In these exceedingly rare tracts, Lobachevskii devises the first work of non-Euclidian geometry.

Lobachevskii, Nicolai. *O nachalakh geometrii*. In the journal, *Kazanskii vestnik, izdavaemyi pri Imperatorskom Kazanskom Universitete*. Kazan, 1829–30. Part 25, Feb. and March, 1829, pp.178–87; Part 25, April, 1829, pp. 228-41; Part 27, Nov. and Dec., 1829, pp. 227–43; Part 28, March and April, 1830, pp. 251–83; Part 28, July and Aug., 1830, pp. 571–636.

Lobachevskii's *O nachalakh geometriii* ("The Origins of Geometry") is the first work on non-Euclidian geometry to be published. Euclid's *Elements* had attracted criticism, commentary, and elaboration even in ancient Greece. Over the years, some of his postulates came to be proved as theorems, but the fifth (on parallel lines) could not, even by Lobachevskii (1793–1856), who eventually concluded that hyperbolically curved space was possible, with Euclid's postulate but a special case under that general rubric. He delivered his paper as a faculty lecture at the University of Kazan in 1826, but did not publish it until 1829–30.

Euclid's Fifth Postulate essentially asserts (albeit in somewhat different terms) that in any given plane, through any given point, only one straight line can be drawn that will not intersect with a given straight line. Lobachevskii devised a non-Euclidian system in which an infinite number of parallel lines may be drawn. Karl Friedrich Gauss (1777–1855)—Lobachevskii had studied under one of his pupils—had anticipated something resembling the system, but never published his findings, and the Hungarian mathematician Janos Bolyai (1802–60) independently published his own non-Euclidian geometry in Maros Vásárhely a few years later, in 1832–33.

Scientific publishing is now dominated by the brief journal article. Einstein, and Watson, and Crick all published their epoch-making discoveries in journals. But in Lobachevski's time, the notion of the "Big Book" (or even the middle-sized one) still persisted. It would be hard to have published more obscurely and unbookishly than Lobachevskii. He announced his geometrical discoveries in *The Courier of the Imperial University of Kazan,* a journal that hardly circulated beyond its province, let alone

abroad. The text was in Russian, at a time when few foreigners could read the language, French or German being the chosen tongue of publication, even for many learned Russians. Publication of the paper, moreover, was spread out over five issues, impeding a synoptic view, and offering the reader every excuse to lose the thread of a complicated and novel argument. Offprints (to use the bibliographical term—scientists call them "reprints" or "separates") of the serial articles were the usual means of acquainting colleagues with a scientist's latest contribution to the field, but do not seem to have been produced in this case.

These circumstances combined to ensure that Lobachevskii's paper, for all its modern fame, made as little immediate impact as Gregor Mendel's obscurely published article on the inheritance of color in the pea. It is now an extraordinary rarity in any form. Fewer than half-dozen sets appear to be known. The five parts in the copy reproduced here have been extracted from bound volumes, as may be judged by the variable trim-sizes and the intermittently stained top-edges. The five title-pages of the original issues are not present, nor are any of the original wrappers. There is indeed a front and back wrapper, as well as a title-page—the first a photographic facsimile and the other two genuine—but all are extraneous, as they belong (even the facsimile) to other issues of the journal than those in which Lobachevskii's paper appeared.