efforts on the part of the Russian army, it was to perish, bleeding from the mortal wound it had received at Borodino. The direct consequence of the battle of Borodino was Napoleon's causeless flight from Moscow, the return down the old Smolensk road, the destruction of an invading army of five hundred thousand men, and the destruction of Napoleonic France, upon which had been laid for the first time, at Borodino, the hand of an adversary stronger in spirit.

Tolstoy, War & Peace
Pevear & Volokhonsky translation

Part Three

I

For human reason, absolute continuity of movement is incomprehensible. Man begins to understand the laws of any kind of movement only when he examines the arbitrarily chosen units of that movement. But at the same time it is from this arbitrary division of continuous movement into discrete units that the greater part of human errors proceeds.

A well-known so-called sophism of the ancients posits that Achilles can never overtake a tortoise that is walking ahead of him, even though Achilles walks ten times faster than the tortoise: while Achilles covers the distance that separates him from the tortoise, the tortoise will get ahead of him by one tenth of that distance; Achilles covers that one tenth, the tortoise gets ahead by one hundredth, and so on to infinity. The ancients considered this problem insoluble. The nonsensical conclusion (that Achilles will never overtake the tortoise) resulted only from the fact that discrete units of movement were introduced arbitrarily, while the movement of both Achilles and the tortoise was continuous.

By taking smaller and smaller units of movement, we only approach the solution of the problem, but never reach it. Only by allowing for an infinitesimal quantity and the ascending progression from that up to one tenth, and by taking the sum of that geometrical progression, do we arrive at the solution of the problem. A new branch of mathematics, having attained to the art of dealing with infinitesimal quantities in other, more complex problems of movement as well, now gives answers to questions that used to seem insoluble.

This new branch of mathematics, unknown to the ancients, in examining questions of movement, allows for infinitesimal quantities, that is, such as restore the main condition of movement (absolute continuity), and thereby corrects the inevitable error that human reason cannot help committing when it examines discrete units of movement instead of continuous movement.

The same thing happens in the search for the laws of historical movement.

The movement of mankind, proceeding from a countless number of human wills, occurs continuously.

To comprehend the laws of this movement is the goal of history. But in order to comprehend the laws of the continuous movement of the sum of all individual wills, human reason allows for arbitrary, discrete units. The first method of

history consists in taking an arbitrary series of continuous events and examining it separately from others, whereas there is not and cannot be a beginning to any event, but one event always continuously follows another. The second method consists in examining the actions of one person, a king, a commander, as the sum of individual wills, whereas the sum of individual wills is never expressed in the activity of one historical person.

Historical science in its movement always takes ever smaller units for examination, and in this way strives to approach the truth. But however small the units that history takes, we feel that allowing for a unit that is separate from another, allowing for the *beginning* of some phenomenon, and allowing for the notion that all individual wills are expressed in the actions of one historical person, is false in itself.

Any conclusion of historical science, without the least effort on the part of criticism, falls apart like dust, leaving nothing behind, only as a result of the fact that criticism selects as an object for observation a larger or smaller discrete unit, which it always has the right to do, because any chosen historical unit is always arbitrary.

Only by admitting an infinitesimal unit for observation—a differential of history, that is, the uniform strivings of people—and attaining to the art of integrating them (taking the sums of these infinitesimal quantities) can we hope to comprehend the laws of history.

The first fifteen years of the nineteenth century in Europe present an extraordinary movement of millions of people. People abandon their usual occupations, rush from one side of Europe to the other, plunder, kill each other, triumph and despair, and the whole course of life is altered for several years and presents an intense movement, which initially increases, then weakens. Human reason asks, what was the cause of this movement, or according to what laws did it occur?

Historians, in answer to this question, lay before us the deeds and speeches of several dozen men in one of the buildings in the city of Paris, calling these deeds and speeches by the name of *revolution;* then they give a detailed biography of Napoleon and of some persons sympathetic or hostile to him, tell of the influence of some of these persons on others, and say: here is the origin of this movement, and here are its laws.

But human reason not only refuses to believe in this explanation, but says straight out that this method of explaining is incorrect, because in this explanation a weaker phenomenon is taken as the cause of a stronger one. The sum of individual human wills produced the revolution and Napoleon, and only the sum of those wills endured them and then destroyed them.

"But every time there were conquests, there were conquerors; every time

there were upheavals in the state, there were great men," says history. Indeed, each time conquerors appeared, there were wars, human reason replies, but that does not prove that the conquerors were the cause of the wars, and that it is possible to find the laws of war in the personal activity of one man. Every time I look at my watch and see the hand approaching ten, I hear the bells start to ring in the neighboring church, yet from the fact that the bells start to ring every time the hand reaches ten, I have no right to conclude that the position of the hand is the cause of the movement of the bells.

Every time I see the movement of a locomotive, I hear a whistling sound, see the opening of the valve and the movement of the wheels; but I have no right to conclude from this that the whistling and the movement of the wheels are the cause of the movement of the locomotive.

Peasants say that a cold wind blows in late spring because the leaf buds of the oak are sprouting, and indeed a cold wind blows every spring when the oak is sprouting. But though the cause of the cold wind that blows as the oak sprouts is unknown to me, I cannot agree with the peasants about the sprouting of the oak being the cause of the cold wind, if only because the force of the wind is beyond the influence of the leaf buds. I only see the coincidence of conditions that occurs in every phenomenon of life, and I see that however long and thoroughly I observe the hand of my watch, the valve and wheels of the locomotive, and the leaf buds, I will not learn the cause of the bells ringing, the movement of the train, and the spring wind. For that I must change my point of observation completely, and study the laws of the movement of steam, bells and the wind. Historical science must do the same. And attempts at it have already been made.

To study the laws of history, we must change completely the object of observation, leave kings, ministers, and generals alone, and study the uniform infinitesimal elements that govern the masses. No one can tell to what extent it is given to man to achieve in this way an understanding of the laws of history, but it is obvious that the possibility of grasping historical laws lies only on this path, and that on this path human reason has not yet made one millionth of those efforts the historians have made in describing the deeds of various kings, commanders, and ministers, and in setting forth their reflections on the occasion of those deeds.

II

The forces of two-and-ten European nations burst into Russia. The Russian army and populace retreat, avoiding a confrontation as far as Smolensk, and from Smolensk to Borodino. The French army, with an ever-increasing force of momentum, races on to Moscow, the goal of its movement. The force of i