
Preface

The investigation of a murder led a movie director (a character of a detective story by Victoriya Tokareva⁸) to the conclusion: “Mathematics is that which can be explained.”

The main contribution of mathematics to the natural sciences is not in formal computations (or in other applications of ready-made mathematical achievements), but in the investigation of those non-formal questions where the exact setting of the question (what are we searching for and what specific models must be used) usually constitutes half the matter.

The 39 essays collected below have the same goal: to teach the reader not only to multiply large numbers (which sometimes also has to be done), but to guess about unexpected connections between seemingly unrelated phenomena and facts, at times coming from different branches of the natural and other sciences.

Examples teach no less than rules, and errors, more than correct but abstruse proofs. Looking at the pictures in this book, the reader will understand more than learning by rote dozens of axioms (even together with their consequences about what sea the Volga river falls into and what horses eat).

⁸A Soviet and Russian screenwriter and short story writer.

Boris Pasternak wrote that “the question of the usefulness of poetry arises only in periods of its decline, while in periods of its flowering, no one doubts its total uselessness.”

Mathematics is not quite poetry, but in it I try to avoid the feeling of decline preached by the enemies of all natural sciences.

Let me also add that Niels Bohr divided true statements into two classes: the trivial ones and those of genius. Specifically, he regarded a true statement as trivial when the opposite statement is obviously false, and a true statement as genius when the opposite statement is just as non-obvious as the original, so that the question of the truth of the opposite statement is interesting and worth studying.

I take this occasion to thank N. N. Andreev who coerced me into writing this book.

From the editors. Vladimir Arnold died on June 3, 2010. He participated in the preparation of the second edition, but did not see the proofs (in which the only changes were in the essays on pages 37–38 and 51–53).