

MAP LANGUAGE, CONTENT AND COMPOSITION

MAP LANGUAGE

Map language (cartographic language) = a formalized language of a predominantly graphic nature, depicting objects of interest using **cartographic symbols** and expressing their meaning within the framework of a cartographic work

Cartographic symbol – any graphic resource or a collection of resources that carries a certain meaning and expresses something on the map

Cartographic signs form a graphic model of reality, they usually have no meaning or counterpart in the real world by themselves.

Creation of a cartographic language

- ❖ compilation of a system of cartographic signs
- ❖ determining how to display them on the map
- ❖ precise definition of their meaning

MAP LANGUAGE

Cartographic semiology deals with the theory of the creation and use of cartographic signs .

Disciplines of semiology:

- **semantics** – relationships of characters to their content
- **sigmatics** – relations of signs to the function of the expressed object
- **syntax** – mutual relations of characters with each other
- **grammar** – rules for composing characters into higher units
- **pragmatics** – the user's relationship to the character set

Cartographic symbol / map sign

A cartographic feature has three basic properties:

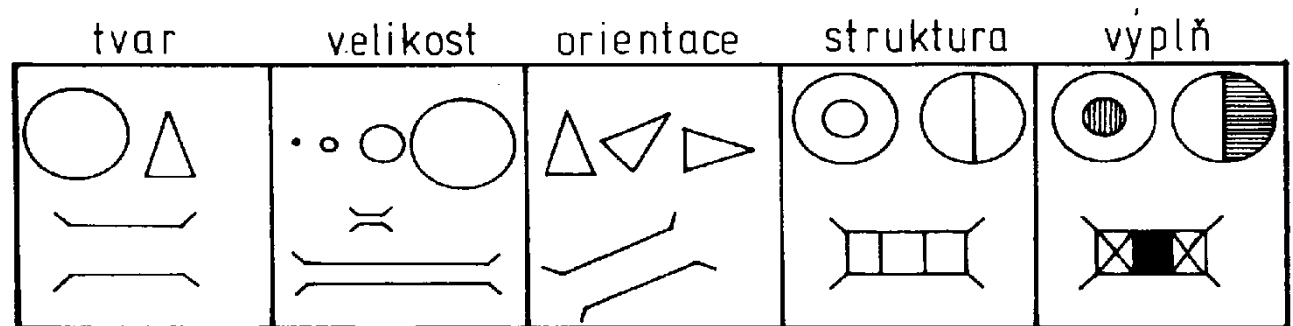
form, content and location.

– presents two types of information: **positional and descriptive**

Map symbols (signs) are a subset of all cartographic features.

Basic morphological features of the map sign:

- face
- size
- orientation
- structure
- filling



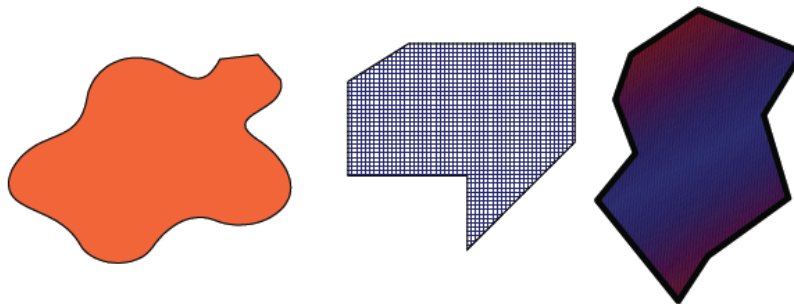
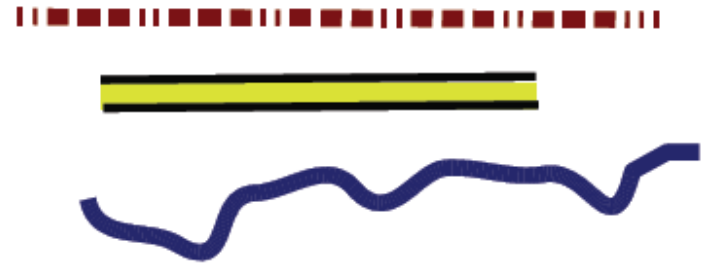
Map signs

– geometric classification

figural (point) marks



line marks
(linear)



area signs

Figural (point) marks

use:

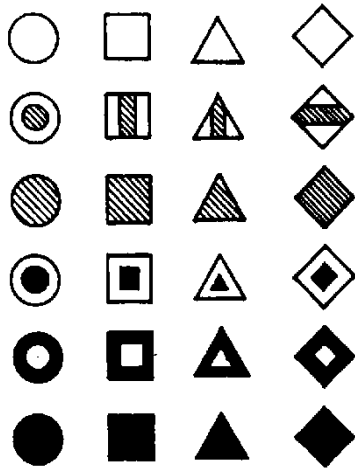
- **point elements** (geodetic points, spot heights, ...)
- **objects whose size in the scale of the map vanishes** (springs, wells, monuments, battlefields, residences, ...)
- in thematic maps – dot method, diagram maps

Types of figural signs:

- **geometric**
- **symbolic**
- **pictorial** (iconographic)
- **alphanumeric**

Figural marks

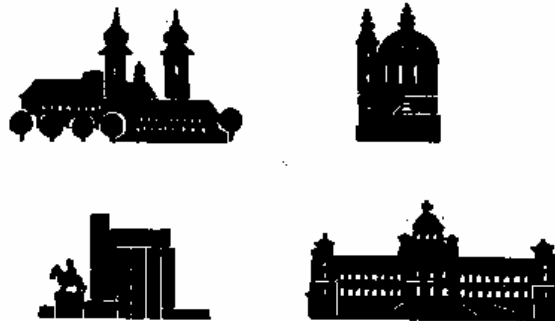
geometric



symbolic



pictorial



aplphanumeric

e.g. extraction of raw

materials: Fe, Cu

date of battle: 1866

Line marks

- they express linear objects or phenomena
- usually placed so that the longitudinal axis coincides with the course of the axis of the expressed fact (roads, waterways, ...)

According to the accuracy of the display of the given phenomenon, we can distinguish line marks:

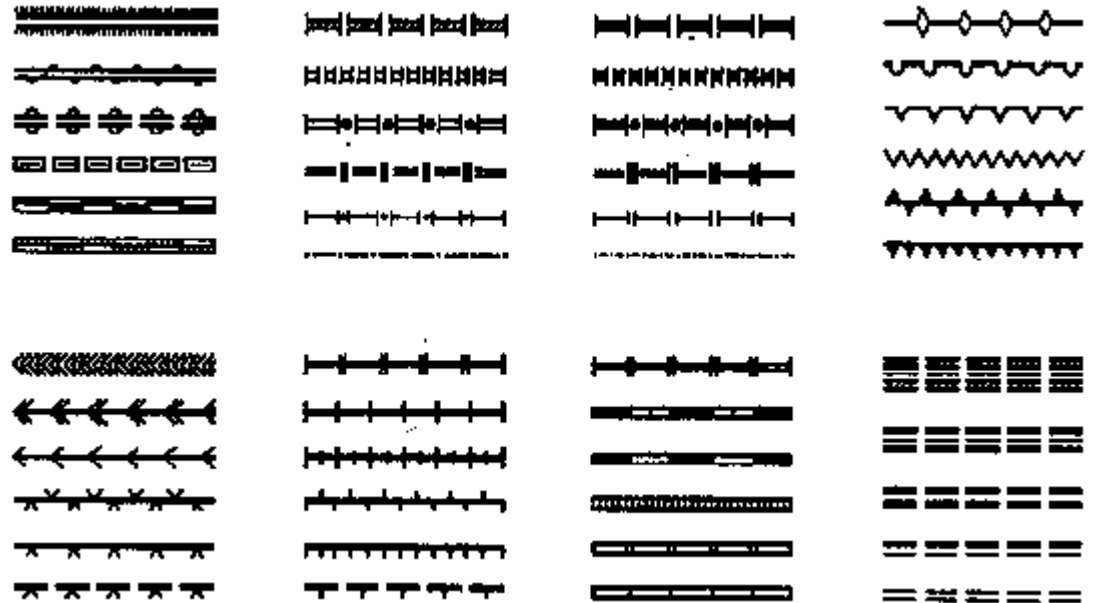
- **geometrically accurate** – borders, geographic and kilometer network
- **topographically accurate** – roads, railways, narrow waterways
- **schematically accurate** – connections (e.g. air and water lines), sea currents,...

Line marks

Distinguishing features

- width (thickness)
- structure of the drawing
- colour
- fill intensity
- (edging)

examples of line marker structure



Area signs

- characterized by surface phenomena
- vegetation, political divisions, bodies of water...

Means of expression:

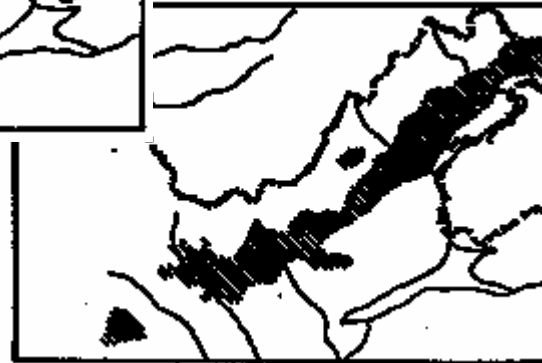
- **contour line**
- **area filling** (colour, hatching, symbol, ...)

An area sign can be used to express:

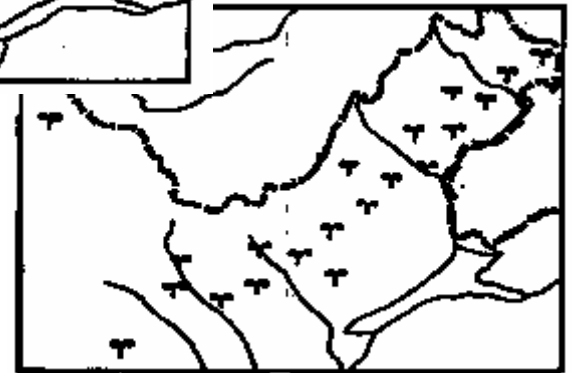
- **quantity:** size
- **quality:** filling, intrinsic structure

Area signs

contour
line



area filling



Scripts on maps

Descriptive information – requirements: **legibility, aesthetics**

- **geographical nomenclature** – labels of settlements, mountain ranges, watercourses and areas, names of countries, ...
- **out-of-frame data** – map name, scale, display, explanatory notes, imprint
- **accompanying texts** – registers
- **general designations and numerical data** – *stat., gar.*
(attribute extension of objects)

– use of sans-serif font (better readability)

– more significant elements – graphically more distinct expression

– labels of various content elements – aesthetically coordinated

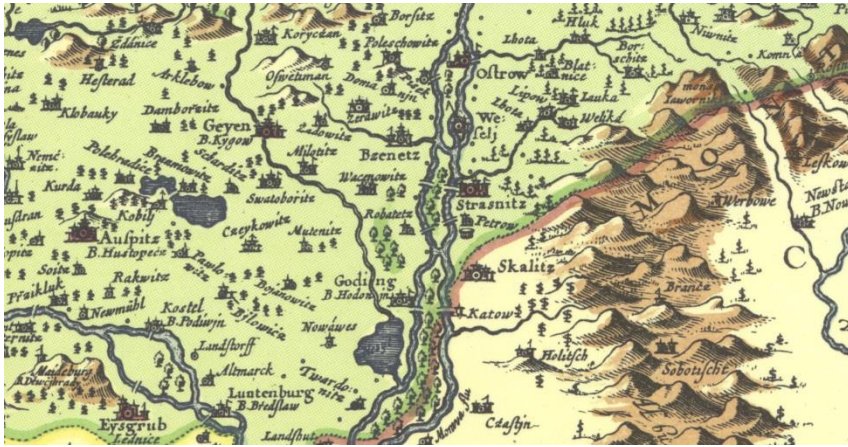
BASIC MAP CONTENT ELEMENTS

- **water level** – hydrographic component of map elements of natural and artificial nature
- **relief** – the altimetry component of map content, the third dimension of the map
- **settlements** – settlements of urban and rural type
- **communication** – ground, water, air and other connections
- **land surface and land-use** – land without vegetation and with vegetation
- **border** – demarcation of political administrative units or geographical areas
- **geographical nomenclature** – proper names in the map of the displayed objects

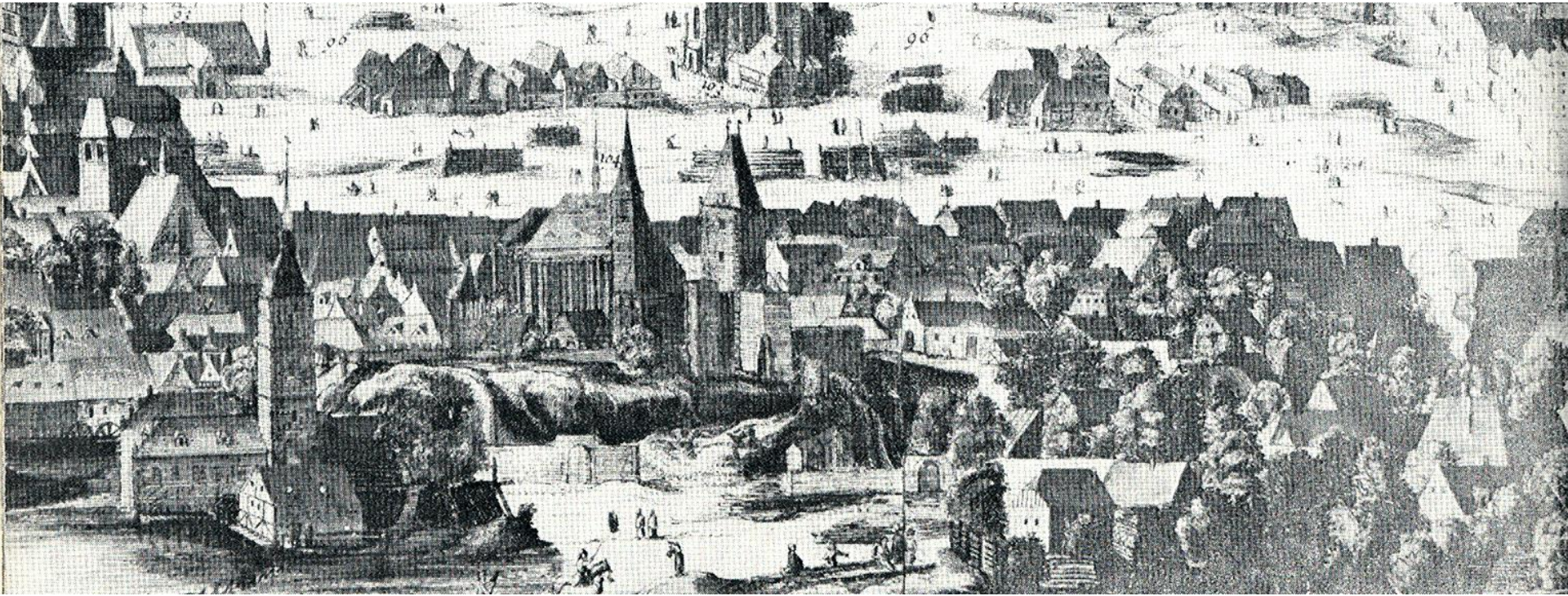
Relief imaging methods

- **scoop method**
- **panoramic maps**
- **shading**
- **hatching**
- **spot-height dimensioning**
- **colour hypsometry**
- **contour lines**

Scoop method



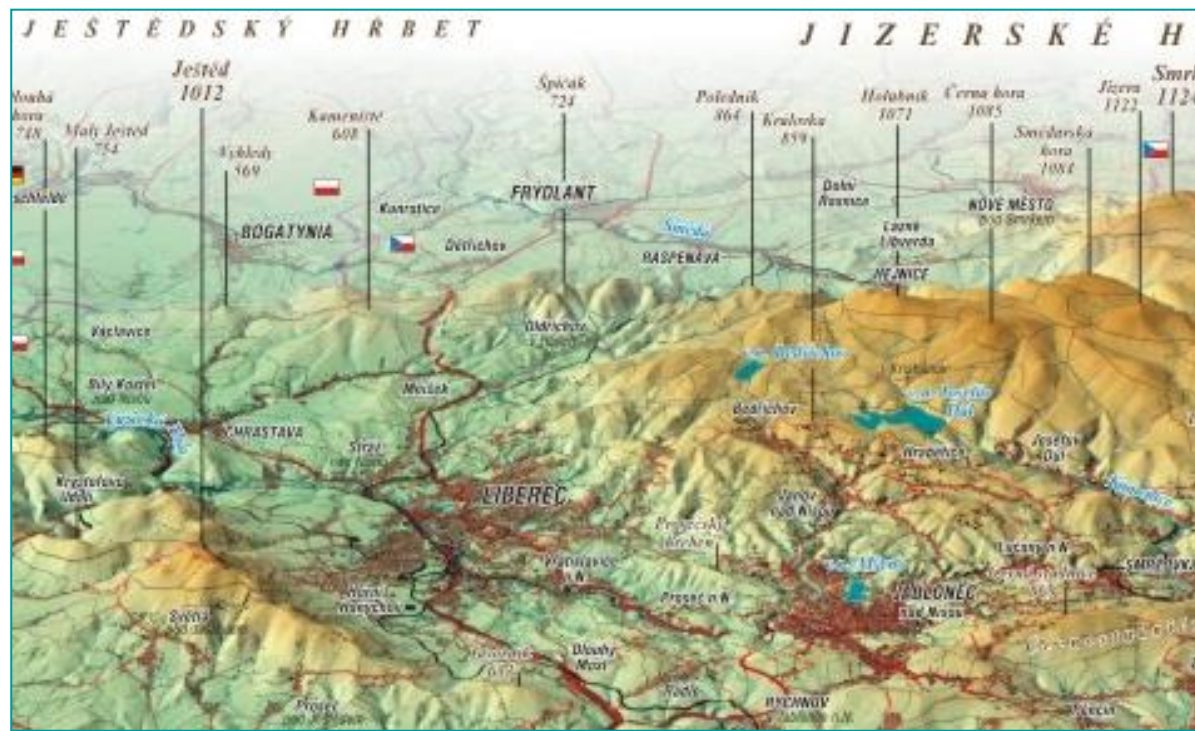
Panoramic maps



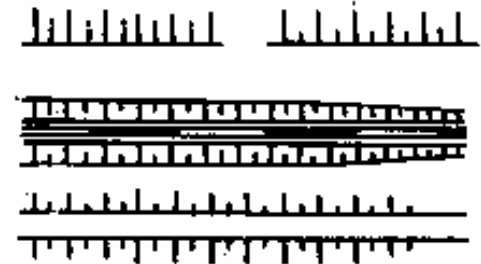
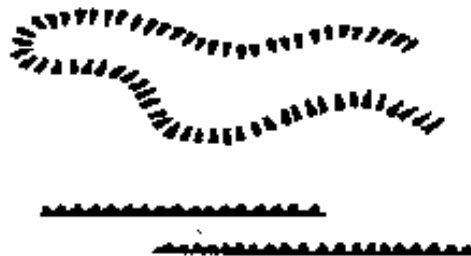
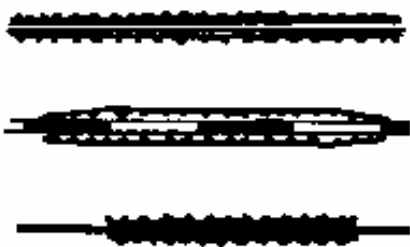
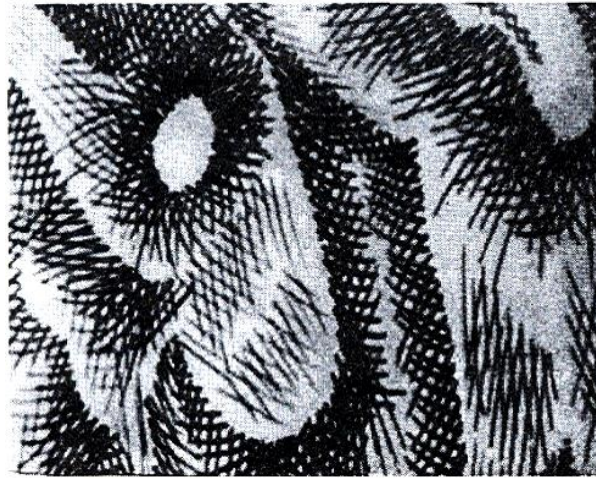
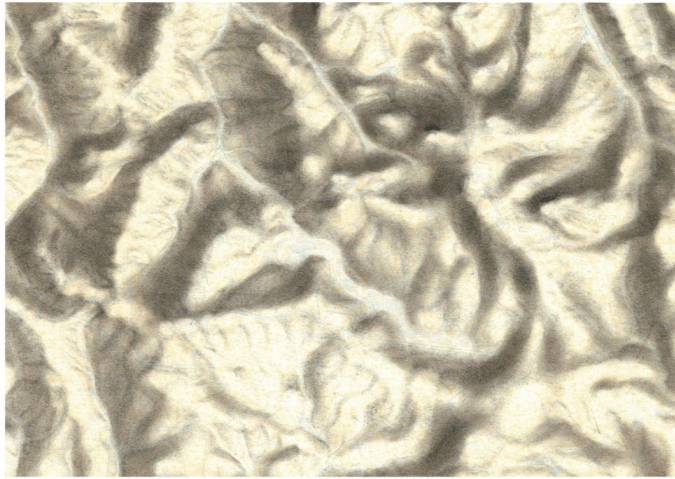
vedutes

Pictorial relief maps

- perspective view of the relief, still used
- manual (formerly) or computer creation
- mainly touristic and promotional purposes
(maps of mountain systems and large territorial units)
- global views – maps of continents and large parts of the earth's surface

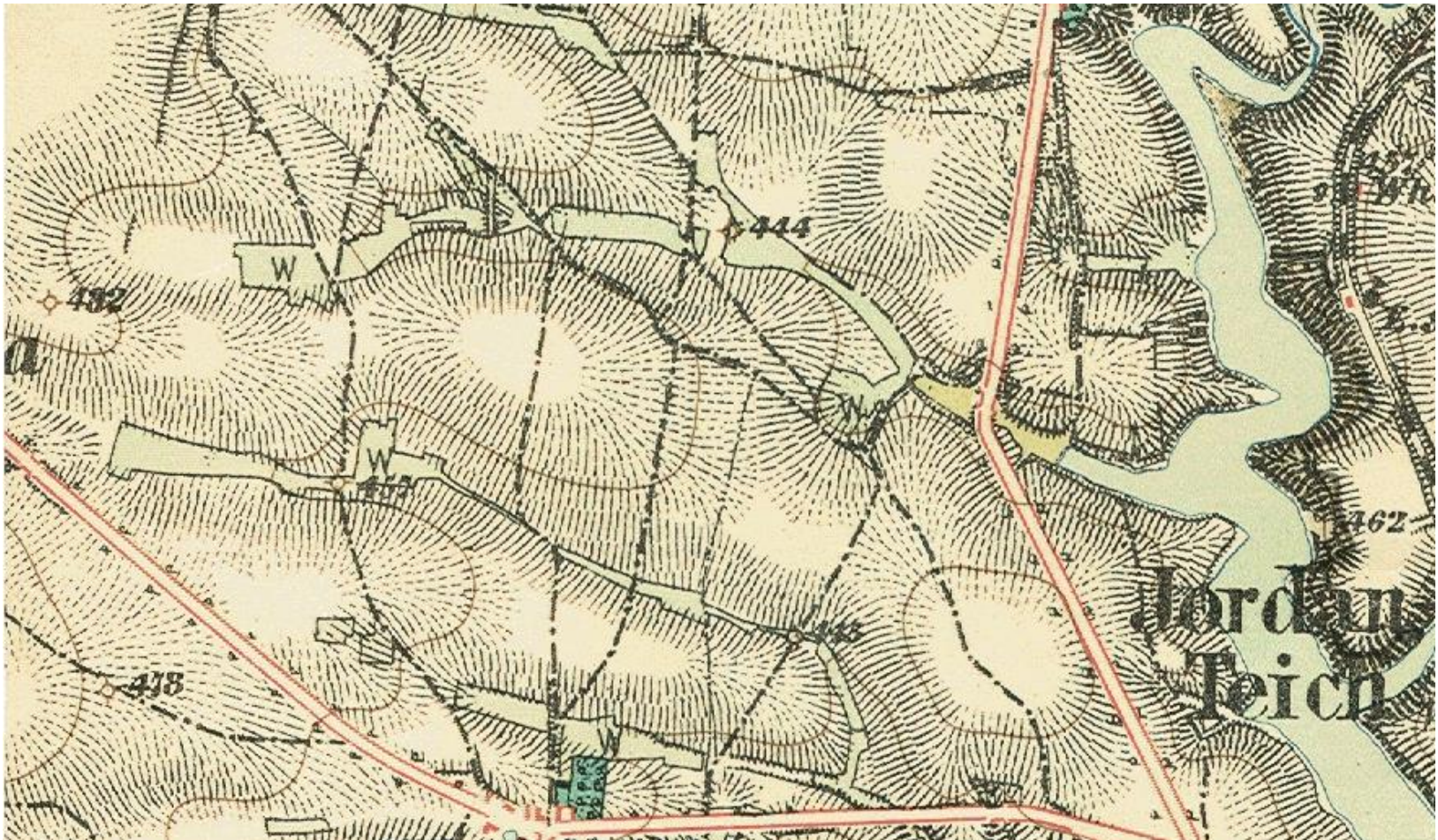


Shading, hachuring



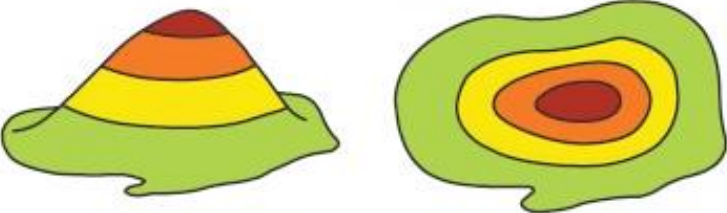
Hachuring





Inclined hatches – maps of the III. military survey



Colour hypsometry

Area of different heights are shown using different colours. Brown shows the highest point.

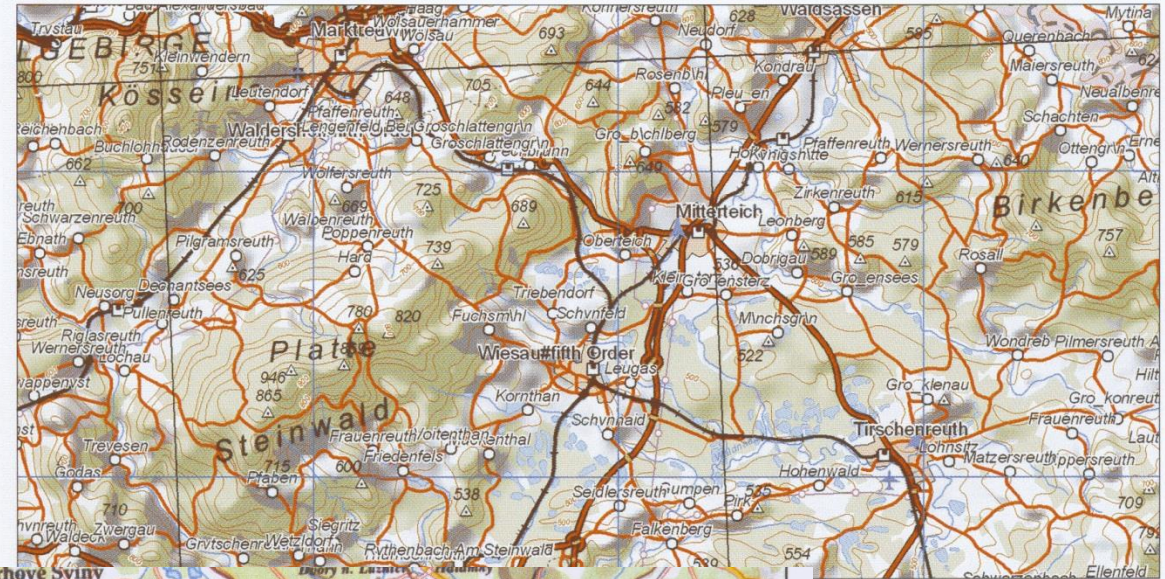


Height in metres (m) above sea level	
 More than 300	 100 - 200
 200 - 300	 Less than 100



Display of relief on contemporary maps

Map for
joint NATO operations
1 : 250,000
spot-heights, contours,
hillshading



Map of the Czech
Republic
1 : 500,000
spot-heights,
hillshading



Display of relief on contemporary maps

Color hypsometry – Atlas of the Czech Republic



CARTOGRAPHIC GENERALIZATION

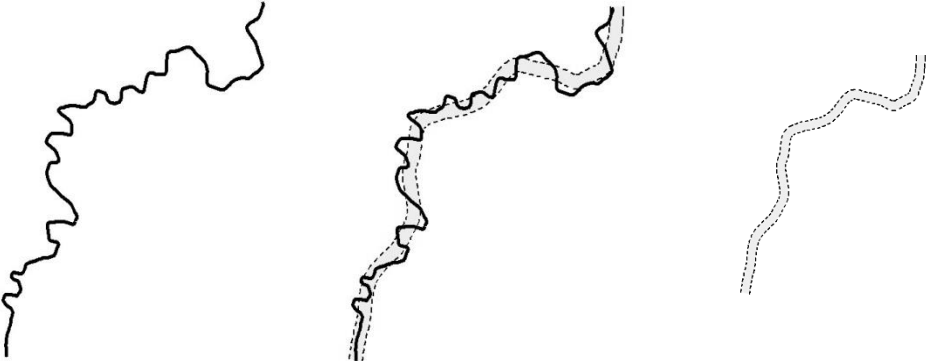
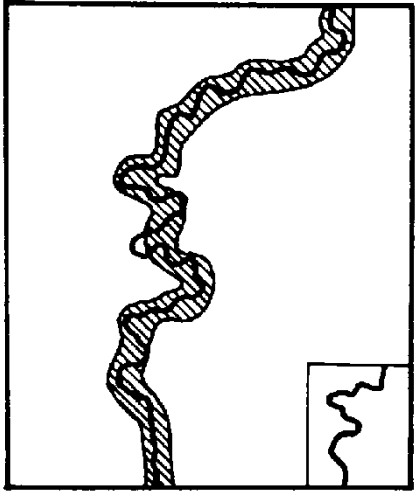
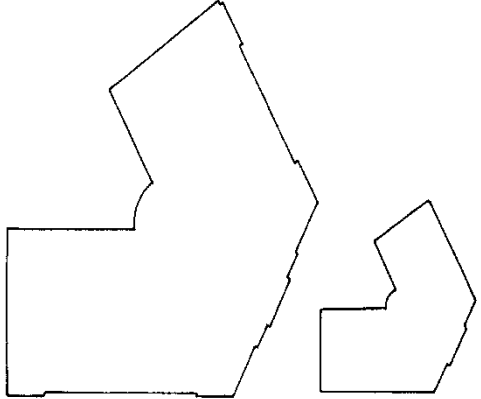
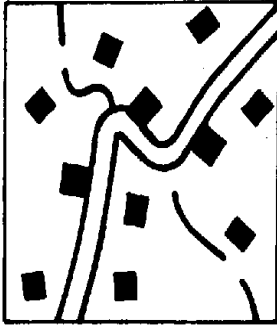
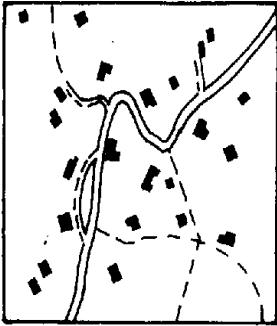
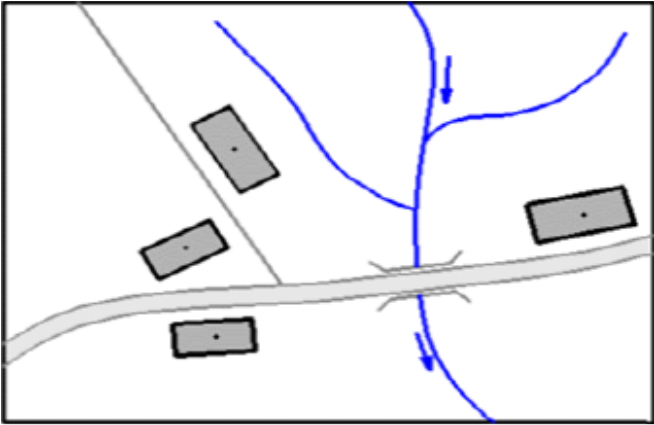
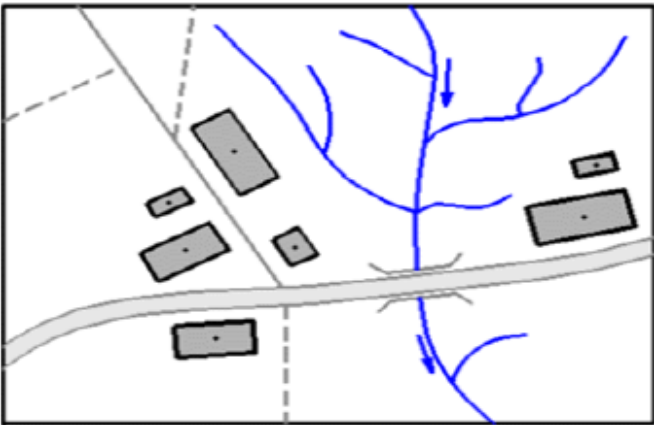
map content simplification

Universalization, selection and harmonization of objects, phenomena and their relationships for graphic expression in the map, which is influenced by **the purpose, scale, character** of the displayed territory and **by way** of the cartographic processing.

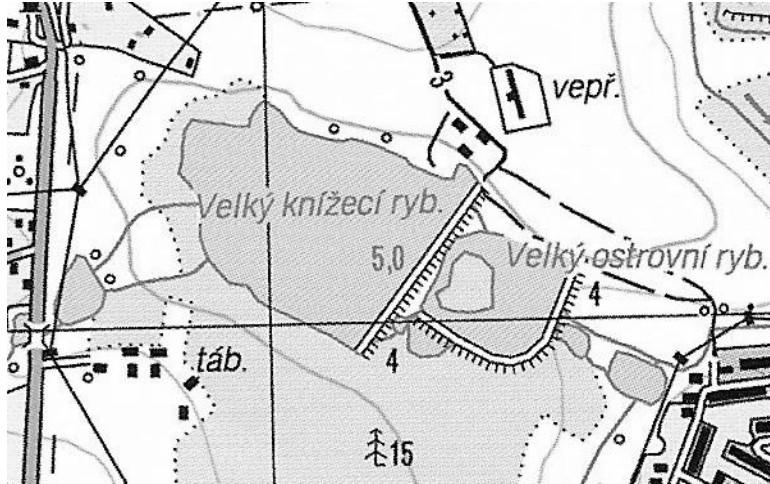
Methods:

- element selection
- geometric simplification
- change of scale intervals
(quantitative, qualitative)
- cartographic abstraction
 - e.g. area → point mark (circle signatures of cities)

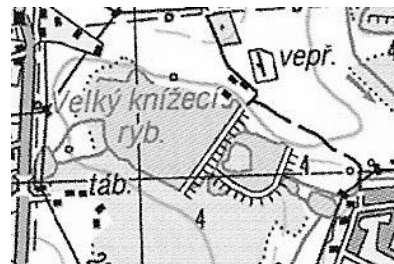
CARTOGRAPHIC GENERALIZATION



Generalization of a topographic map



1:25,000



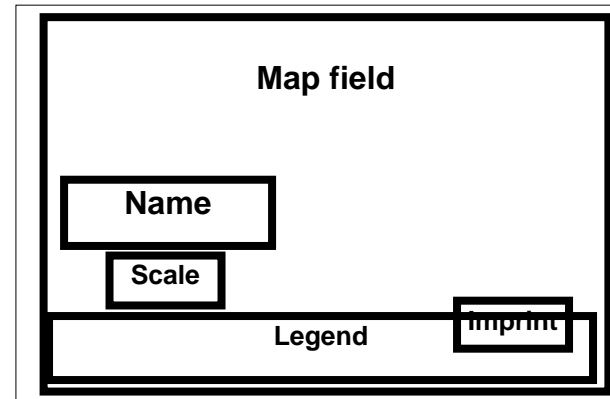
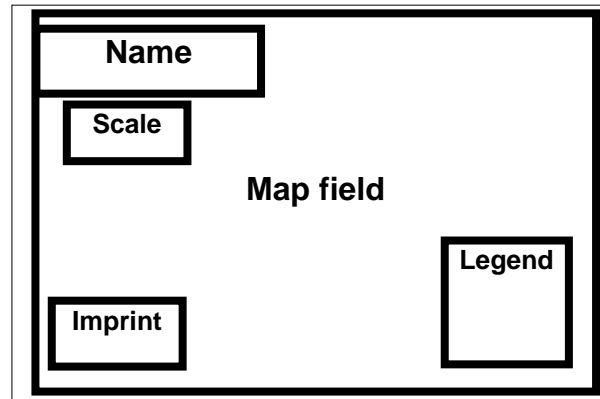
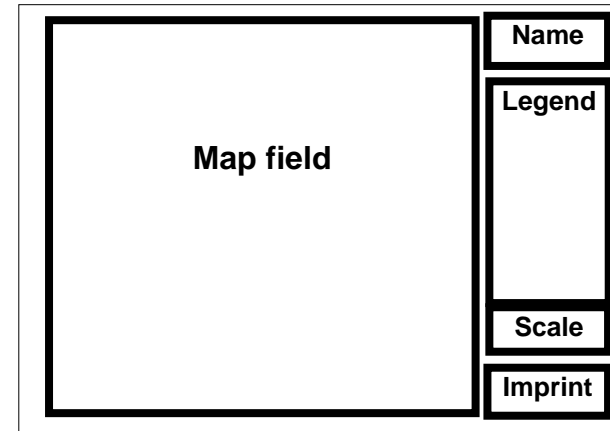
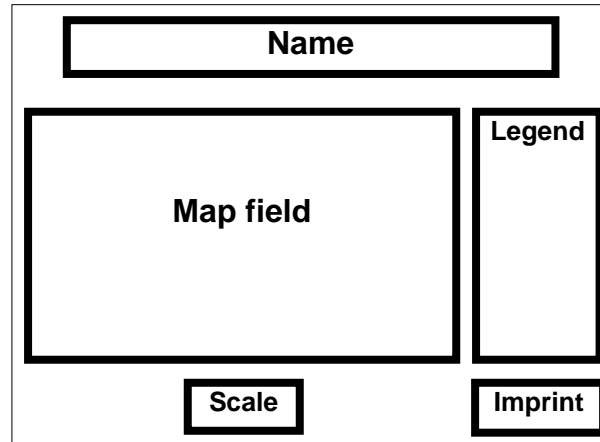
1:50,000



1:100,000

MAP COMPOSITION

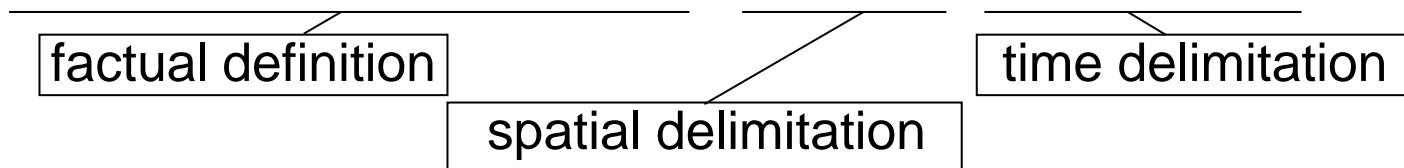
- name
- legend
- scale
- imprint
- map field



Map name

- must contain factual, spatial and temporal definition of the displayed thematic phenomenon
- most often located near the upper edge of the map
- sufficiently large font (simple, without serifs)
- the word "map", "choropleth", etc. is not used in the title

UNEMPLOYMENT RATE IN PRAGUE IN 2016



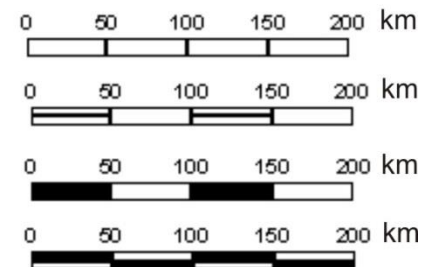
UNEMPLOYMENT RATE IN PRAGUE year 2016

Legend

- provides an explanation of the map symbols used, including colour scales
- the name "Legend" is not used
- it should be complete, unambiguous, comprehensible, logically arranged, in accordance with the expression on the map (in terms of character size and colour)

Scale

- it tends to be subordinated to the purpose and thematic focus of the cartographic works
- it is usually presented in graphic and numerical form
- **the numerical scale** should be in appropriately rounded decimal form (1 : 10,000 | 1 : 250 thousand, 1 : 40 million)
- only the **graphic scale** is given:
 - in cases where, for example, the map is enlarged or reduced during copying and the numerical scale would become incorrect
 - if the map is on a non-standard scale (e.g. 1 : 325,665)
- the main and minor division of the graphic scale is always carried out in a decimal way, if possible



Imprint

- contains a set of information on various aspects of map creation.
- in smaller print, most often at the bottom of the map (mostly on the right)
- should always include:
 - **the name of the author** or publisher of the map
 - **place of issue of the map**
 - **the year the map was published**
(usually includes other information as well)
- the data that must be included in **maps intended for public distribution** (with the exception of plastic and wall maps, globes and basic and thematic state map works) is stipulated by Act No. 37/1995 Coll. on non-periodical publications

Extensional compositional elements

may increase informational value, attractiveness, readability, clarity and testimonial value of the map

- north sign
- logo
- tables
- graphs (*diagrams*)
- side maps
- pictures
- text fields, indices and lists
- advertisements



Thank you for your attention

tomas.janata@fsv.cvut.cz