JACQUES BERTIN

Great grandpa of graphics

JACQUES BERTIN

- Jacques Bertin was a French cartographer who's seminal book 'Sémiologie graphique. Les diagrammes, les cartes, les réseaux' (Graphic Semiology: Diagrams, Maps and Networks)1967 was the first structuralist analysis of graphics.

- Bertin identified early in his work that every visualization is made by a series of basic components that have different expressive power and that each one works best only in some conditions. He suggested 6 basic variables: size, value, texture, color, orientation, shape and for each one he pointed out in what cases they work best and how to use them.

BIO

- Jacuqes Bertin (1918-2010)

- Born in Maisons-Lafitte, a suburb of Paris

- Studied, architecture, drawing and cartography in Primary school.

- In 1934 was accepted into Ecole de Cartographie at the Sorbonne where he studied cartography and geography.

- After WWII while working for Centre National de Recherche Scientifique CNRS he wrote a chapter entitled Recherche Graphique in a volume on social spaces in Paris.

BIO (CONT.)

- He thought that mapmakers should work towards 'visual unity', i.e. an image that is efficient and that can be comprehended globally.

- Opened a graphics laboratory in 1954 at Ecole Pratique des Hautes Etudes which he headed until retirement in 1985.

- The laboratory was used to prepare maps and diagrams on demand from researchers from different backgrounds.

- Confronted with these diverse requirements in terms of both data and types of illustration, Bertin and his collaborators progressively went on to develop the general principles to guide graphic representation, at the same time maintaining fruitful links between mapmaking and the different disciplines of the social sciences.

SEMIOLOGY OF GRAPHICS

- **Defining the graphic sign-system:**

- Graphic representation constitutes of the basic sign-systems conceived by the human mind for the purposes of storing, understanding, and communication essential information.

- As a "language for the eye", graphics benefits from the ubiquitous properties of visual perception.

- As a monsemic system, it forms the rational part of the world of images.

DEFINING THE GRAPHIC SIGN-SYSTEM

- To analyze graphic representation precisely, it is helpful to distinguish it from musical, verbal and mathematical notations, all of which are perceived in a linear or temporal sequence as well as the animated image, which is governed by the laws of cinematographic time.

- Within the boundaries of graphics fall the fields of networks, diagrams and maps. The domain of graphic imagery ranges from the depiction of atomic structures to the representation of galaxies and extends into the spheres of topography and cartography.

RETINAL VARIABLES

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He suggested 6 basic variables: size, value, texture, color, orientation, shape and for each one he pointed out in what cases they work best and how to use them.
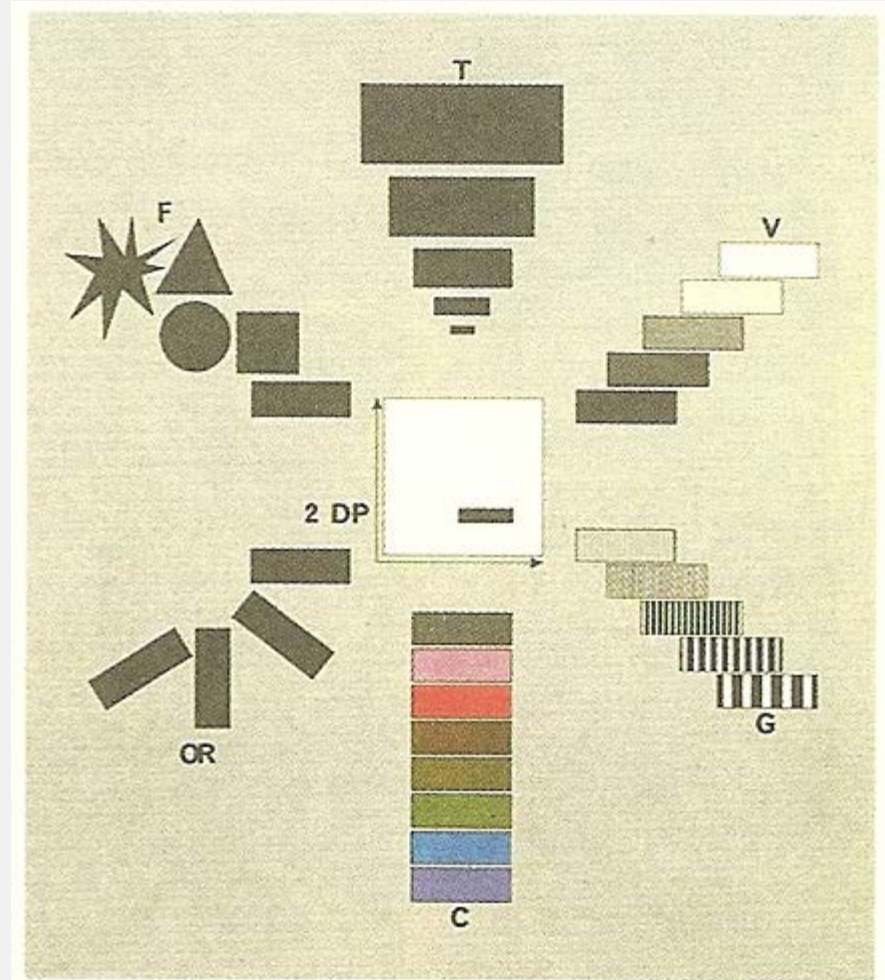
CHARACTERISTICS OF RETINAL VARIABLES

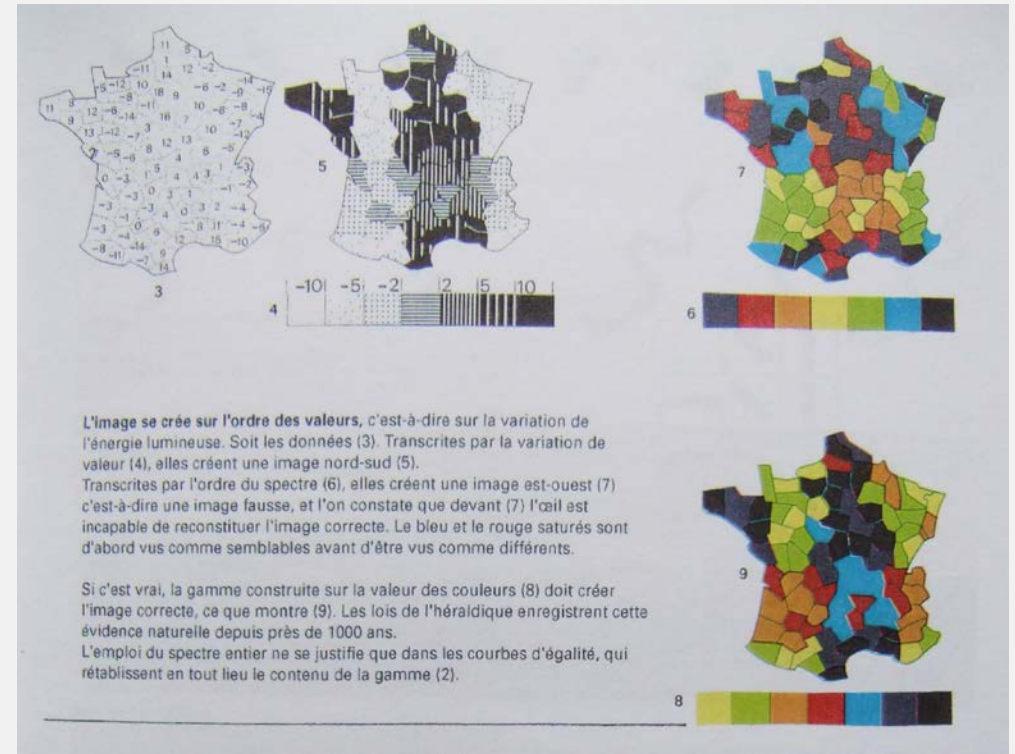"The aim of the graphic is to make the relationship among previously defined sets appear."

• selective- is a change in this variable enough to allow us to select it from a group?

• associative - is a change in this variable enough to allow us to perceive them as a group?

• order - are changes in this variable perceived as ordered?

• quantitative - is there a numerical reading obtainable from changes in this variable?
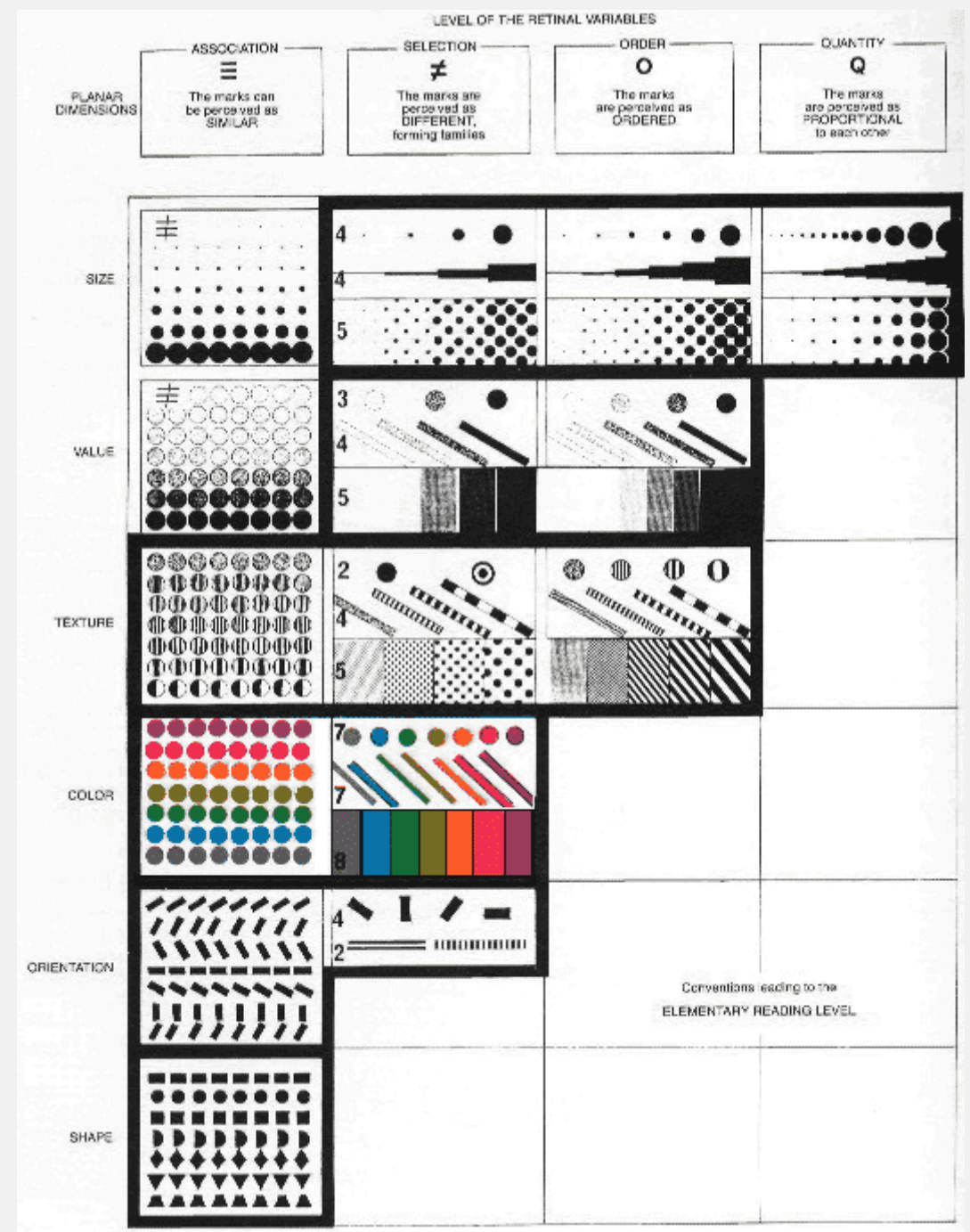
SHORTCOMINGS OF COLOR

"Value perception dominates color perception."

"The author has the reputation of being against color. I am indeed against color when it masks incompetence; when it allows the superimposition of characteristics to the point of absurdity; when people believe it capable of representing ordered data."
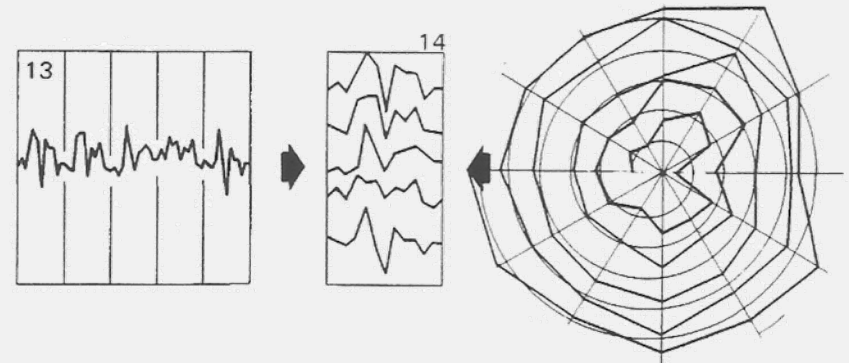
NETWORKS

"The aim of the graphic is to make the relationship among previously defined sets appear."
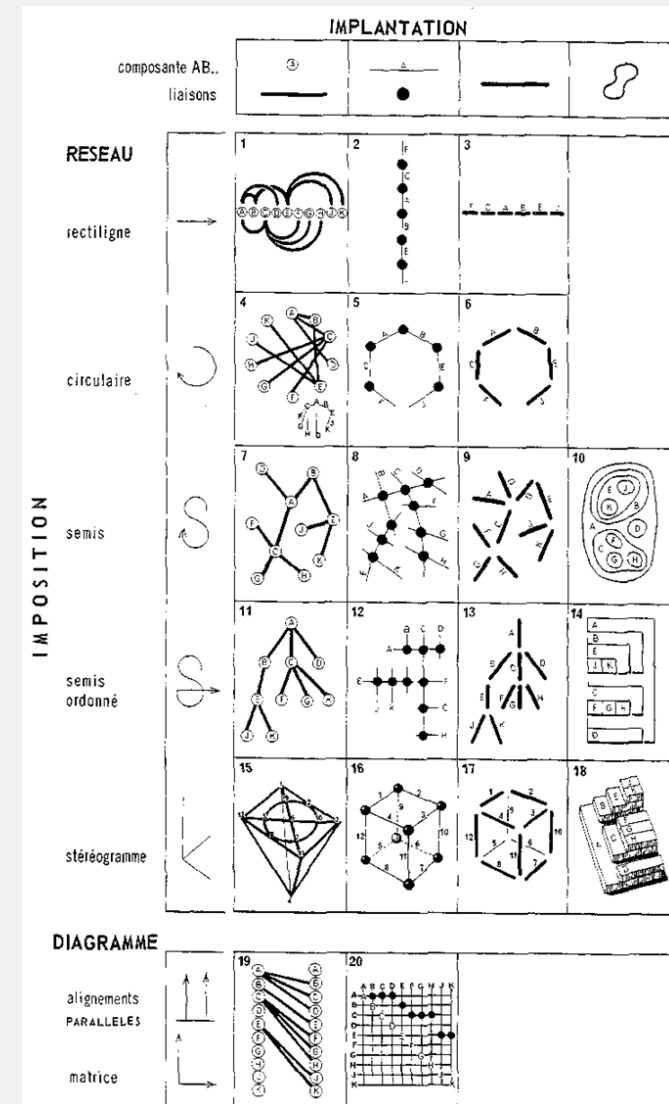
SPIRAL GRAPHS

Bertin proposed the initial design of presenting temporal data in a spiral as a way to spot cyclic trends. The same idea was re-proposed many years later by several researchers.

HOW HE SAW

- His work can be considered as a typical structuralist analysis, because he focuses on the relationship between elements of graphics, and not on the elements themselves. - Françoise de Blomac (2011) "A tribute to Jacques Bertin"

- [Jacques Bertin Talk about his Painter's Eye](#)

ENDURING PRINCIPLES

In the early 1980s, Bertin's work was picked up by researchers in statistical graphics and the nascent field of visualization (which didn't quite have its name yet). William Cleveland and Robert McGill performed experiments to find out which of Bertin's retinal variables were best suited for particular types of data, while Jock Mackinlay built a system that put Bertin's and their work to use to create visualizations from data.

• Kosara, R.(2013, April 11). "The Science of What We Do (and Don't) Know About Data Visualization," on: Harvard Business Review Blog Network. Retrieved April 4, 2015


Jock Mackinlay, 1986
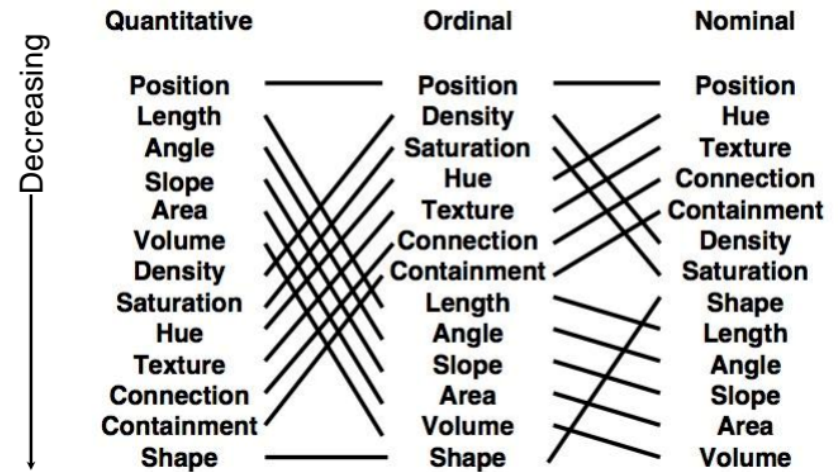
[Mackinlay, Automating the Design of Graphical Presentations of Relational Information, 1986]

BERTIN MATRICES

In order to simplify sets of data, in his laboratory Bertin developed various tools that can be assimilated to "mobile" graphics: ordered displays (known as Bertin matrix) and image-files. By way of manual interventions – permutations and reclassifications - categories of objects or spaces with similar characteristics can be identified. Bertin considered the discovery of the mobility of images as a founding element of his thought.

- Bébert et la Graphique

LA MATRICE ORDONNABLE

BERTIFIER

- http://bertifier.com/
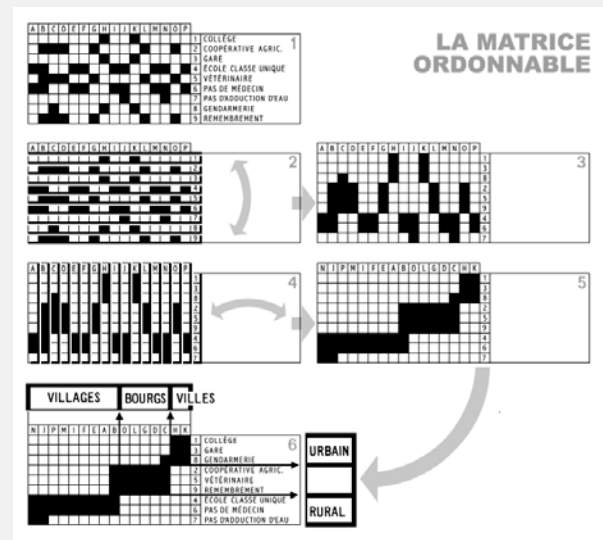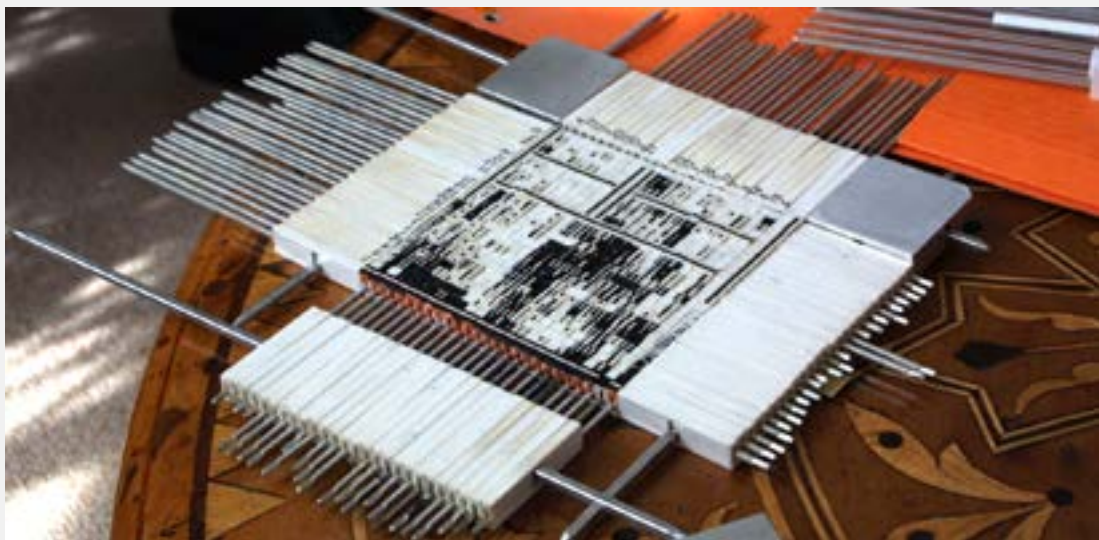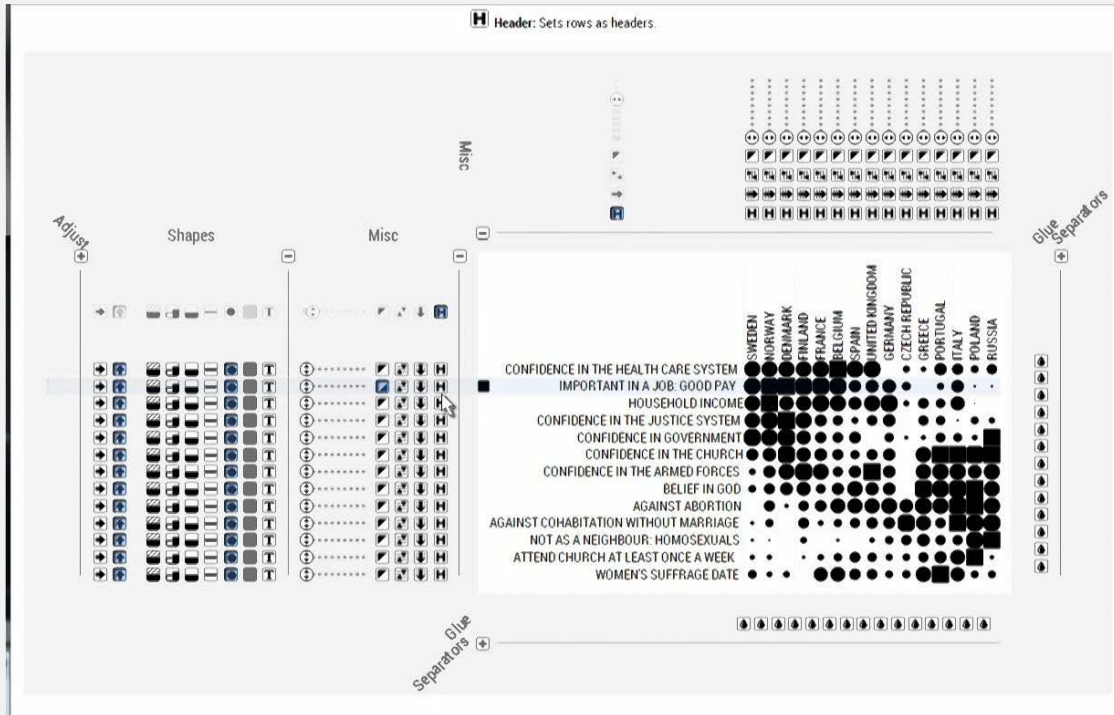
JEAN-DANIEL FEKETE INTERVIEW

- Bertin made concrete contributions to cartography: he elaborated several projection methods in the fifties, he illustrated numerous publications, research studies and school textbooks, and he designed wall maps and several historical atlases.

- 3:30 Wasn't part of the info-vis community, mainly geography

- 6:20 Well known in geography, did a couple atlases, wanted to make easily digestible history books

- 9:00 Translation wasn't great, considerations into re-translating. Out of print for 27 years

- 11:10 anecdote about the orientation of hatching, how Bertin suggested holding up the paper and orienting to see the hatching direction. Fekete mentions how this is something you would never do with a screen, 7 years later with an iPad you could definitely do this

- 19:34 4 editions the English is the second French edition, third generation includes some CGI,

- 24:00 Tufte is displaying good examples, Bertin is trying to build a system

- https://vimeo.com/17283289

LEGACY

"His work influenced, directly or indirectly, almost all the future developments of visualization starting from the foundations." - Enrico Bertini

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- https://pdfs.semanticscholar.org/79c2/4f17ce9321cd336aa345292b7717fcb66845.pdf