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# The History of Mills in Russia in the Context of Architectural Traditions

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## Abstract

Interdependence of the architectural form with function is one of permanently open questions in the architectural theory. The paper describes the history of development mills in Russia in the context of architectural traditions. The use of wind and water engine was a real engineering breakthrough and by the end of the XIX century had been determining the nature of many types of industries. Architectural principles of the mills construction determined common European technological advances and development. The choice of the mill type depended only on the conditions of the building. Mills were built around by a project or likeness. Mill buildings were utilitarian and functional. Changing the architectural appearance of mills associated with the process and its improvement. The peculiar features of the mill buildings appeared only in connection with the characteristic of particular region general construction technologies, traditional building materials and the level of construction equipment.

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*Keywords:* the history of architecture, architectural form, industrial architecture, mills, renewable energy sources

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## 1. Introduction

Interdependence of the architectural form with function is one of permanently open questions in the architectural theory [1-17]. Speaking of the architecture of buildings, we can safely call the use of solar and wind energy as form design factor in architecture [18-27].

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The history of culture and building technologies were directly related to the process that began at the end of the first millennium AD and had been continuing by the XVI c. It was named the second industrial revolution. The spiritual renewal of Renaissance revived interest in the ancient world and contributed to the gradual spread and improvement of technology that had changed social conditions and the mentality of people. Undoubtedly, European trends in the development of society's productive forces and the development of the sciences had an effect on similar processes in Russia. We can trace the characteristics and the relationship of building principles to create mills and technical equipment required for the mill production. Interdependence of the architectural form with function is one of permanently open questions in the architectural theory. Fig. 1 [28, 29].

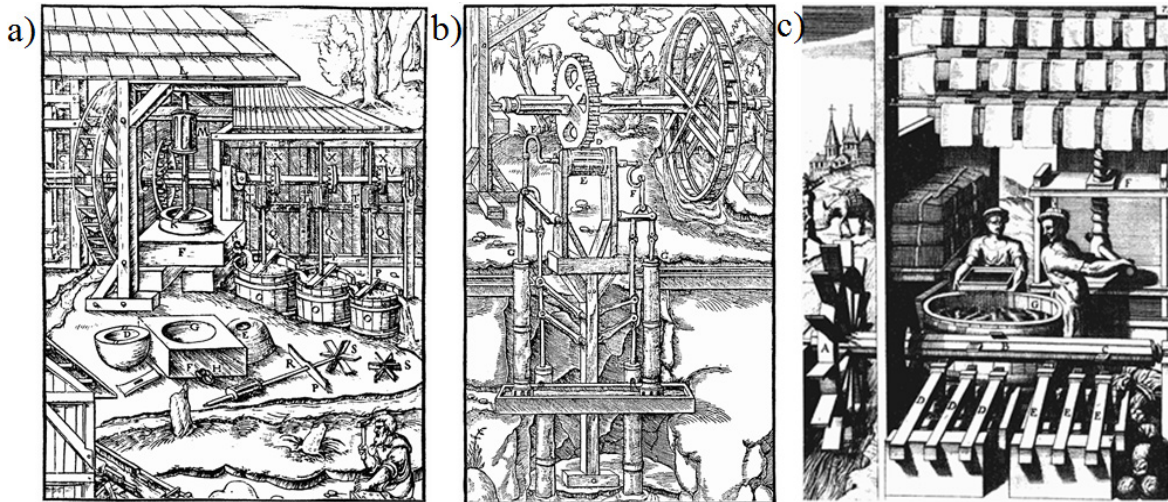


Fig. 1, a) An ore crushing mill in the book "De re metallica" XVI c., b) A mine pumps mechanism that used the water wheel force in the book "De re metallica", c) A paper machine running from the vertical undershot type wheel in the book by Andream Borkler "Theatrum machinarum novum" 1662

## 2. Mills building in Europe

From the XI century new sources of energy began to use to the needs of crafts and industry actively. Water Mill, which was already known to the Alexandrians in the first century BC, had been widely distributing in the West in various forms depending on local conditions. For example, there were working on the tides power in Venice, liquid in river areas. At the same time and windmill gained, introduced by the Arabs and had come to Europe through Morocco and Spain. Water- and windmills which are already in its original form in the XI and XII centuries had a capacity of 40-60 horsepower, had been determining the nature of technical installations by the end of the XVIII century. New sources of energy in the first decades of the XIII century gave a powerful impetus to the development of metallurgy, glass brightened skills, new weaving and fulling machine (Fig. 1, 2). Grand hydraulic works were undertaken in the Netherlands for the drainage areas, flooded waters of the sea, with the use of various types of pumps using of wind energy.

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