. Tolstoy is at home in this mode of persuasion, compelling total assent rather than appealing for an increment of agreement. Yet this is not the practice of historians, and so Tolstoy must build a rhetorical bridge between the kind of statement he wants to make and the kind that is familiar to their craft. Calculus is that bridge, with a magnificent, graceful, "true" curve supported by arbitrarily many logical straight-line struts. The image he seeks to convey is that you can have both, and they can work together.

Calculus versus Statistics

To interrogate my contention that the image of calculus serves a primarily rhetorical purpose for Tolstoy (as an image of the successful combination

of incremental reason and sweeping truth claims), I want to consider an opposing view, that in appealing to calculus Tolstoy really is offering—or at least trying to offer—something of genuine relevance to the study of history. Since a great deal of *War and Peace* itself is devoted to the narration of historical events, we might start by asking how well Tolstoy's historiography-as-calculus theory meshes with the historical scenes in that novel.

To my knowledge, I. S. Lur'e and Jeff Love have offered the most convincing arguments in favor of the applicability of calculus to Tolstoyan history. Lur'e contends that Tolstoy's "differentials" are the basic human needs and desires (for food, warmth, and so on), rather than individual people or even their particular decisions. He supports this claim by noting Tolstoy's insistence that the differentials are "uniform," as are these basic needs. Lur'e goes on to argue that the actions of Napoleon's forces accorded with, and had to accord with, these "uniform differentials." The advance on Moscow makes sense when one reflects that the soldiers saw an opportunity to shelter themselves in the inhabitants' homes; the retreat can be explained by the lack of shelter after the fire (Lur'e 19–23).

It seems to me that Lur'e is entirely correct in his account of Tolstoy's reasoning, and of Tolstoy's conception of the way history works. However, these uniform human needs are not infinitesimal entities, but rather indivisible ones. We arrive at these uniform quanta not by infinite *subdivision*, but by *stripping away* everything that is not essential. They are, in other words, minimal units, rather than infinitesimals. One "integrates" them creatively, with imagination and narrative. Lur'e's interpretation is true to Tolstoy's conception, I assert, precisely because of the *lack* of insistence on the precise applicability of the paradigm of calculus.

Jeff Love, too, interprets calculus as a decidedly loose analogy. It seems obvious, he writes, that "the narrator applies the conceptual apparatus of calculus to the continuous motion of history with

much less precision and far greater conceptual generality" ("Tolstoy's Calculus" 26) than any literal interpretation would sanction.

With calculus, Tolstoy wishes to find a means of writing history capable of aspiring to the comprehension of the whole available to a divine intelligence. But striving remains just that—Tolstoy recognized that realization of this ideal would neither be easy nor *desirable*. (31)

Once we drop the insistence on the *literal* applicability of the model of calculus, we can observe that, in Love's words,

Tolstoy's approach still follows the basic rhythm of the calculus—that is, to bring together a diversity of complexly imbricated parts within the ambit of a single law or set of laws that establishes more general patterns. (32)

Thus in *War and Peace* Tolstoy creates a work

emerging from combinations of smallest narrative configuration into greater wholes that mimics the central flexibility of calculus, its capacity to negotiate between the part and the whole so that, as a consequence of their inner reciprocity, neither is sacrificed to the other. (26)

This reconciliation of huge and tiny (as well as curved and straight) must have appealed to Tolstoy.

However, there are many models that could connect the pattern to the element within it. Aside from calculus, we might appeal to will, causality, knowledge itself, evolution, psychology, or many other types of relation between individuals and patterns. If, like Tolstoy, we want a mathematical model, it seems to me the basic choice is between calculus and statistics. And in his actual treatment of historical parts and wholes, Tolstoy's dominant conception seems to be "the elemental life of the swarm" (732), a phenomenon that for Morson stems from Tolstoy's "prosaic" outlook (125–128).

This swarm life ought to imply a fundamentally statistical methodology, rather than one based on, or conceptually analogous to, calculus.

Calculus allows its user to find the slope of a curve at any point precisely because those individual points are all in line, and the position of each point is uniquely determined by the function that defines the line. All is known, any point can be plotted, and there is no need to say of any given point that it “might” belong to the function. By contrast, statistics treats patterns that one can know *without* knowing all the points. This sort of relation is clearly more characteristic of Tolstoyan narration, where the pattern itself—whether “the movement of masses” or, on an individual level, “habit”—has causative efficacy even when the individual events are to some degree non-determined (free)—and therefore, by Tolstoy’s logic, unknowable. Nikolai Rostov charges the hill at the right moment, and *not* based on calculus or calculation. In his place, someone else might have erred; yet the distribution of opportunities was such that a charge at that moment was likely to succeed. Moscow burned *not* because of any precise chain or curve of events, but burned nonetheless and, according to Tolstoy, it *had* to burn. It burned, in other words, with a *statistical* inevitability.

In the real stuff of *War and Peace*, then, we deal with probability and statistics, rather than with calculus. The naïve generals assume that to control the pattern and ultimate outcome of a battle, you must plot every point. They want a calculus of battle. Effective leaders, by contrast, concern themselves with pattern as such, not with individual causal chains. Napoleon’s greatest achievement is to appear to be in charge. Bagration says “good” in response to every battlefield report. In doing so, they attend to a pattern we might call “confidence” among their troops. Prince Andrey exerts tremendous effort forcing his men to stand in formation while under bombardment because he understands that the way to preserve as many of

them as possible is *not* to guess the trajectory of each incoming cannonball, but to maintain among his men an optimal pattern of distribution. Some are likely to die, and he cannot know which ones. He can only take actions likely to reduce the casualties. Yet Andrey also understands that sometimes

when there is not a coward in front to cry: “we are cut off!” and start running, but a brave, spirited man who shouts: “Hurrah!”—a detachment of five thousand is worth thirty thousand, as at Schöngraben, while at other times fifty thousand will flee from eight thousand, as at Austerlitz. (775)

This is an important point, one obviously related to Kutuzov’s “spirit,” and one that would seem to fly in the face of probability. Such a shout is, after all, statistically insignificant, and that is precisely Andrey’s point. Statistics in the sense that would have been familiar to Tolstoy can drain the importance from individual people and events. This version of statistics is unlovely and inimical to a writer who wishes to stress the importance of the particular.

For a full explication of “swarm life,” what Tolstoy would need is the mathematics, or at least the guiding images, of quantum mechanics and chaos theory. We are now comfortable with the proposition that beyond certain thresholds, the behavior of individual sub-atomic particles is radically unpredictable, even unknowable, while the aggregate patterns of those events *are* predictable. We also know that many patterns have nodes of special sensitivity, where a small input (“Hurrah!”) can cause the whole thing to change course. Such things can be known and even calculated, to an extent, and they provide the most plausible mathematical model of truth and knowledge in *War and Peace*.

We can hardly blame Tolstoy for overlooking these refinements, some of which entered popular

intellectual life over a hundred years after the publication of *War and Peace*.

Yet even ordinary statistics still corresponds much more closely than calculus to history as Tolstoy depicts it. The basic mathematical instruments of statistics and probability theory were easily available at Tolstoy's time: Statistics enjoyed something of a vogue in the "thick journals" of the time. Moreover, Urusov himself suggested their utility in his *A survey of the Campaigns of 1812 and 1813, Military-Mathematical Problems, and Concerning the Railroads*. "Finally," writes Urusov,

even political economy, by subjecting itself to statistics (and the latter to mathematics) now has the stature of an exact science. For some reason, only history, the highest and most important of all the transcendental sciences, remains stuck on empiricism, where it has been since pagan times. (qtd. in Eikhenbaum, 218)

Tolstoy needn't have learned any actual statistical techniques to absorb from Urusov the (rather commonsensical) view that the branch of mathematics best suited to any "science" of history is statistics.

The Art of Integration

Tolstoy's main integrative task was neither historical nor polemical: It was artistic, a point that Eikhenbaum (227–229) and Love (*Overcoming* 92–93) both emphasize. In *War and Peace*, the coexistence of fundamentally different modes of thought—logical, rhetorical, and skeptical on the one hand; sweeping, confident, and authoritative on the other—is in my opinion an artistic strength, rather than a weakness. It allows Tolstoy to attain what E. B. Greenwood has called a "comprehensive vision," rather than a programmatic one. The active, sensitive human mind must constantly find ways to doubt and ways to believe; ways to verify or discredit its own procedures and ways to risk the bold affirmation of something known deep down

to be true, yet not quite proven. The theoretical mind will perceive tensions between these ways of thinking and will attempt to resolve them whenever possible. Tolstoy's genius as an artist of thought lies in the integrity with which he depicts—or comprehends, or embraces—these ways of thinking.

This interpretation clearly gives precedence to the artistic order: Each movement of the mind is placed in dynamic juxtaposition with all the others. This order gives maximum fidelity to the experience of thought and minimum priority to its codification. The many types and instances of thought given in *War and Peace* are united primarily by the integrity of the artistic mind as it confronts itself and the world. Yet Tolstoy wanted to be a thinker as well as an artist. And as a thinker, he wanted more than integrity: he wanted something like mathematical integration. Thus, while Lur'e and Love interpret calculus as a viable but loose model of Tolstoy's view of history and of the formal construction of the novel, I view calculus as a more precise model of something that Tolstoy desires but does not attain: the total synthesis of logic and truth.

Exhorting Tolstoy to mathematical precision, Urusov wrote in a letter to Tolstoy that

disregarding causes, I have shown that laws can be discovered, and I even discovered the law governing the rise and fall of armies. The existence of mathematical laws not only does not negate the existence of freedom, but, on the contrary, confirms it. I can only make a guess, saying: such an event will occur. But to guess something does not mean to force it to happen. (qtd. in Eikhenbaum 22)

Urusov's is of course a probabilistic view. Artists, by contrast, do force things to happen. They create complex but uniquely determined wholes, works where every little bit is where it is not as a matter of chance but as a matter of

necessity. Their characters enjoy infinitesimal freedom at best.

All of which brings us to a final reason why Tolstoy might not have endorsed any sort of probabilistic model of history. Vladimir Nabokov liked to point out a certain temporal relativity in Tolstoy's work, which allows him to violate basic requirements of consistency among time-frames without injuring a sense of the whole (*Pnin* 122 and 128–9, *Lectures* 141–2 and 194–198; see also Alexandrov). Tolstoy and Einstein may have even more in common than that. Both of them reconceive their world in a way that reveals new truths, and yet both shrink from the indeterminate qualities of this new world. "I cannot believe that God plays dice," Einstein said, expressing his opposition to a quantum theory that grew directly out of his own discoveries. For Tolstoy, the rhetoric of calculus exists to show precisely that God does *not* play dice, that truth and reason, curves and straight lines, emotions and thoughts, can all be reconciled. It is a figure for the artist's will to coherence, in the face of a world that does not quite submit.

Notes

My thanks to Omry Ronen for bringing Lur'e's book to my attention, and to William Mills Todd III, who pointed out the vogue for calculus in the "thick journals" while Tolstoy was writing *War and Peace*.

1. Any interpretation of Tolstoy that finds a crucial tension between two habits of mind ought to make reference to Isaiah Berlin's hedgehog/fox distinction, if only in a footnote. In Berlin's terms, one might say that calculus embodies a hedgehoggish insistence that there's no fundamental conflict between the two modes after all.

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