NATURAL SCIENCE LABORATORY MODELS - CRITERIA FOR SPATIAL PROGRAMMING OF SCIENTIFIC RESEARCH SPACES

History of Laboratories

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Leipzig Laboratory for Physiology

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Ruđer Bošković Institute, Zagreb, Kazimir Ostrogović

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1965.

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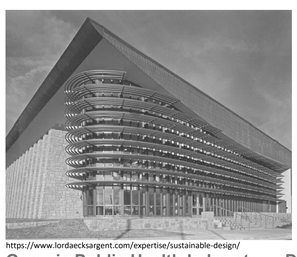

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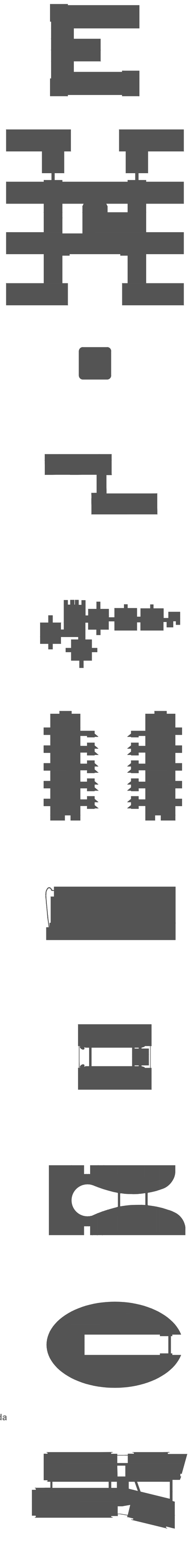
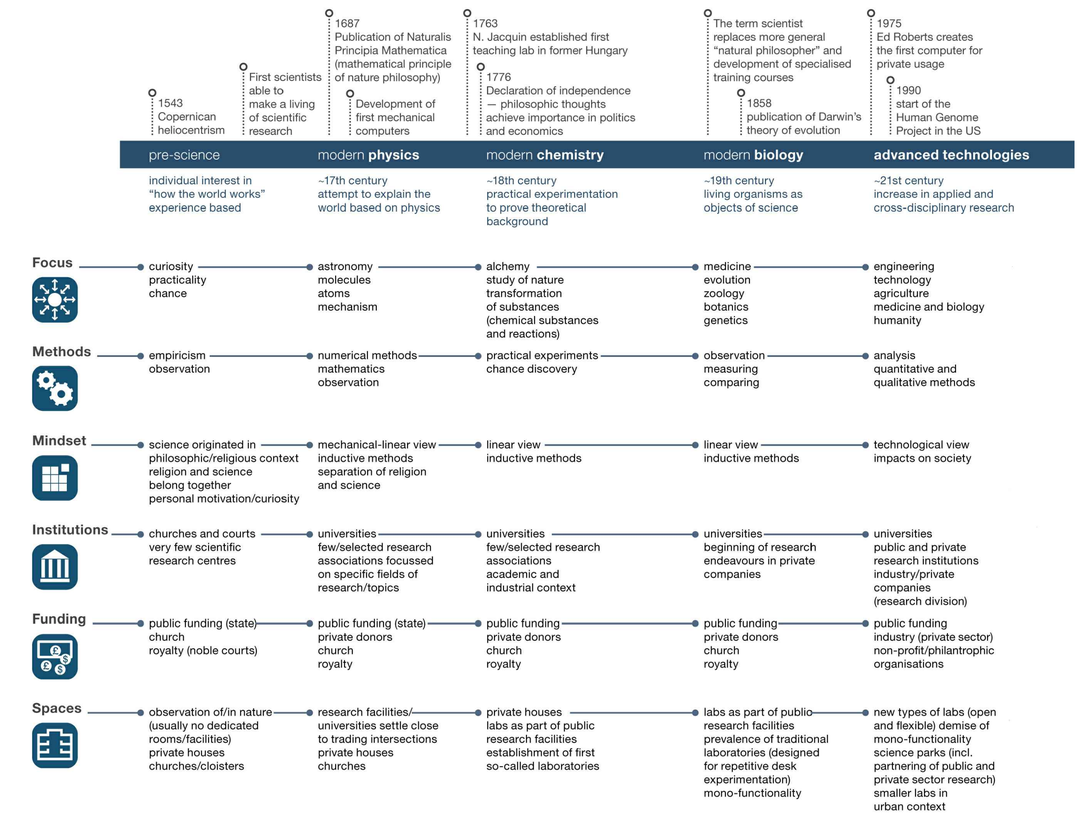


Scientific Research Over Time

https://www.arup.com/perspectives/publications/research/section/future-of-labs



Future of Labs - The Research Ecosystem

https://www.arup.com/perspectives/publications/research/section/future-of-labs

People and colaboration

- generic space layout
- activity based workspace
- intedisciplinary team work
- outdoors spaces as a part of research facility

Spaces and operation

- cloud - based labs
- human - robot interaction
- intelligent spaces (monitoring maintenance needs)

Infrastructure and place

- research custers, science parks
- decentralised lab spaces
- public realm qualities around institutions
- accessibility and visibility of science

Natural science laboratory models - criteria for spatial programming of scientific research spaces

The challenges faced by contemporary architecture are emphasized when it comes to laboratory buildings (which are usually very complex and need to meet wide range of requirements - functionality, technology, economic profitability, sustainability, design, environmental protection...).

Development trends of the scientific research processes lead to the increasing level of use of various devices and automation, AI and web databases derive new forms of research. They affect not only the way scientists work, but also the laboratory space and other supporting spaces. Also, over time, research technologies and priorities changes, new research methodologies / tests are introduced and often the problem arises in the use of the building when it is established that some contents are missing, and some are under-capacitated (this can be disadvantage that could be difficult to compensate). The question of flexibility or ease adaptability of existing spaces to the new demands are now actual more than ever before.

The proposed research includes an analysis of literature on natural science laboratories: typology analysis, historical overview of development, analysis of laboratory design standards, and interviews with users (scientists) and architects who designed laboratory buildings.

The goals of the research are to define

(1) a more detailed systematization of the natural science laboratories (analyzing and supplementing the current systematization in literature),

(2) possible flexibility of laboratory spaces (to what extent the laboratory space is flexible and can be adapted to the needs of the research process), and

(3) a method that could be applied to the programming of laboratory buildings, where all the elements that influence the structure and spaces will be considered: internal determinants related to different types of research and technological processes; the number of users - the required area of the laboratory and the length of the desk per user; the size, that is, the norms of both common and accompanying contents; the ratio of net and gross area; research environment, and also others founds that has relevant impact on laboratory building design

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