Relief depiction

Depiction of relief/terrain/topography is more complex than other elements

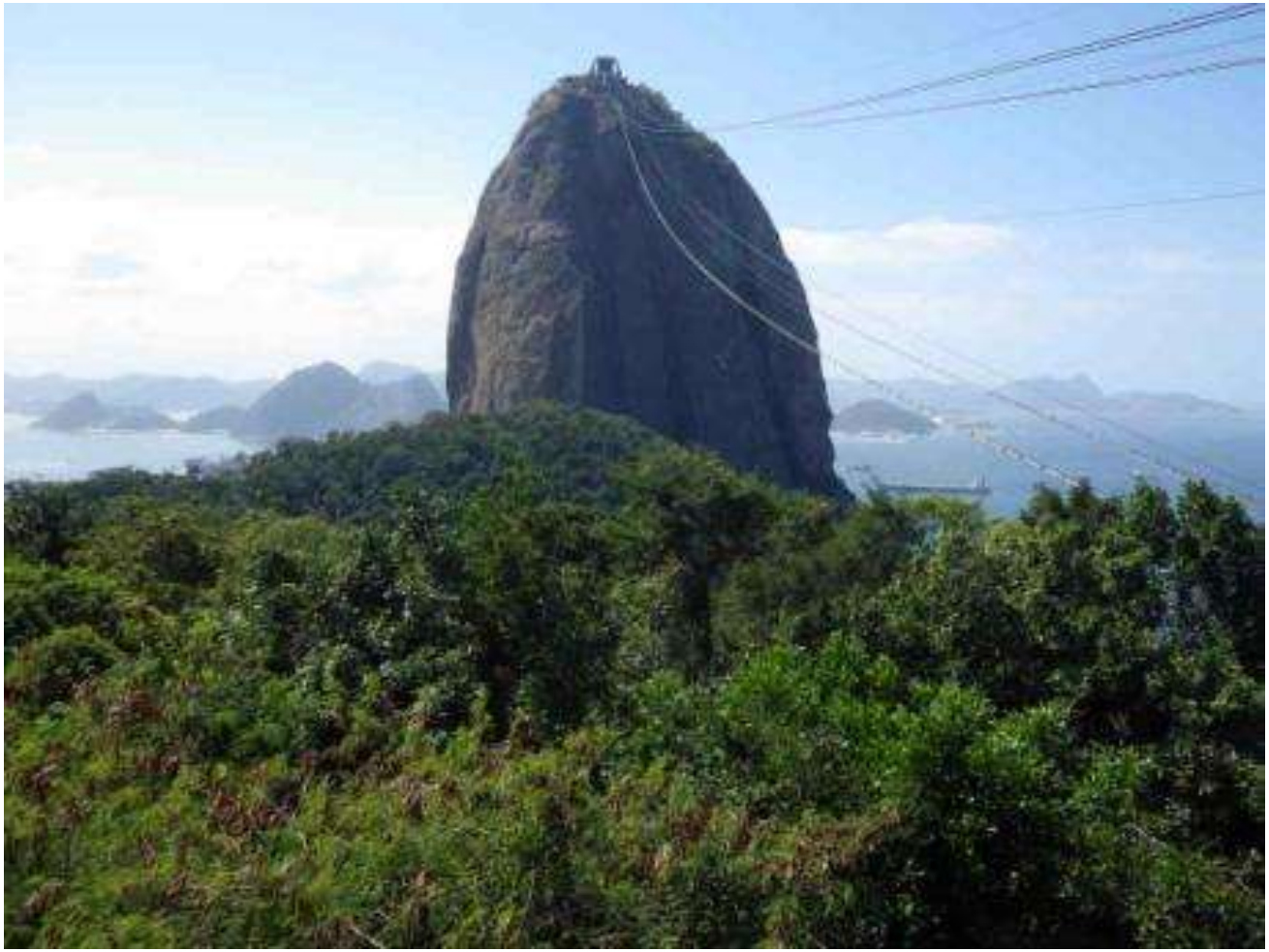
Relief / terrain / topography

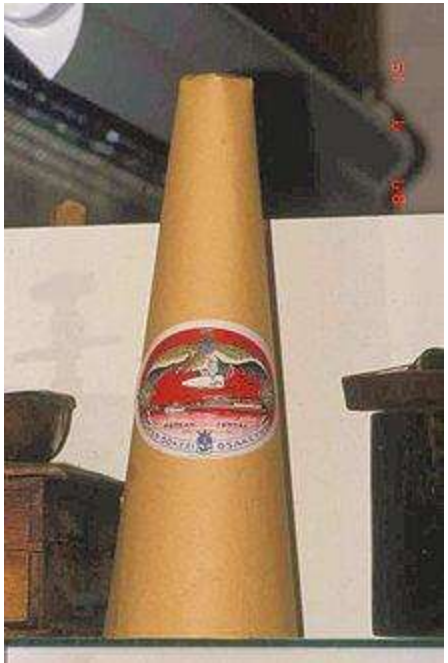
- a third dimension (height) that varies continuously over space
- has several components: e.g. height, slope, shape, aspect
- can be depicted using: points, lines, or areas (~ 10 options)
- they vary in how effective they are visually / quantitatively
- Often the major visual map component and affects the other elements

1. Sugar loafs

Idealized depictions from a side or oblique view; the only form of topography on maps pre-1800

Sugar Loaf, Rio de Janeiro





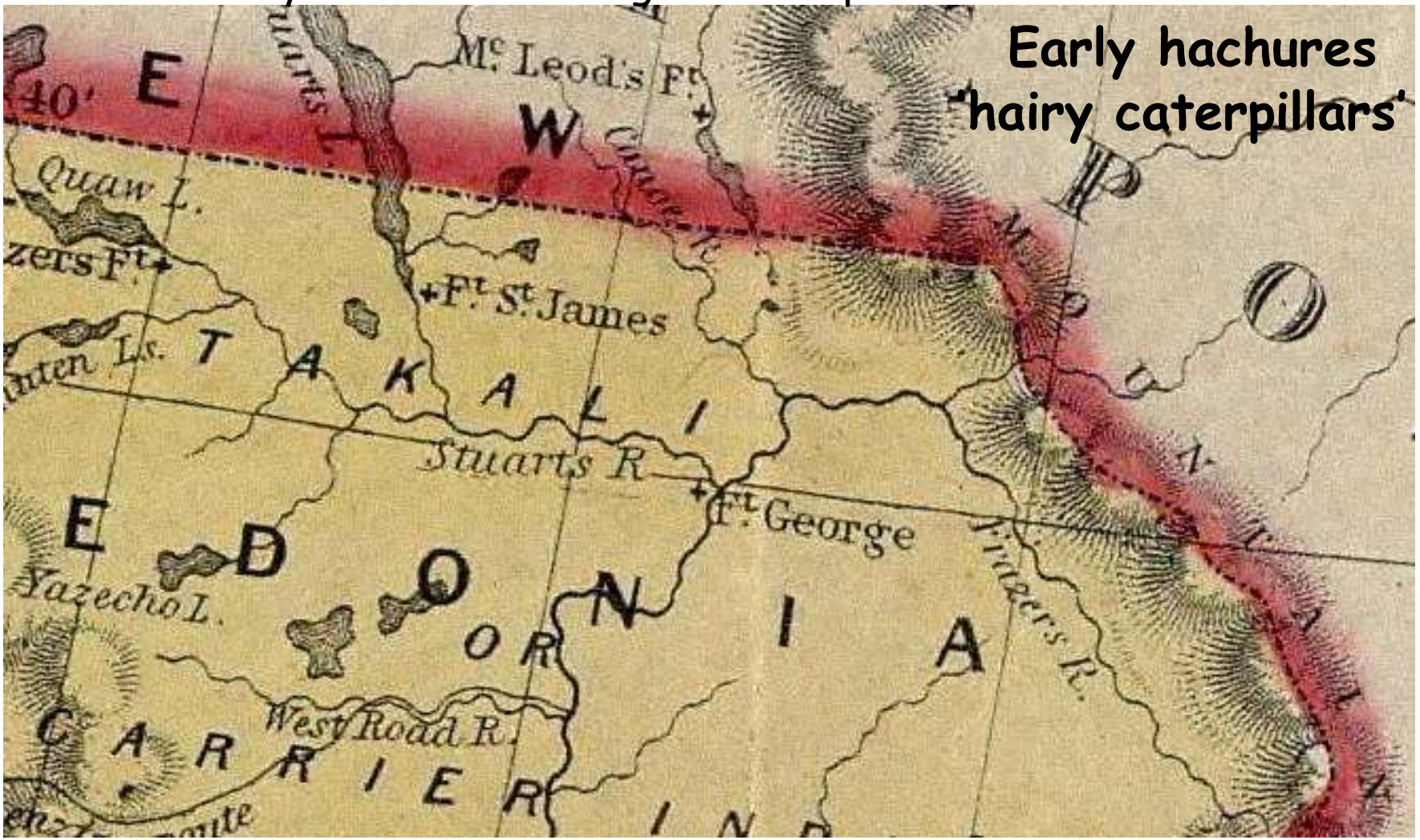
A sugarloaf was the traditional shape of sugar in the eighteenth century: a semi-hard sugar cone that required a sugar axe or hammer to break up

Modern use of sugar loafs: when only a rough idea of hills/mountains is needed

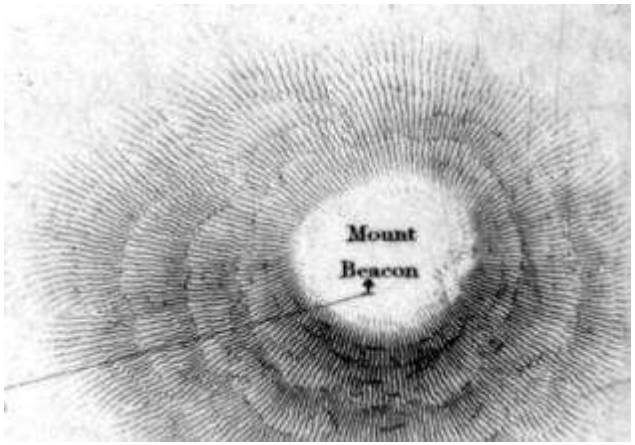
2. Hachures

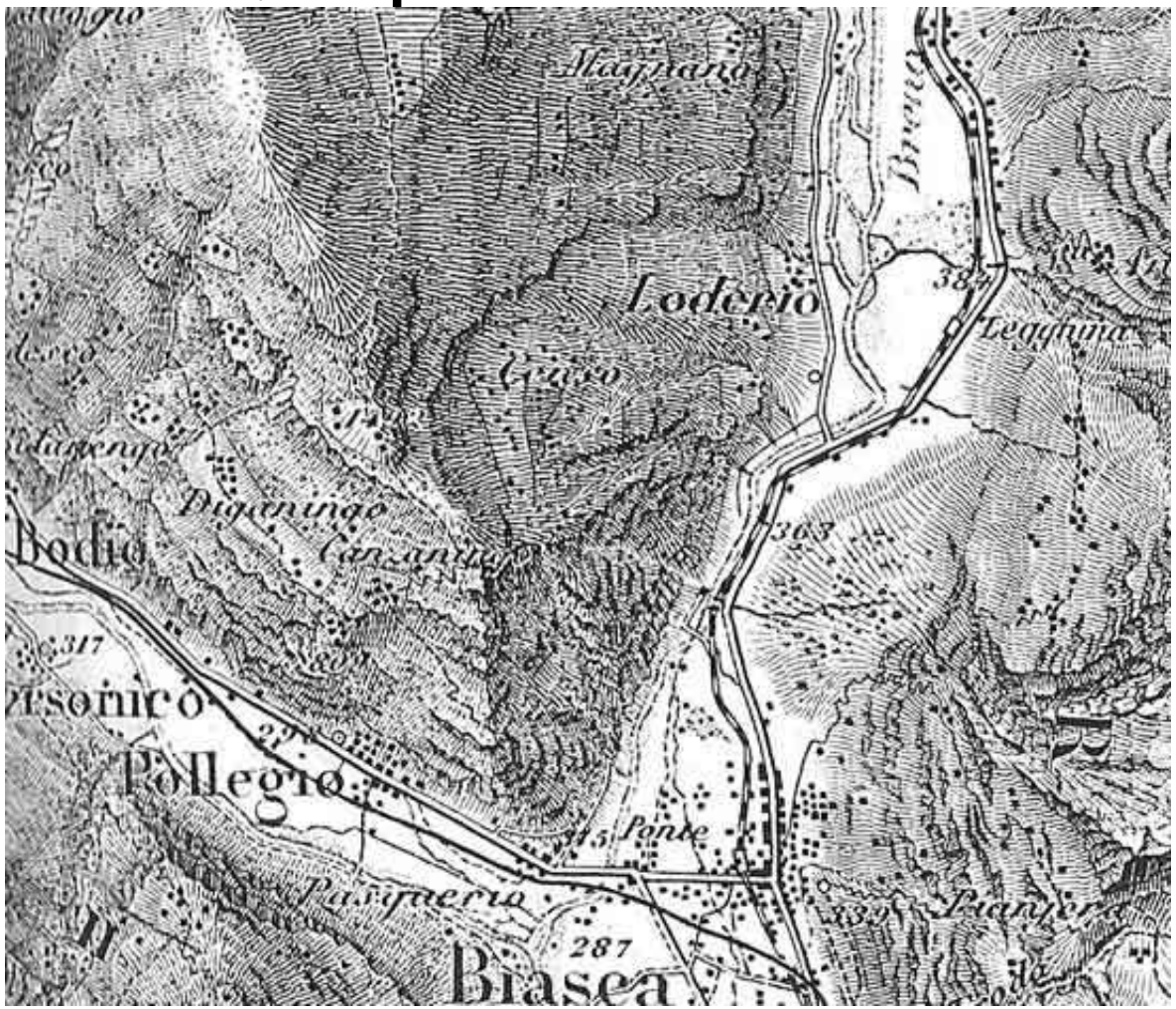
- **lines of varying width and length**, drawn along steepest slope.

- main type of relief depiction through the 19th century, no exact heights ….. In 1800 only 50 mountain heights were plotted worldwide



Oblique illumination could be added for more visual effect – but losing a direct measure of slope to thickness





Disadvantages of hachures

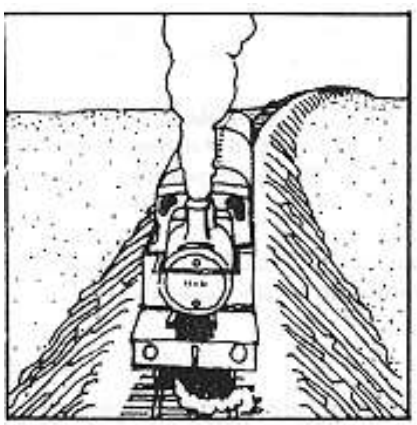
- time-consuming to produce, obscures other information
- not very effective except in mountainous terrain

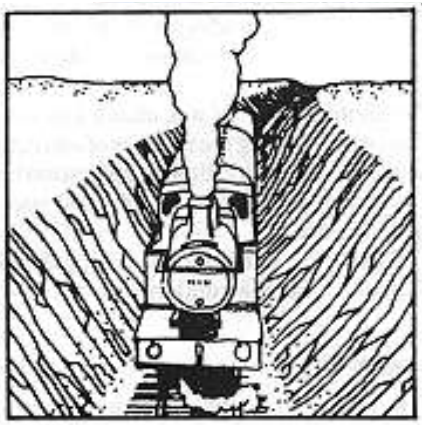
Continuing use of hachures

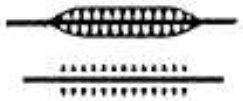
Steep enbankments

Mountain cliffs

http://www.richardphillips.org.uk/maps/symbols.html







http://www.gitta.info/TopoCart/en/html/ContTopo_learningObject2.html

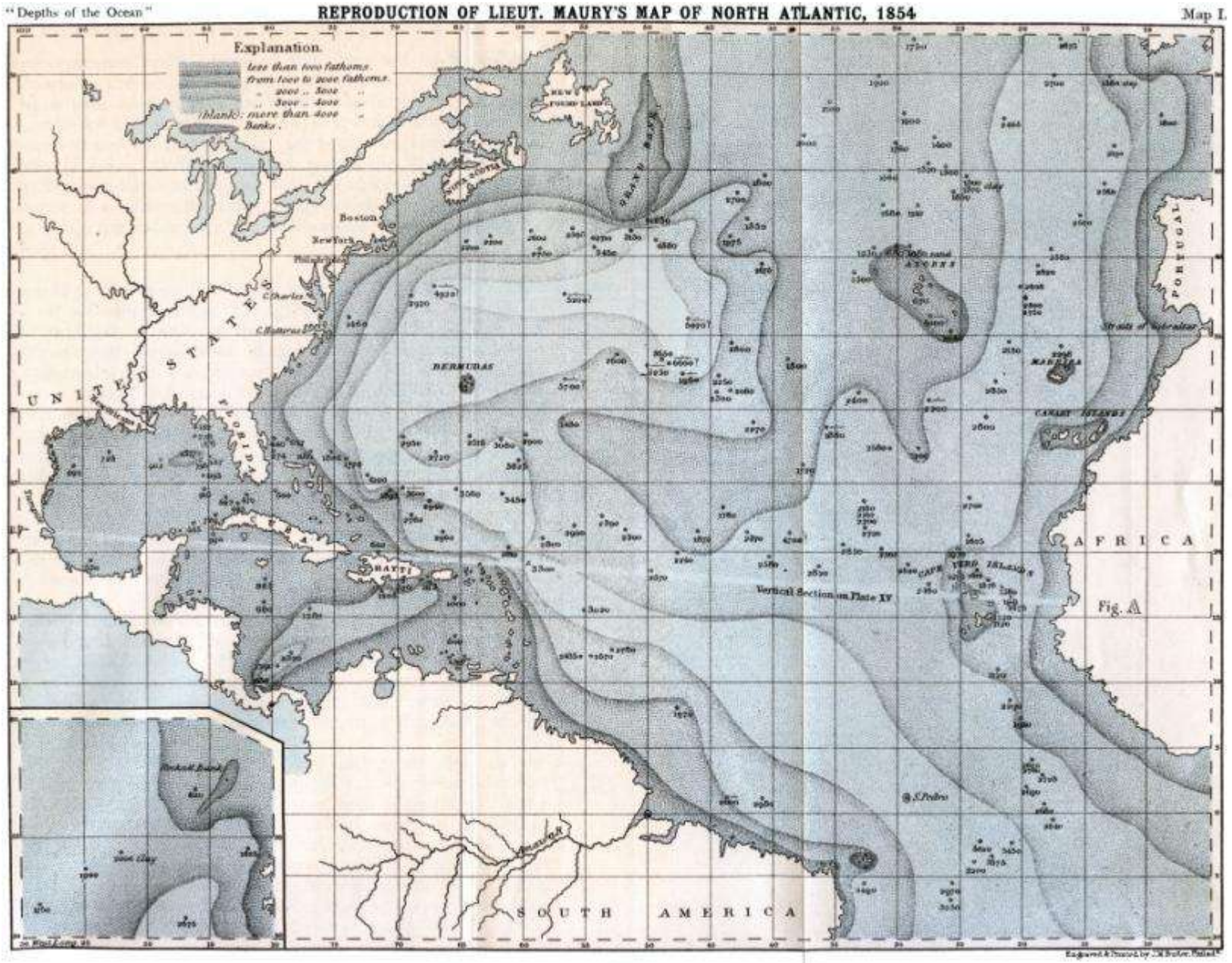
3. Spot heights ……after 1800

exact elevations enabled by surveying

A base for mapping – not an effective display method

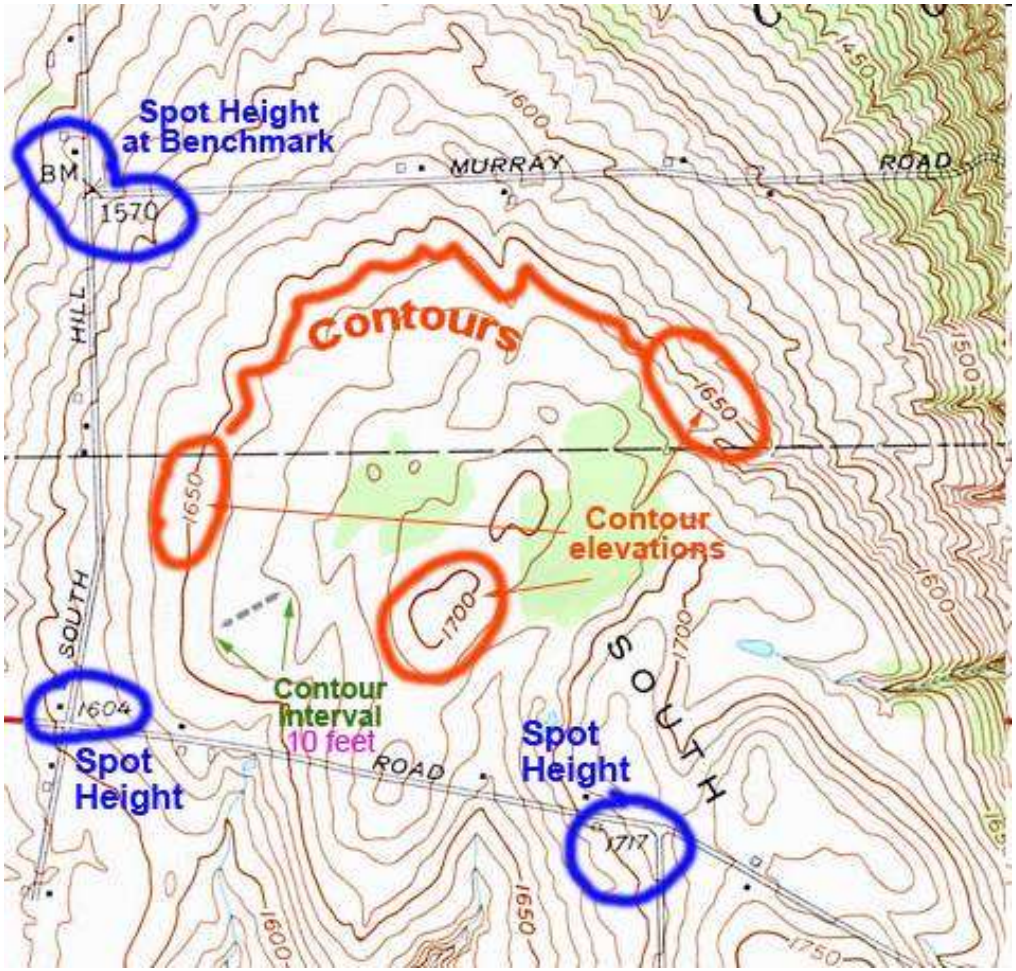
.205 .203 .255 .235 .217 .220 .309 .208 .243 .311 .339 .344 .306 .270 .274 .330 .290 .308 .270 .290 .244 .202 .212

4. **Contours:** *e.g.* bathymetric contours (1854) - isobaths



Accurate surveying of elevations in Canada was developed in the late 19th century, and contouring became common through the 20th century.

A contour is a type of **isoline (isohype)** : line of equal elevation values

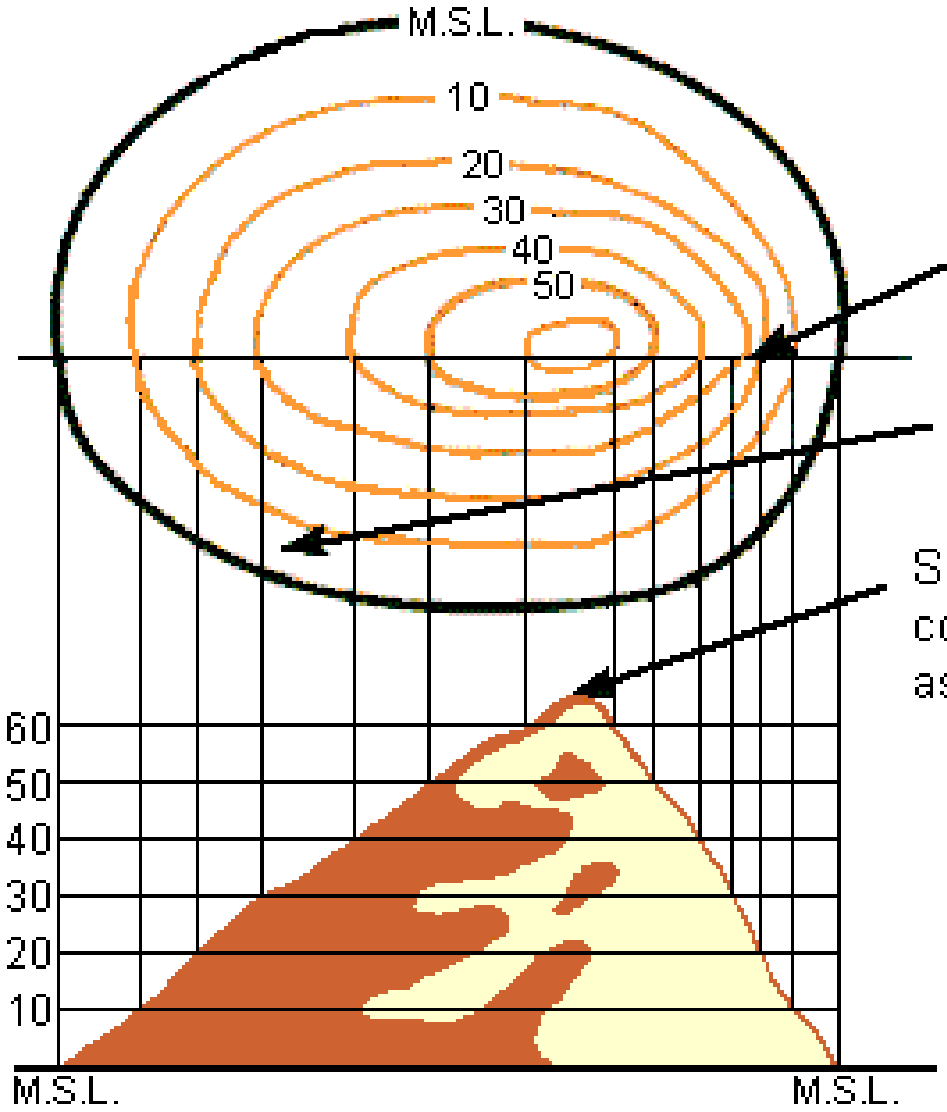


- Index contours – every 5th contour
- Supplemented with spot heights

Contours mapped from Surveying and stereo-aerial photography

http://ublib.buffalo.edu/libraries/asl/maps/cat/images/contours-spot.jpg

Interpreting contours



When close together, contour lines indicate a steep slope.

When far apart, contour lines indicate a gentle slope.

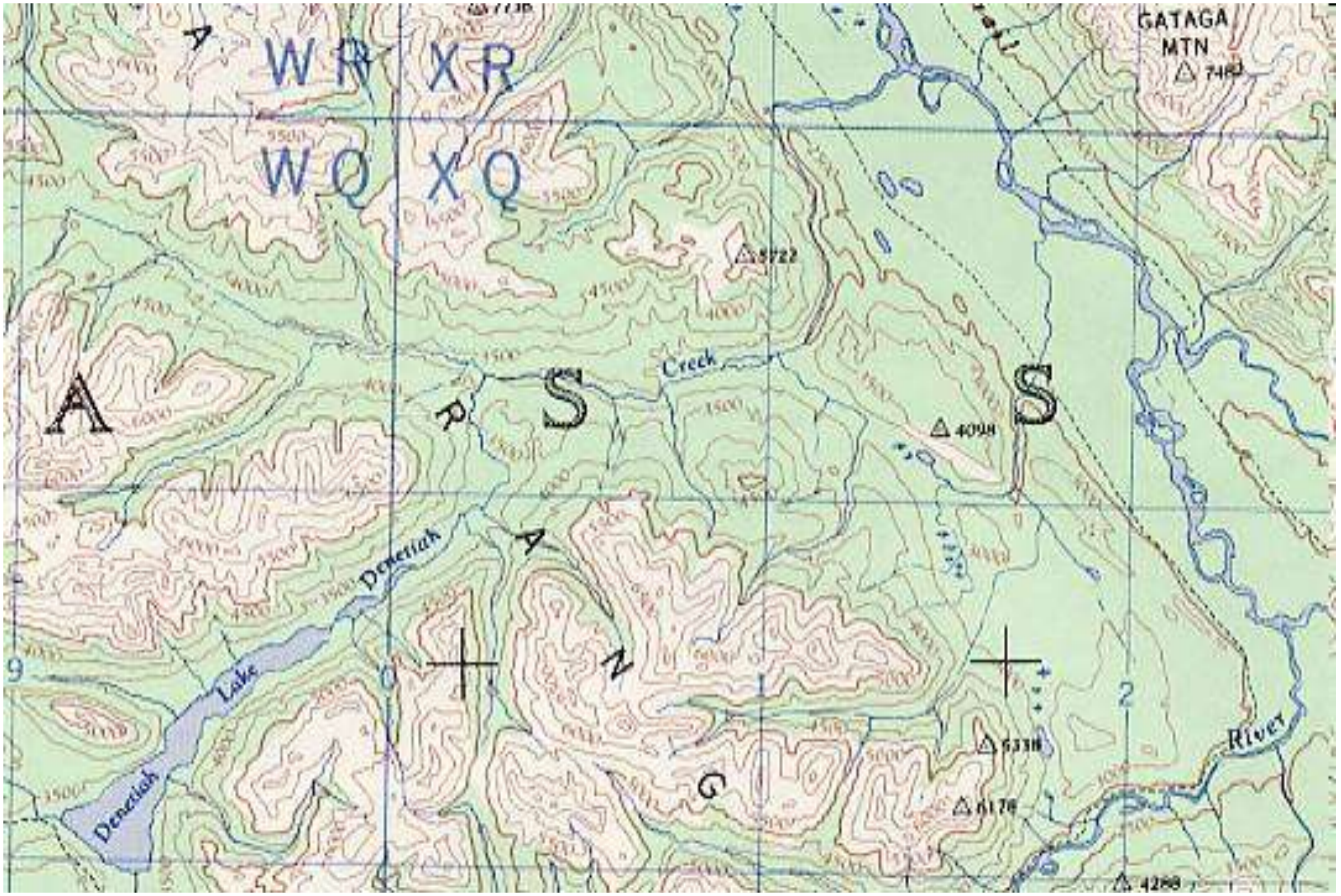
Spot elevations are heights between contour lines, and are shown on a map as dots with a value beside them.

Mean Sea Level (M.S.L.)

Exploring Earth website - visualising contours

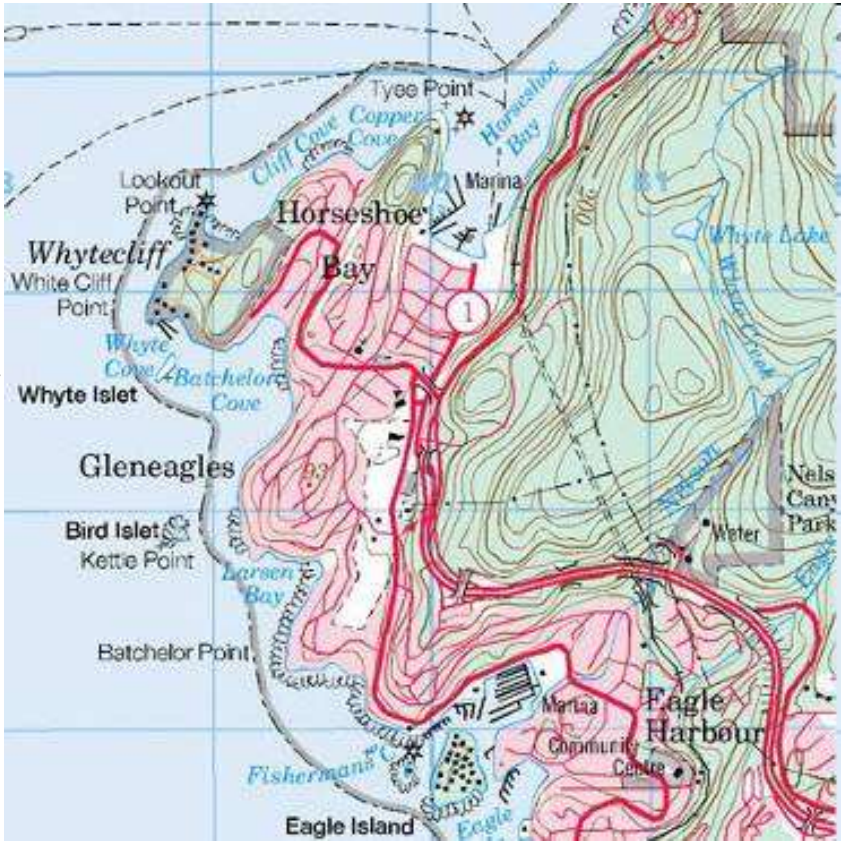
NTS Contour Intervals: - Normal, Hilly, Steep

1:50,000 = 10, or 20, or 40m ; 1:250,000: 50, or 100, or 200m



Kechika 94L 1:250,000 -> Contour interval = 500 feet (pre-metric version)

1:50,000 Horseshoe Bay, BC



Advantages of contours

- the most quantitative manual method
- Effectively stores elevation heights
- Needed for engineering, planning etc.
- the origin for other techniques
- now familiar to many users

Disadvantages

- abstract - no lines on the ground
- less visual, depends on: contour interval, landscape, user experience.

These disadvantages were recognized early on and led to other methods

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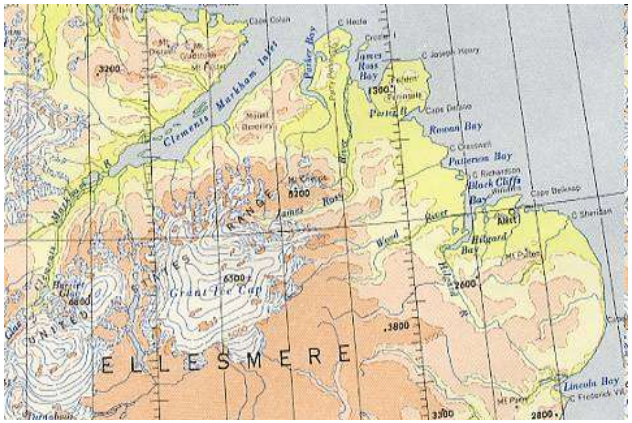
5. Hypsometric Tints

- The addition of colour to elevation ranges
- first tried as early as 1830
- a logical sequence, realistic colours
- the darkest enables readable text

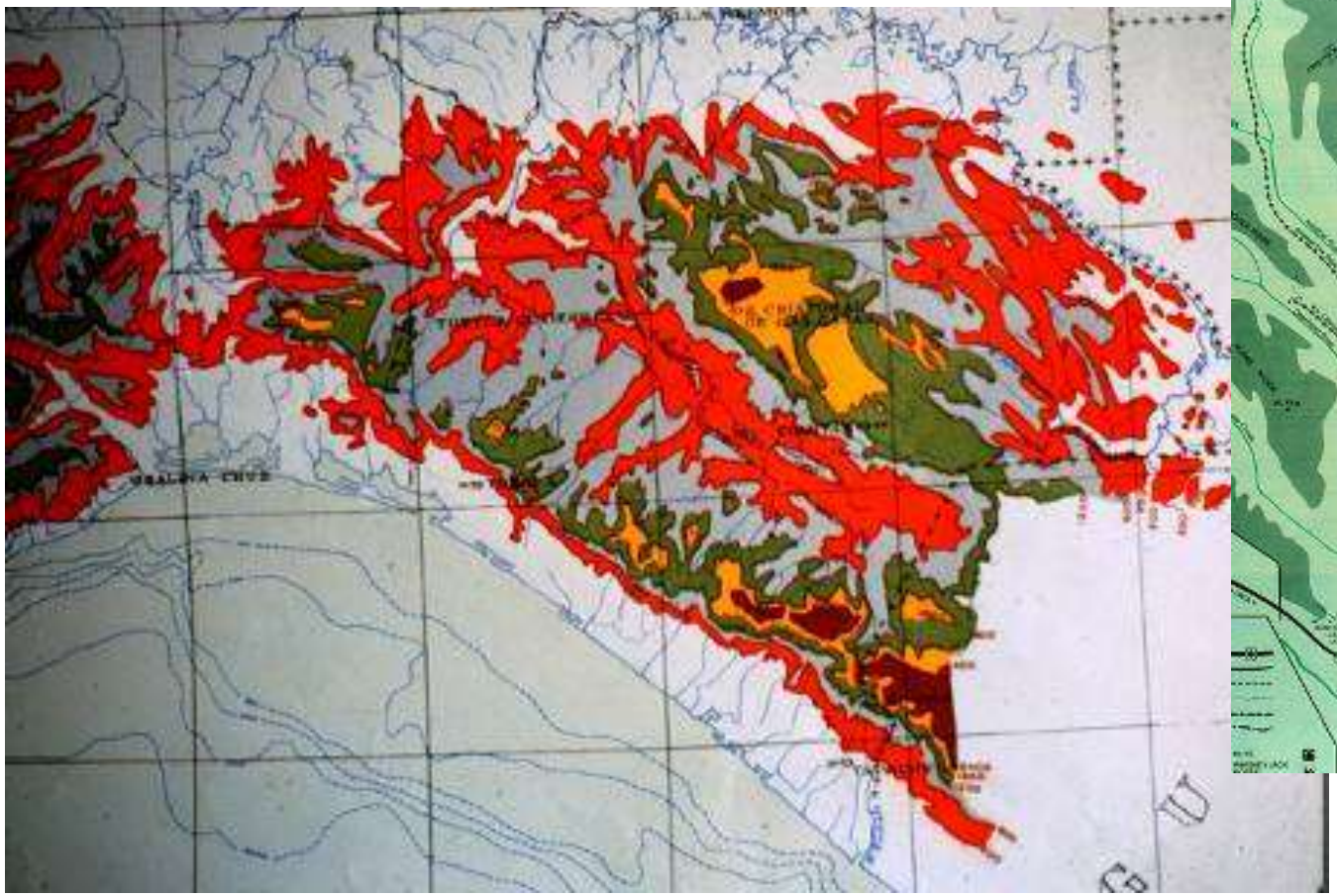


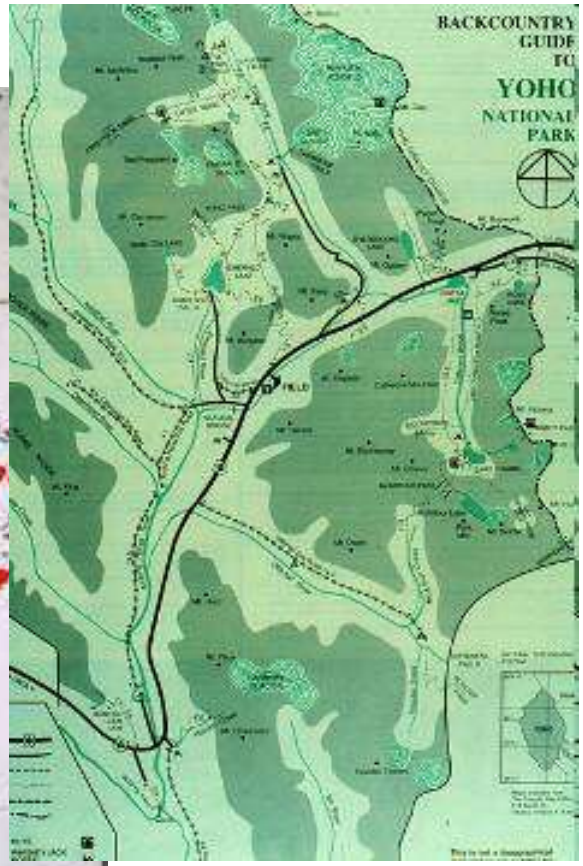
Advantage: adds visual impact at small scale; easily understood

Disadvantages

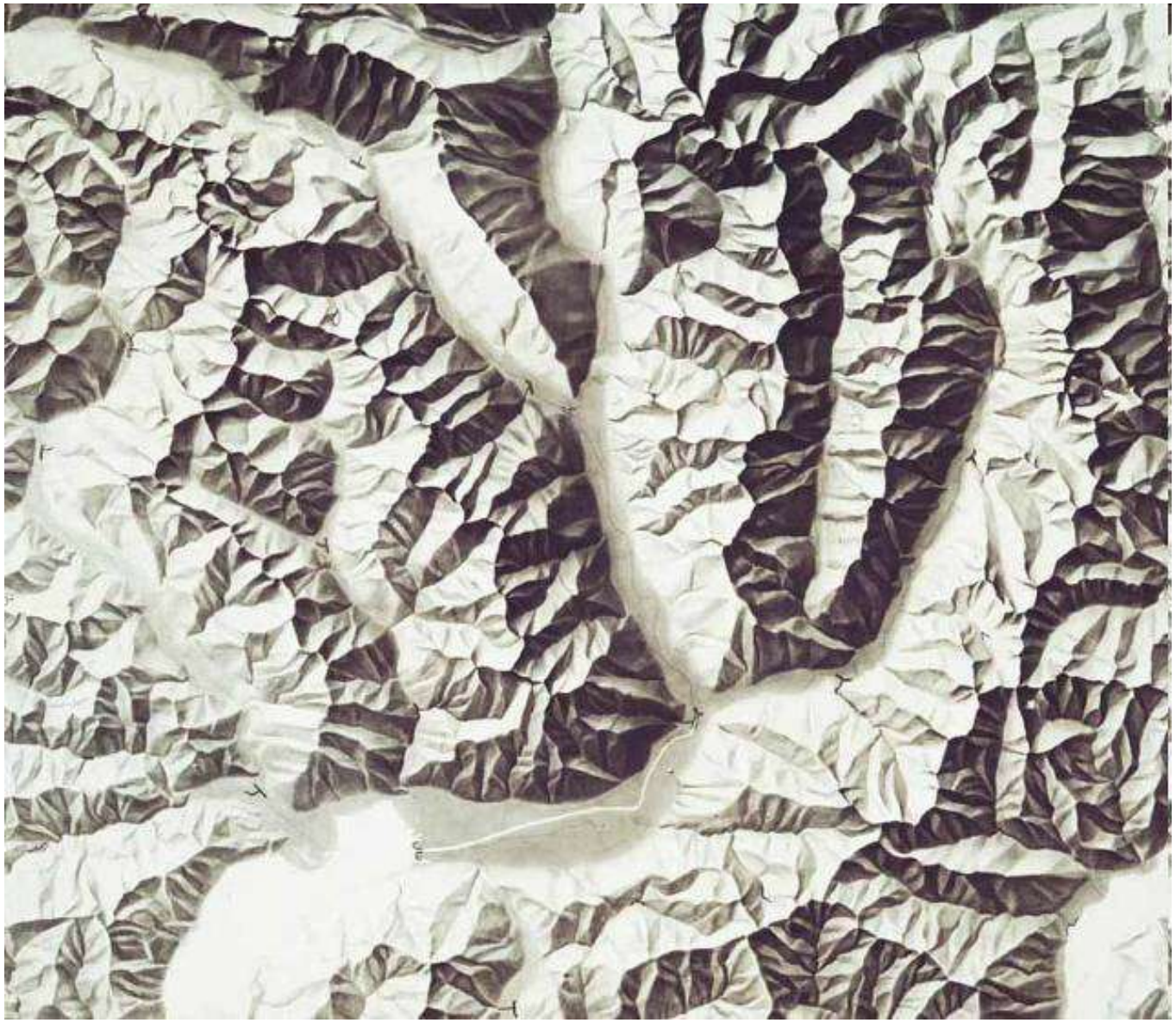
- exaggerated terrace effect, no new 'information' is added,
- differential contrast with other elements
- mixed color associations, (green with forest, etc.)

- which colour scheme?.. NOT the one below !

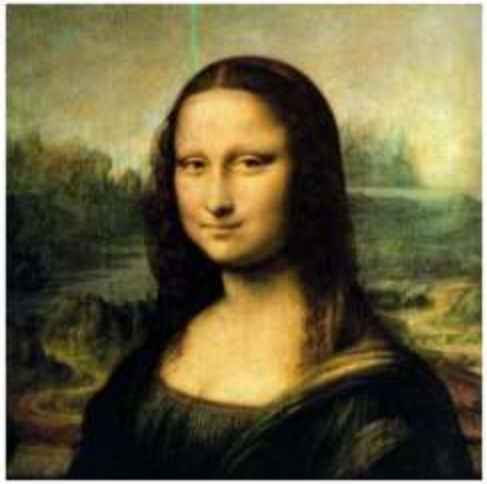


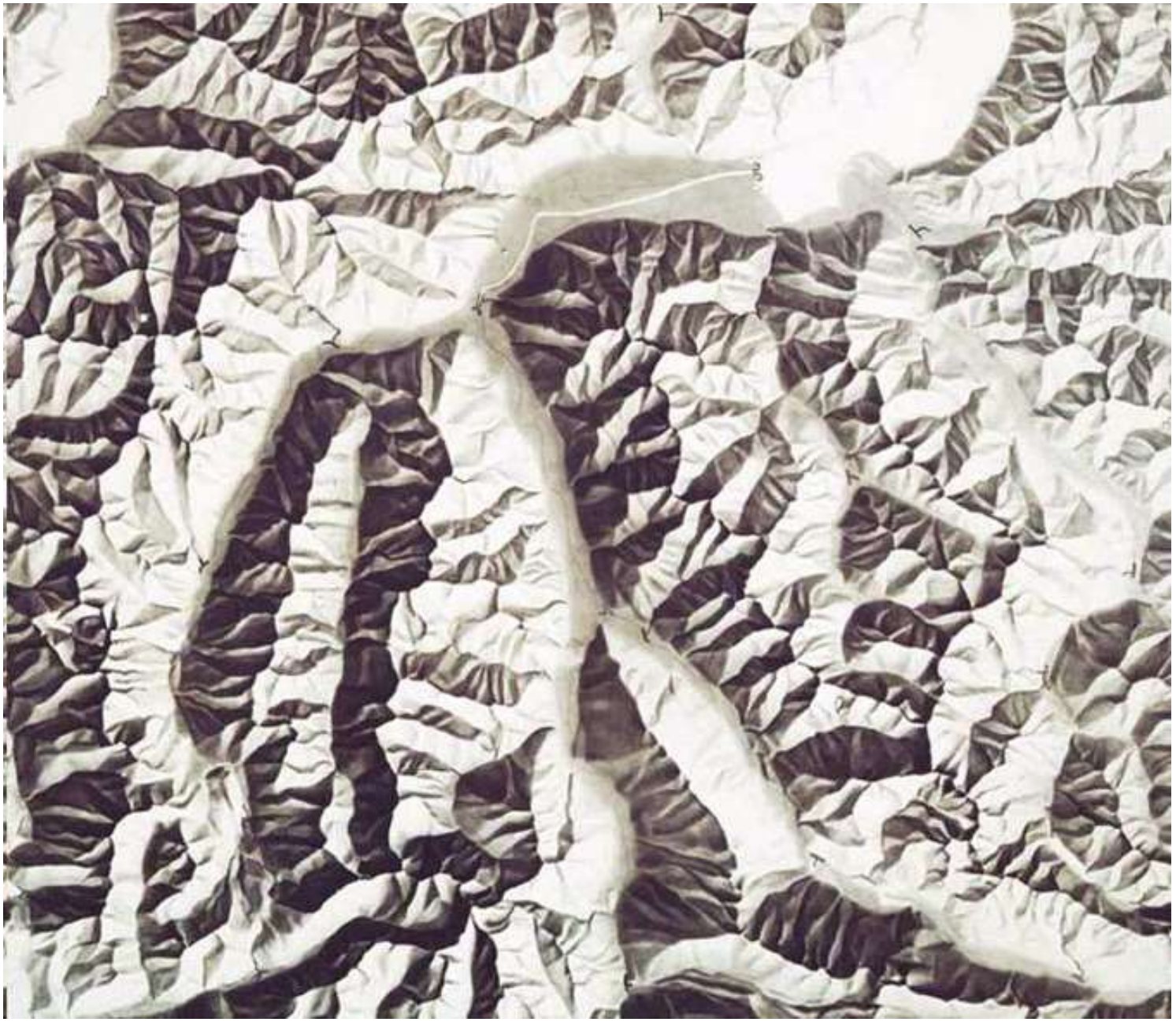


6. Shaded relief (hillshading)



The addition of shadows to give the illusion of depth, with a NorthWest light source (at ~45 degrees elevation). - introduced in the late 1800s





'pseudoscopic inversion'- with light from SE / bottom right

Eduard Imhof

Manual hillshading

Eduard Imhof (1895-1986) was a professor of cartography at the Swiss Federal Institute of Technology Zurich 1925 - 1965. Produced with pencil or airbrush