

spring2018.upol.cz

Viktor Cap Photography

PRESENTATION
FROM THE

ICA JOINT WORKSHOP



Olomouc
Czech Republic
April 27–30, 2018

Atlases & Cognition & Usability



Towards True Atlases: a System Theory in Atlas Conceptualization

Vít Voženílek

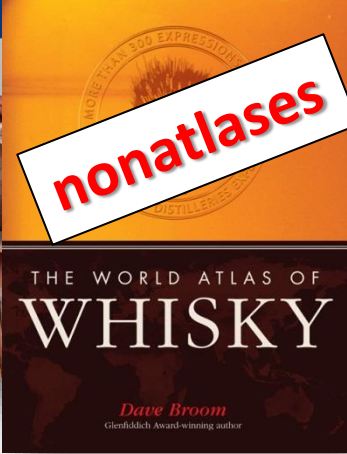
Palacky University Olomouc



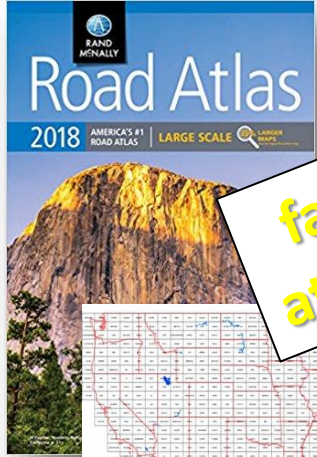
DEPARTMENT OF GEOINFORMATICS

Palacký University in Olomouc | Faculty of Science

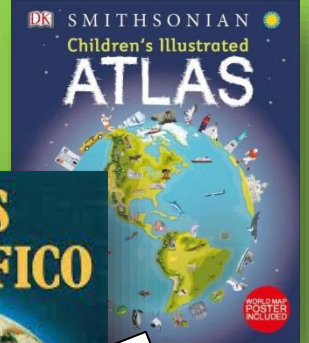
Atlas of Anatomy



nonatlases



false atlases



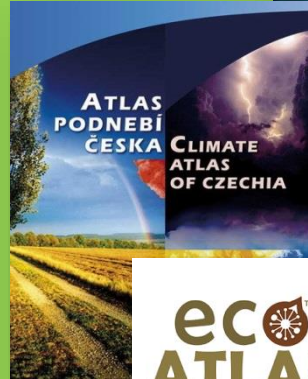
ATLAS GEOGRÁFICO



true atlases



primitive atlases



eco ATLAS

Atlas de l'agriculture
JEAN-PAUL CHARVET
Comment pourra-t-on nourrir le monde en 2050?

A book called atlas

no maps

???? ATLAS ????

only maps

0

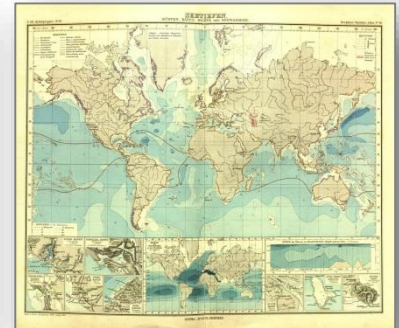
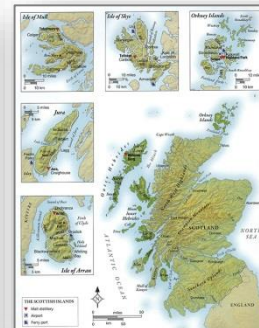
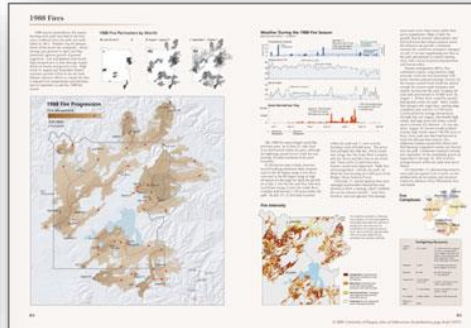
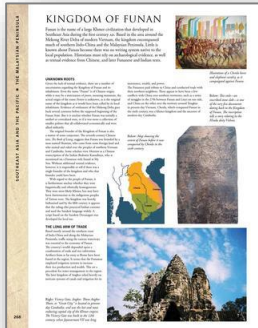
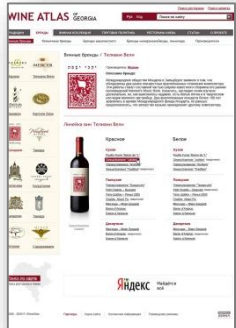
25

50

75

100

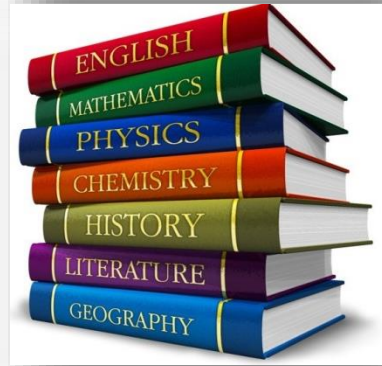
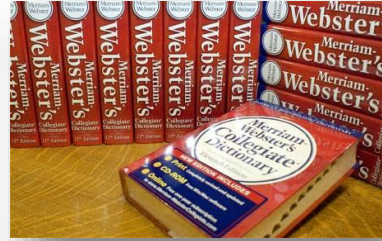
% of maps



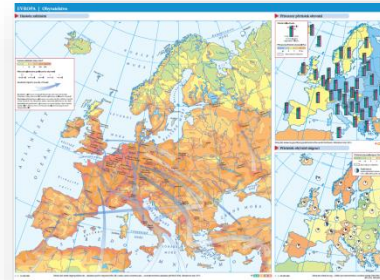
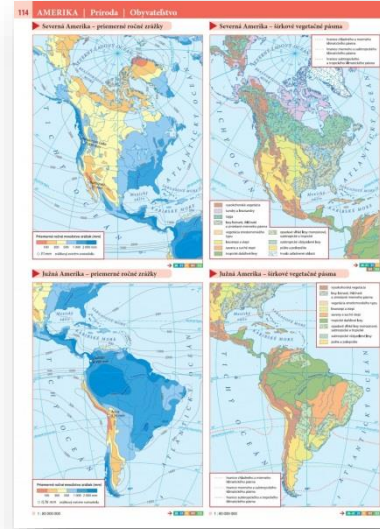
HERBARIUM



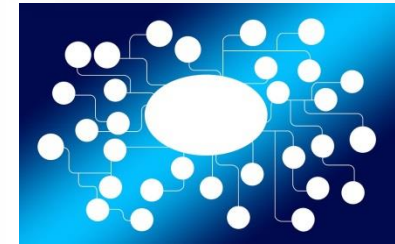
DICTIONARY



ATLAS



SYSTEM



Atlas definitions

- An atlas is a collection of maps; it is typically a bundle of maps of Earth or a region of Earth (Wikipedia, 2018)
- An atlas is a bound collection of maps (dictionary.com, 2018)
- An atlas is structured in such a way that information items can indeed be seen as part of this overall narrative (Ormeling, 1993)
- An atlas as a set of targeted compiled maps systematically organized according to the thematic content, the spatial extent and temporal viewpoint and assembled in a unified map language (Voženílek, 2014)
- Atlases are systematic collections of topographic and/or thematic maps with selected scales for a dedicated region and a dedicated goal (Hake et al., 2002; Kraak and Ormeling, 2010)
- One of the main tasks of an atlas is to enable comparisons between maps in order to recognise correlations between them (Hruby, 2015)

Can atlas be described as a system?

A system consists of elements and relationships between them.

An atlas consists of maps and relationships between them.

A system has a structure and behavior.

An atlas has a structure and usage.

A system has a language – information is passed through the information channels.

An atlas passes spatial information through map language.

If we describe an atlas as a system we can measure it and then improve, redesign, reuse etc.

Given the state space equation and output equation of a system

$$\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1(t) \\ x_2(t) \end{bmatrix}$$

- Determine the transfer function of the system.
- Is the system asymptotically stable?
- Determine the controllability and observability of the system.
- Determine $x_1(t)$ and $x_2(t)$ with $x_1(0) = 0$, $x_2(0) = 0$ and $u(t) = 1$.
- Design a state feedback control law $u = -Kx$ such that the eigenvalues of the closed-loop system are located at $-4 \pm j4$.

LET US EXAMINE ATLASES USING SYSTEMS THEORY

