

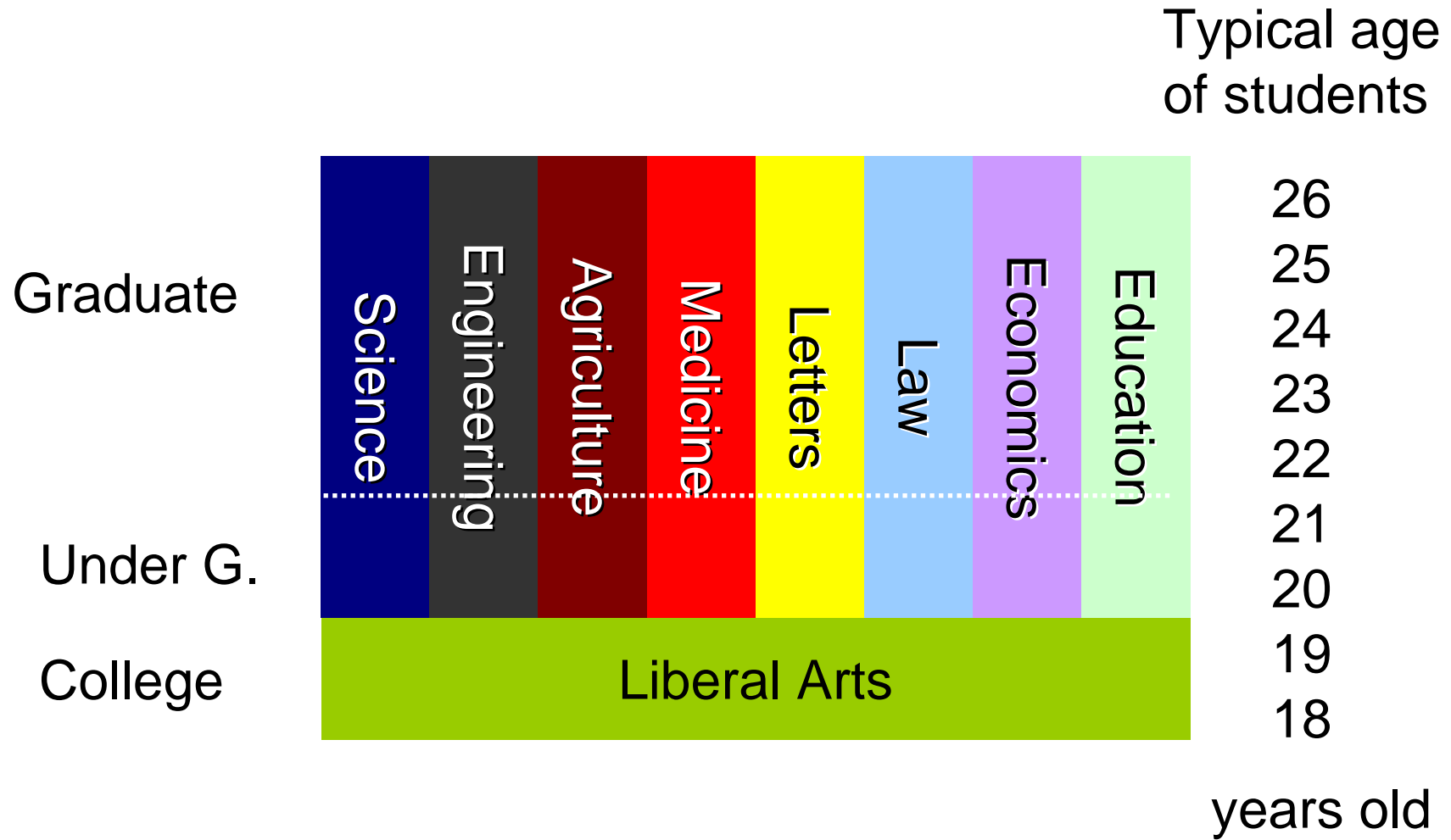
Liberal Arts and Scale-Free Network

(Laboratory Experiments at Kyoto Univ.)

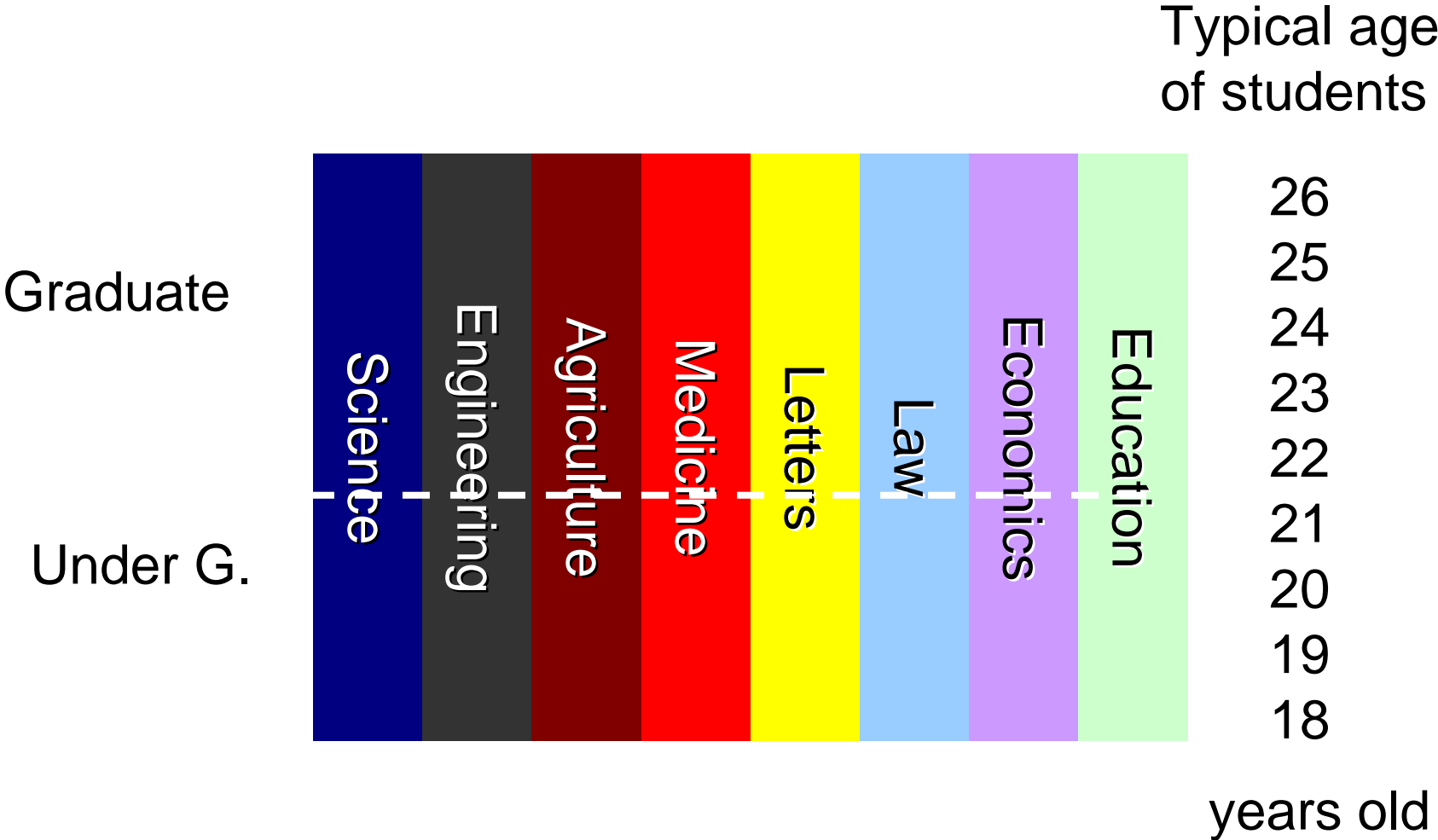
Satoshi Sakai
Kyoto University

Workshop on Teaching Weather and Climate
Using Laboratory Experiments 08/06/19

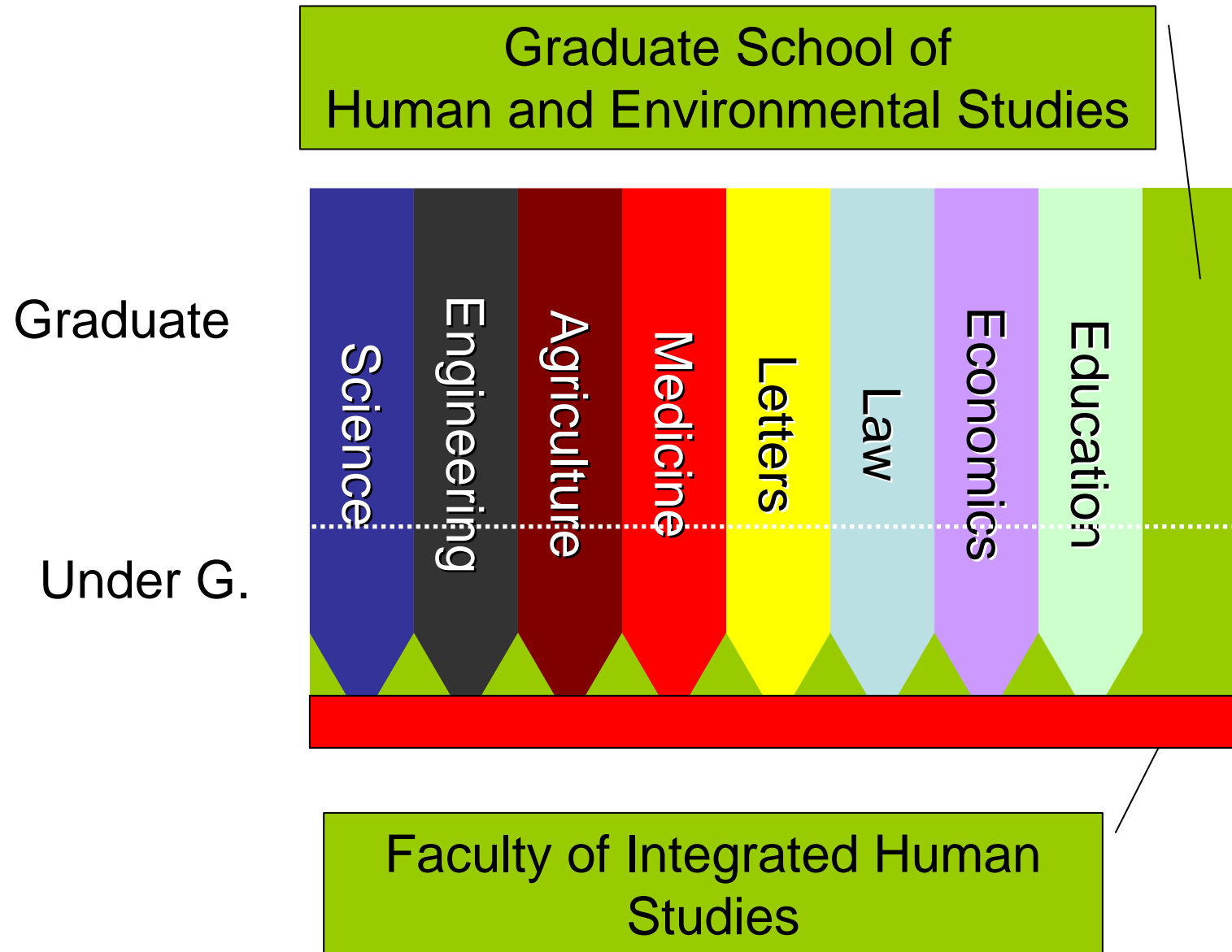
Japanese University 20years ago



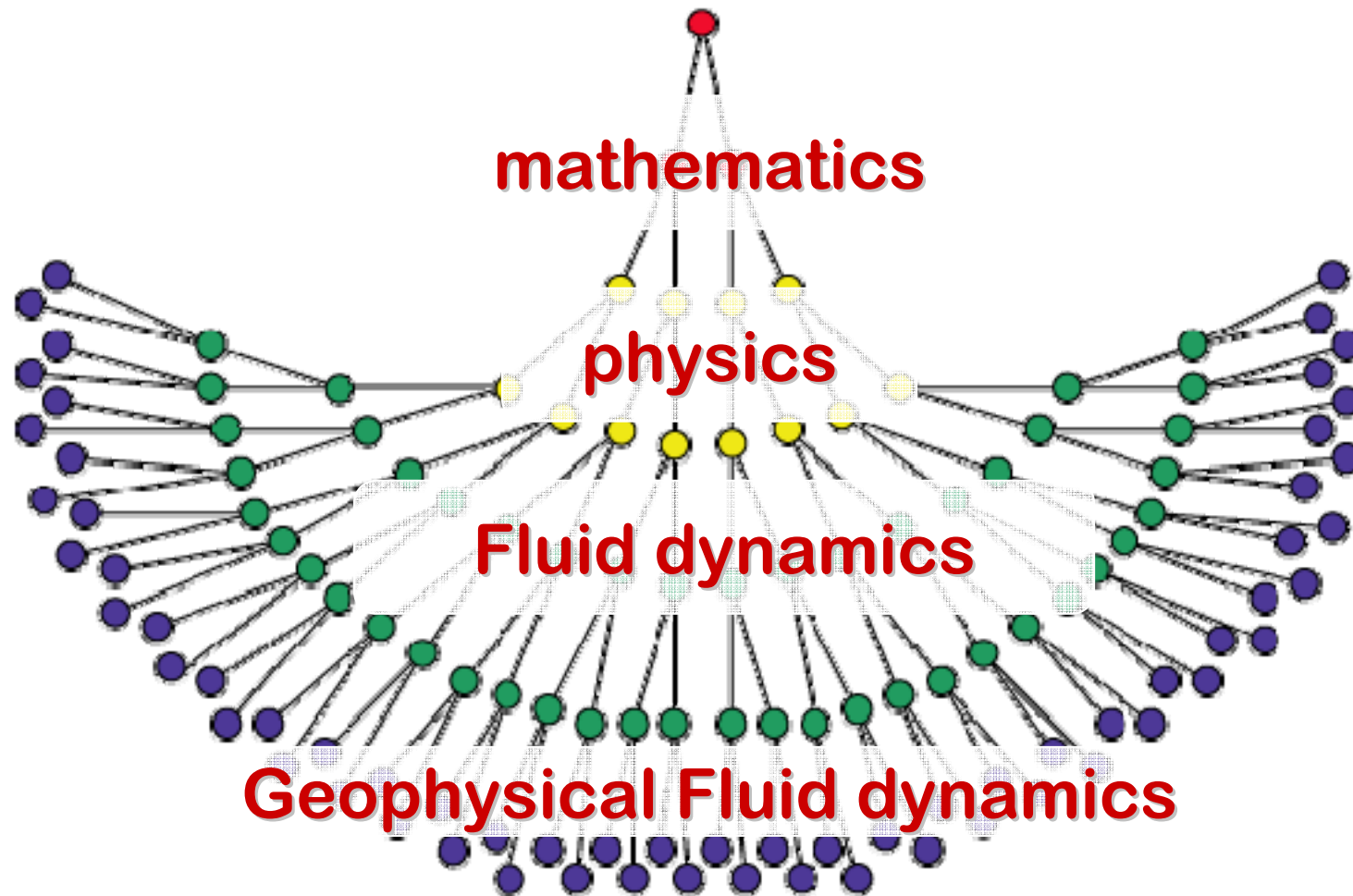
Typical Japanese University Today



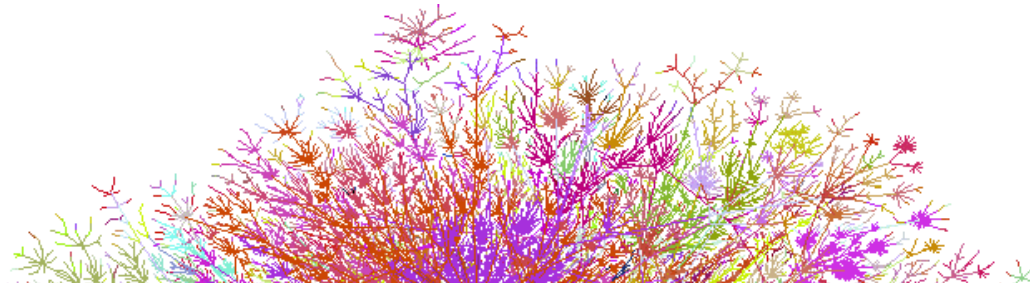
Kyoto University Today



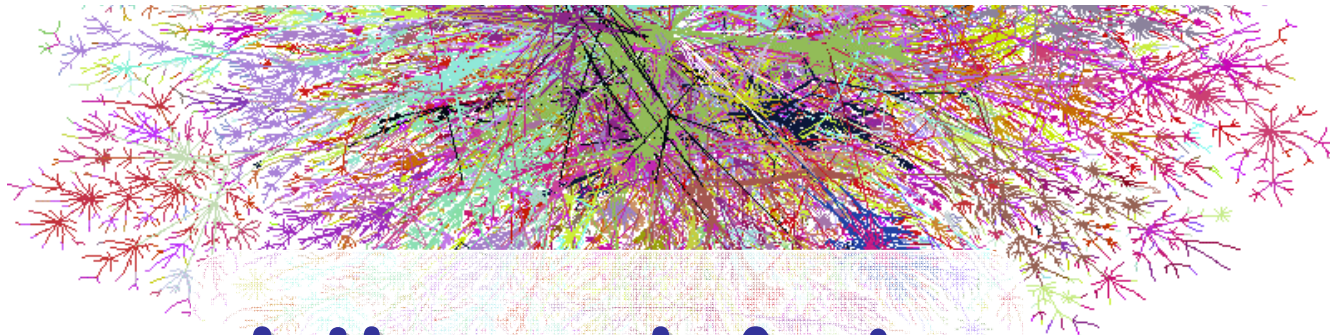
Logical, well organized



Ad hoc, unprincipled, chaotic



Scale-Free Network



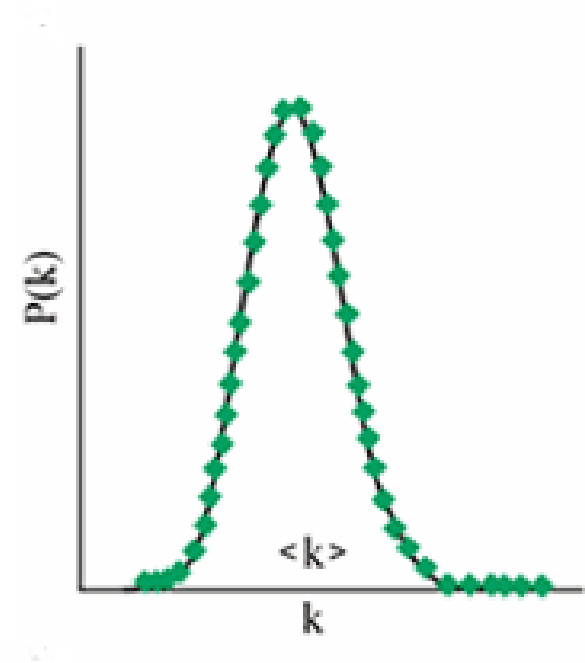
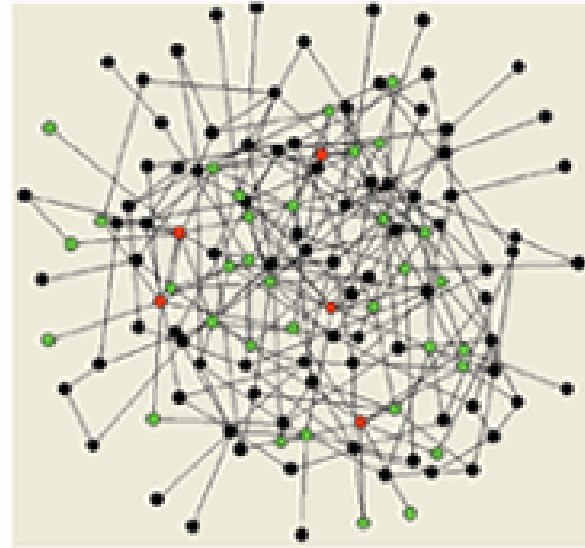
Liberal Arts

Small World

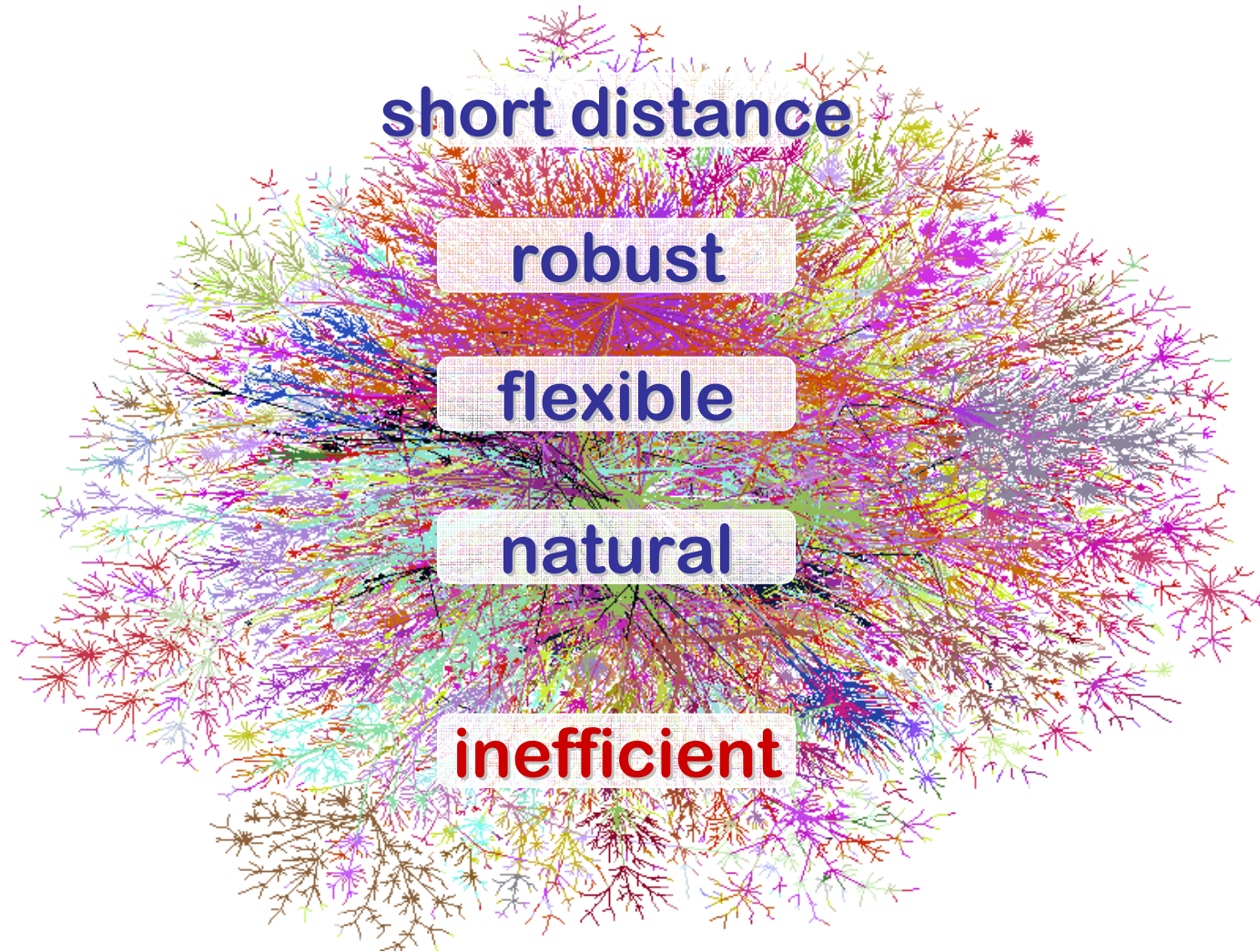
- Everybody on this planet is separated by only six other people.

Six Degree of Separation

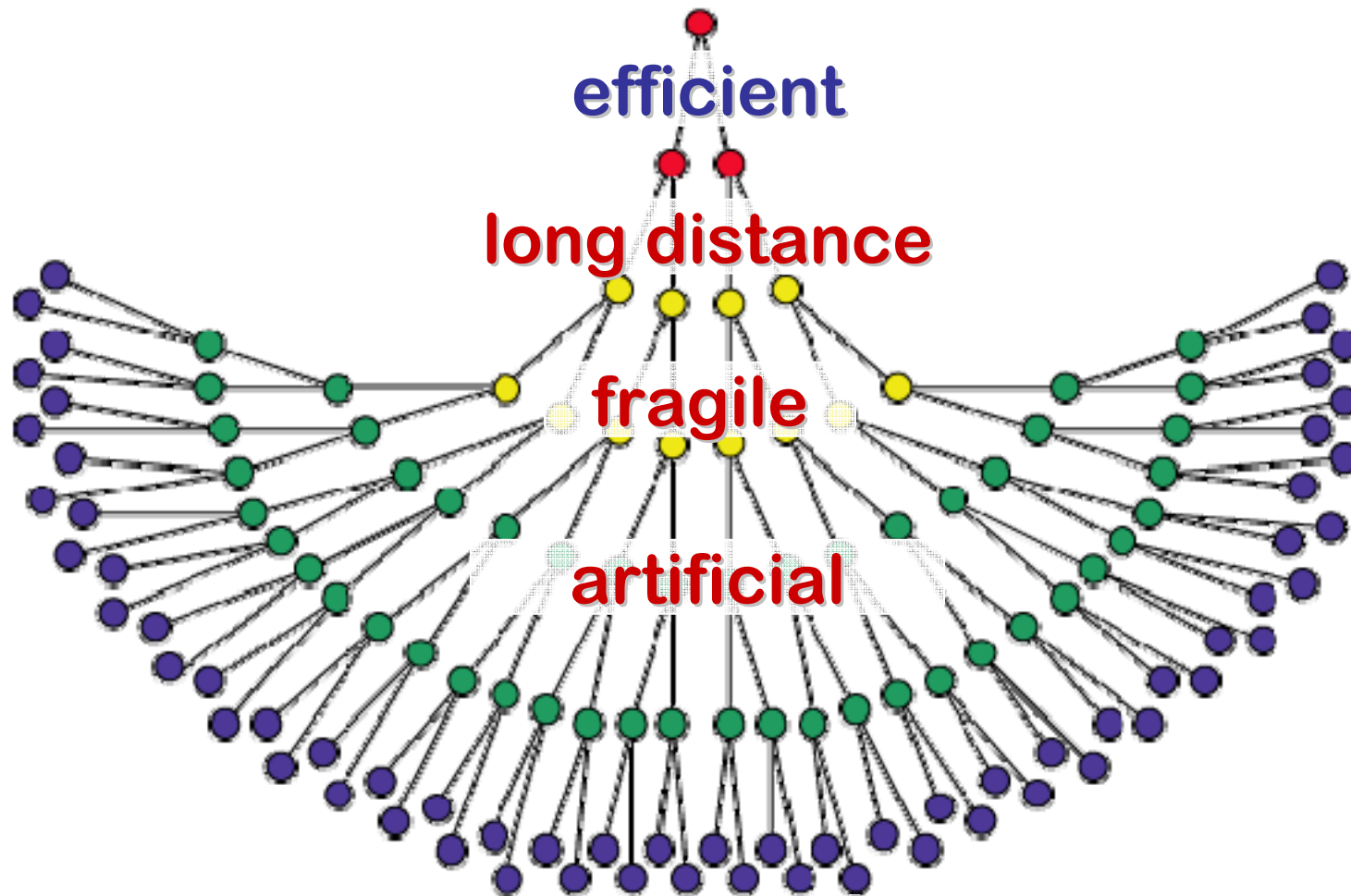
Random Network



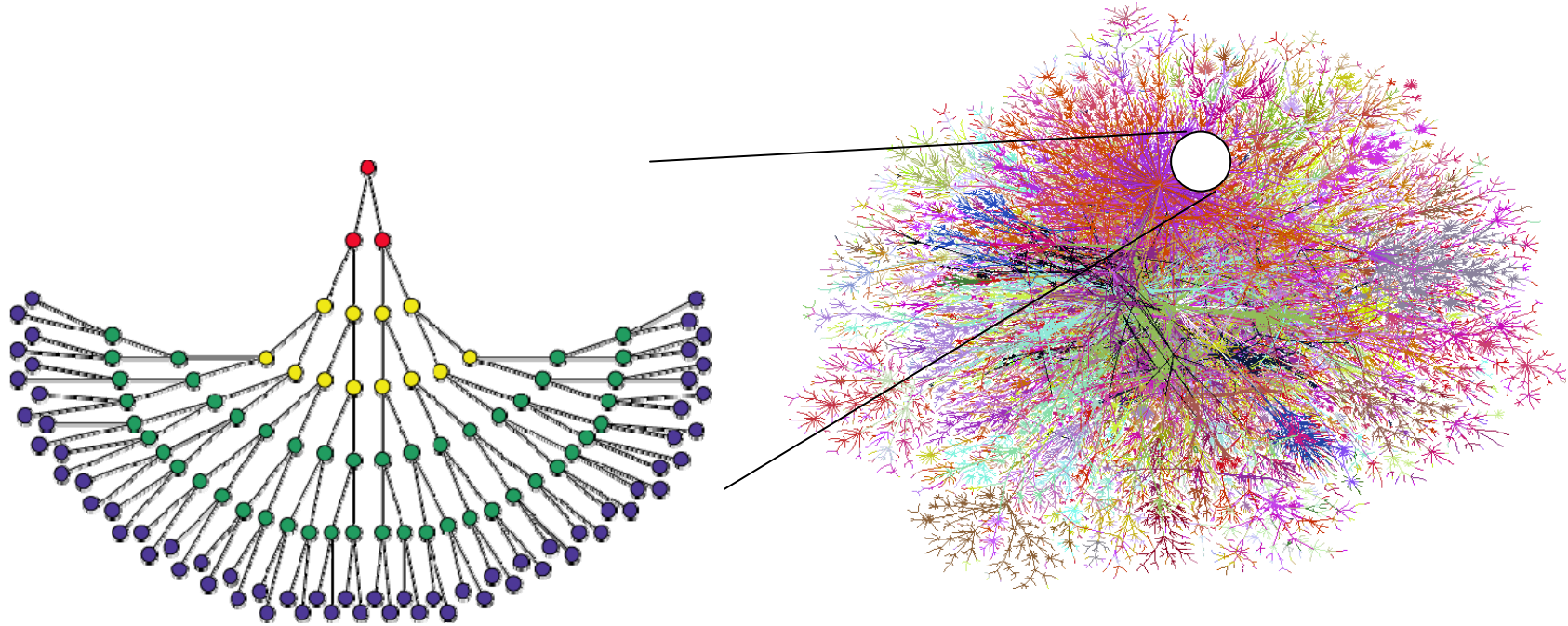
Scale-Free Network



Systematic Network (bureaucratic)



When you learn a systematic knowledge



you find a systematic structure in your bush of knowledge or reconnect them.

**You can not understand
what you have never seen.**

Ekman Spiral

depth to $e^{-2\pi} = 1/535$ th part for each time its direction rotates four right angles. The direction and velocity of the

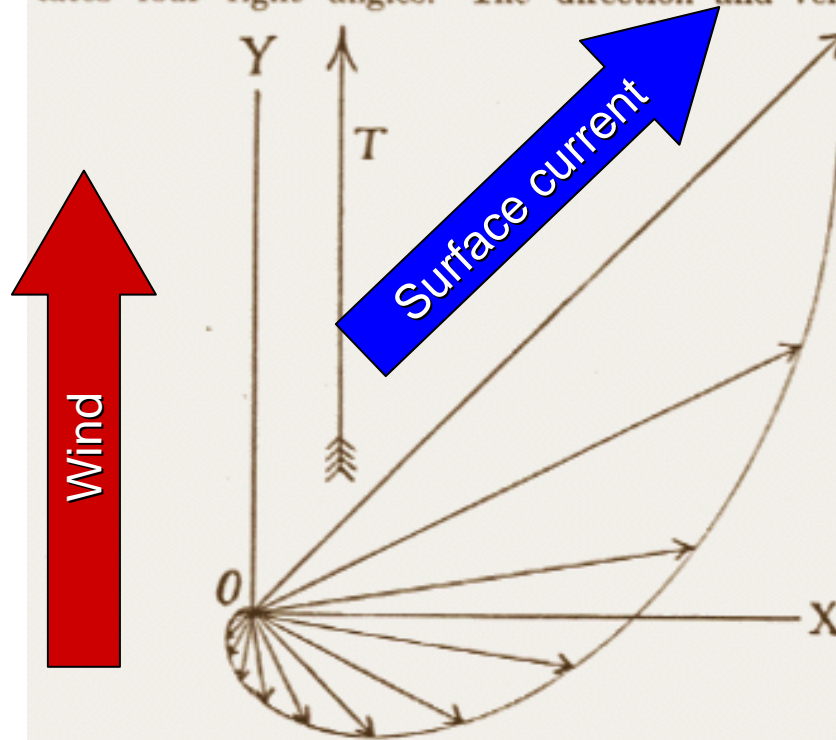
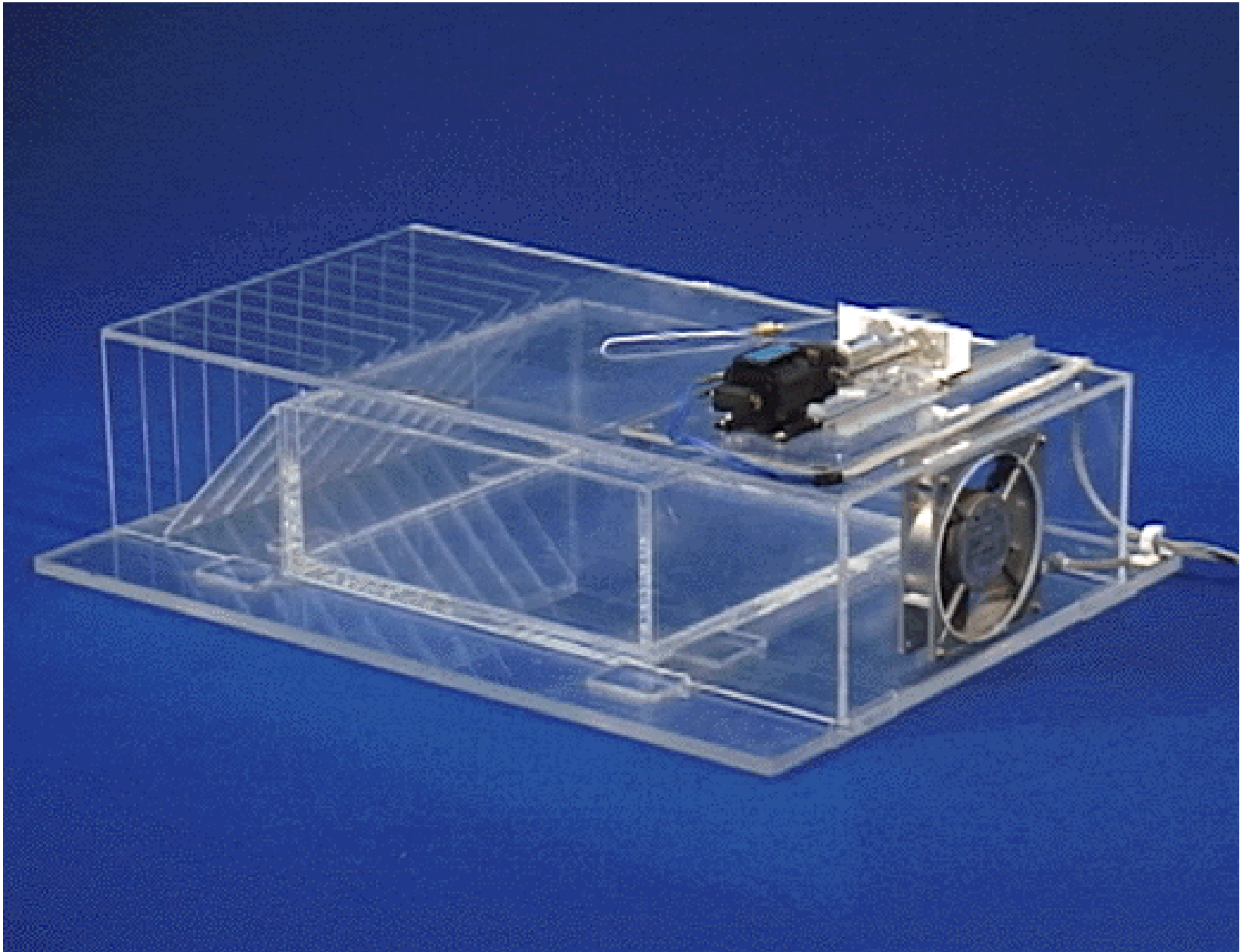
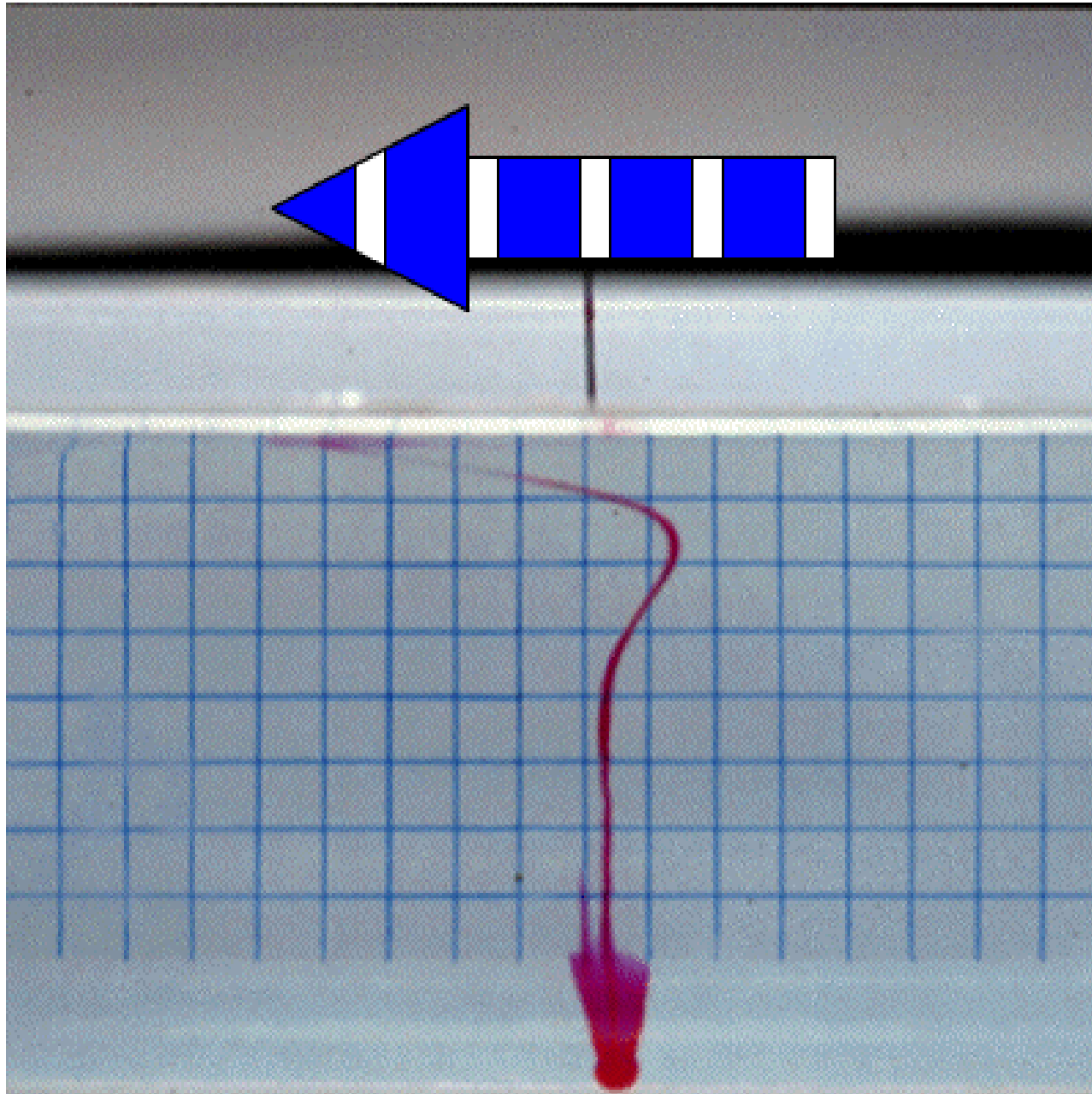
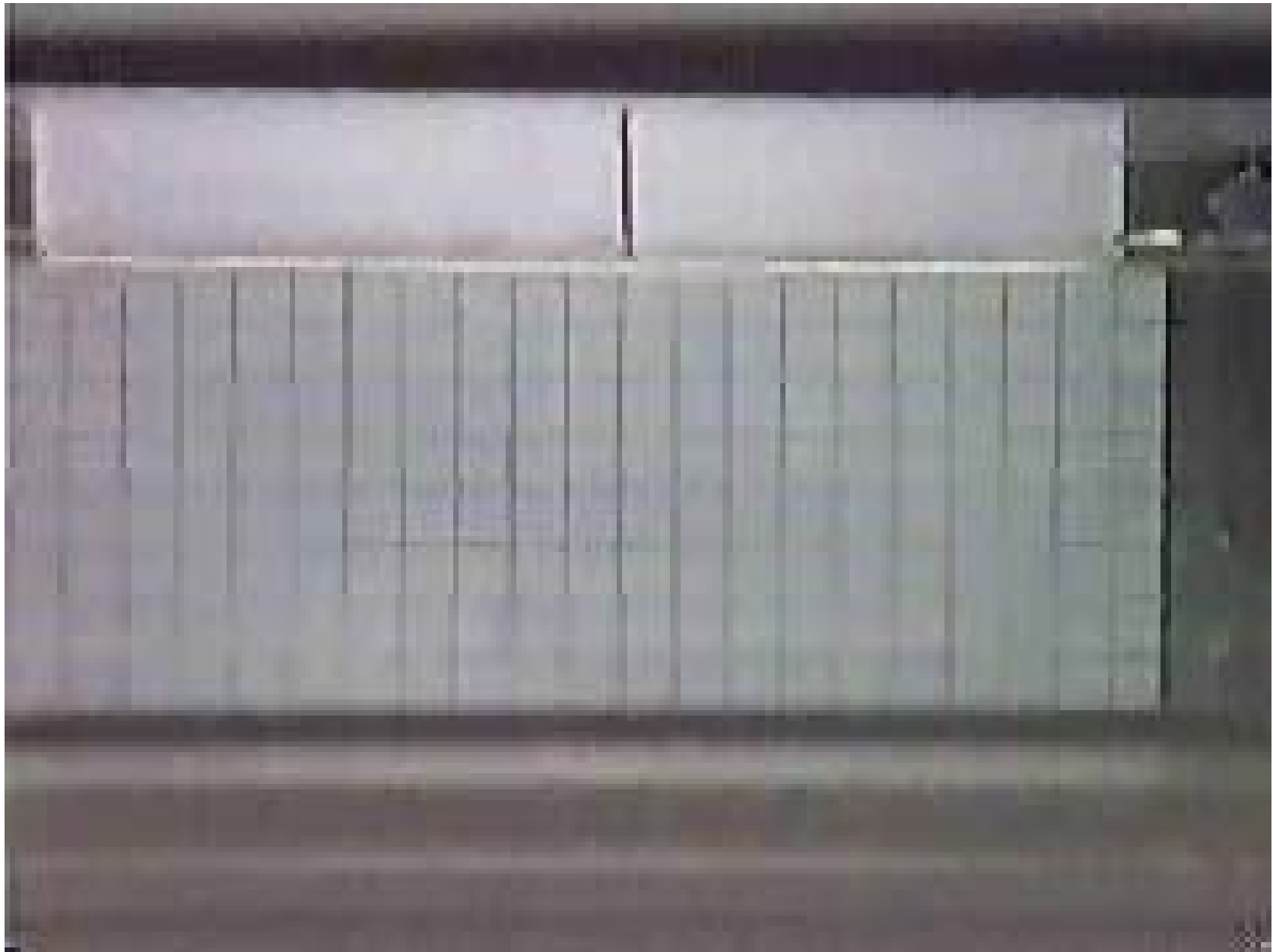


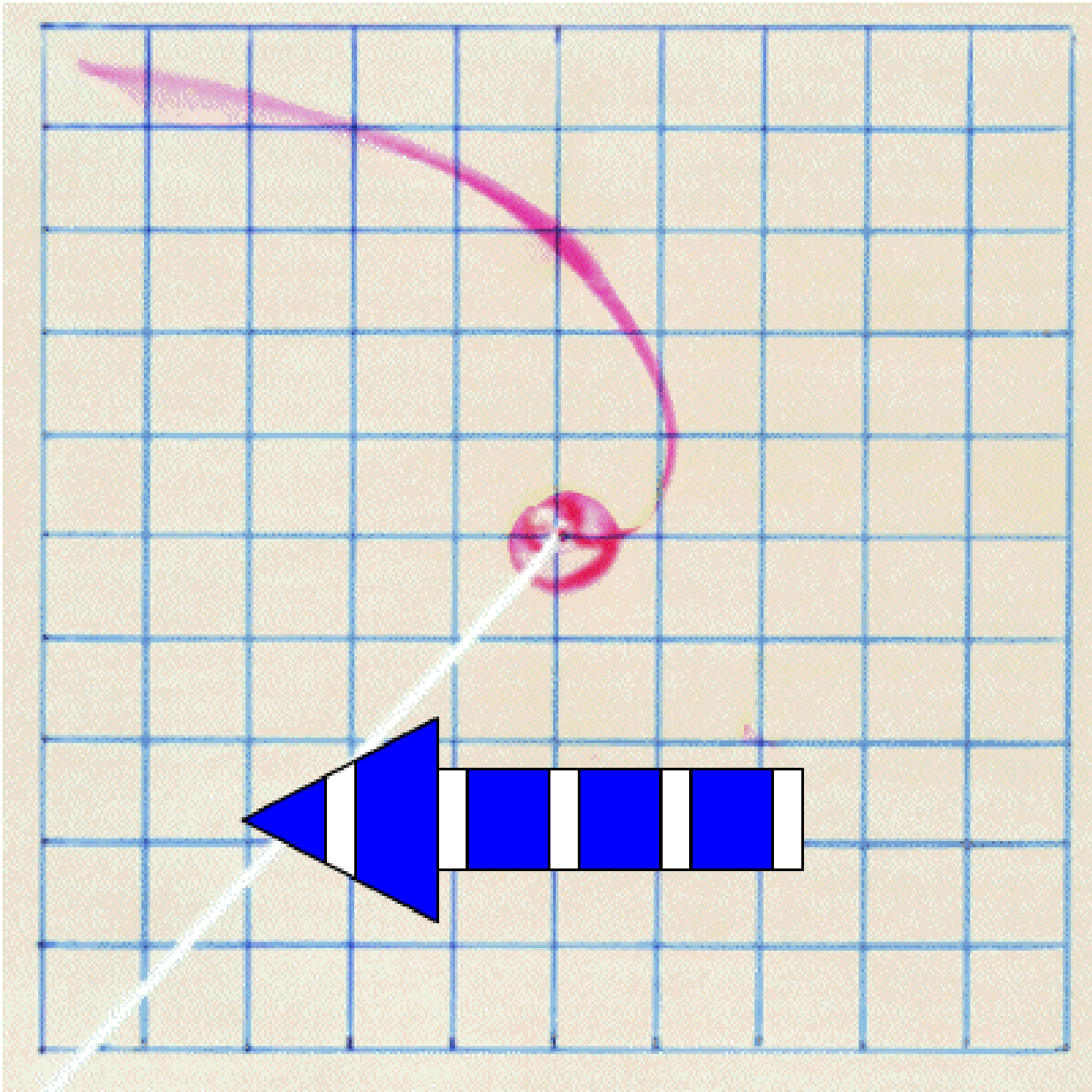
Fig. 1.

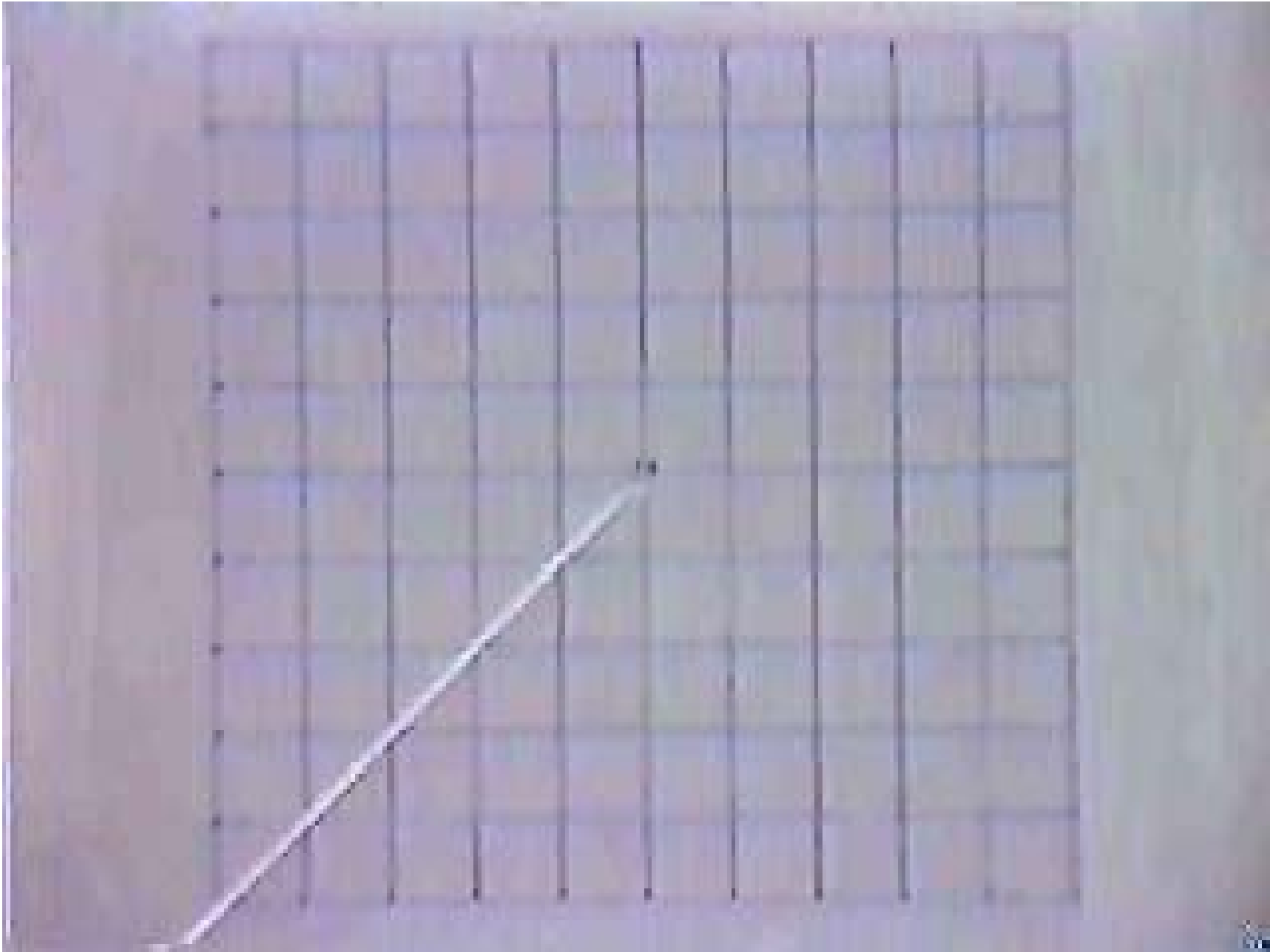
current at different depths are represented by the arrows in Fig. 1 above; the longest arrow refers to the surface, the (the water) does not however vary appreciably with the height, within



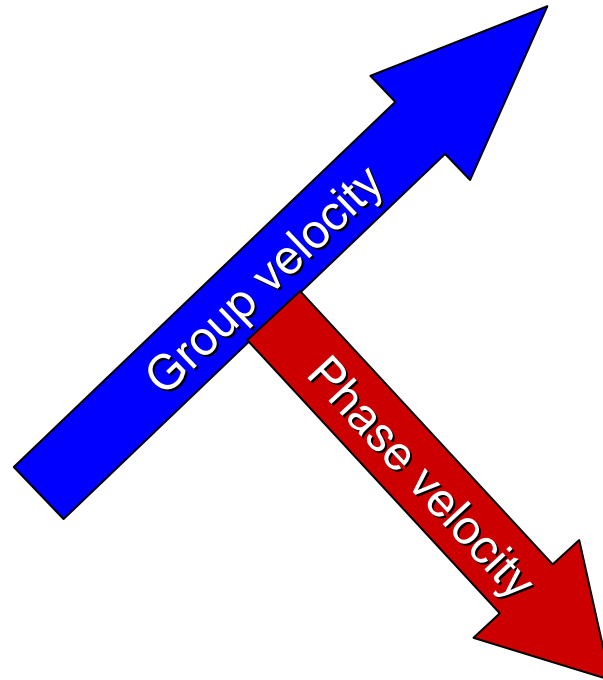


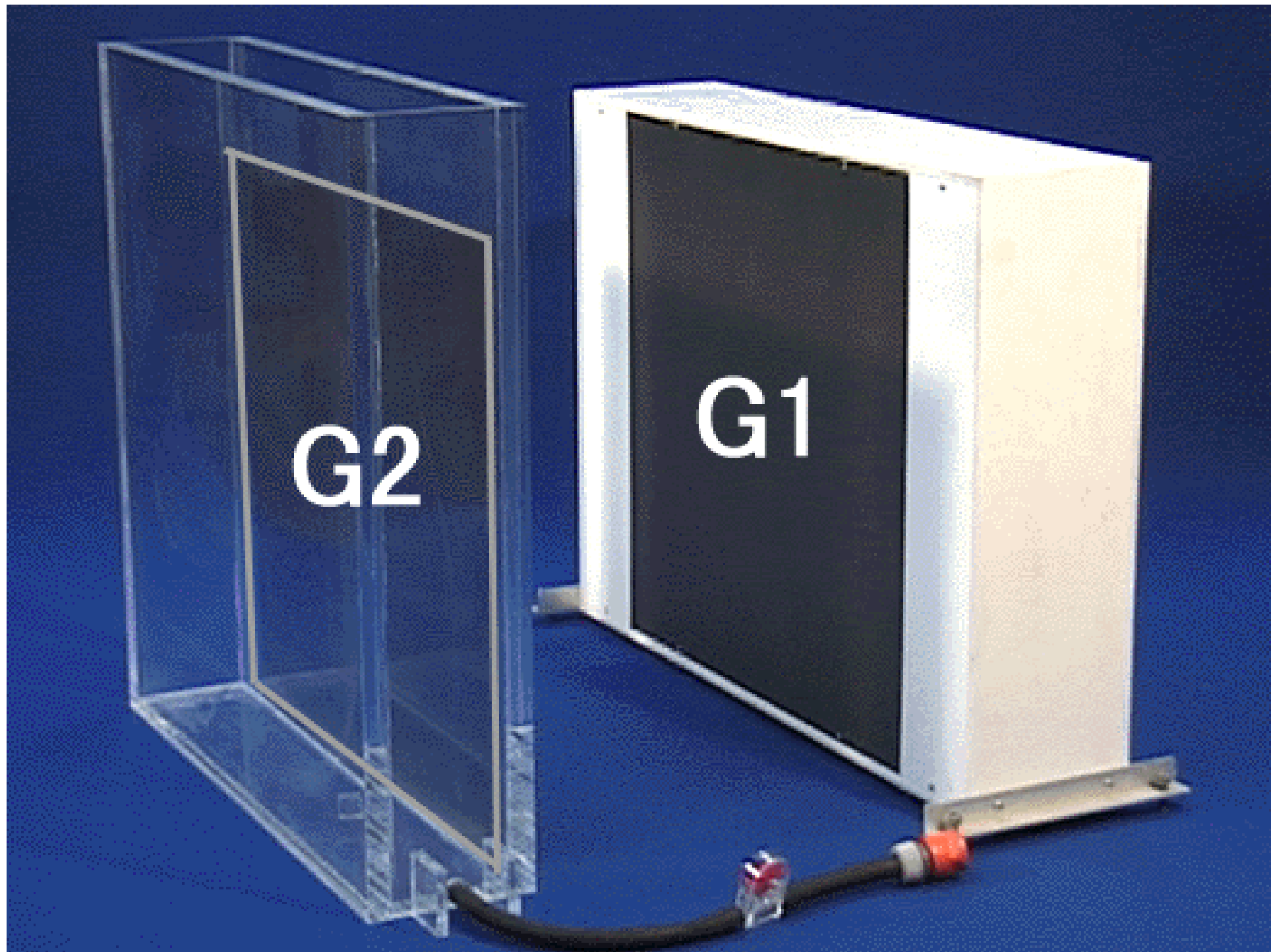






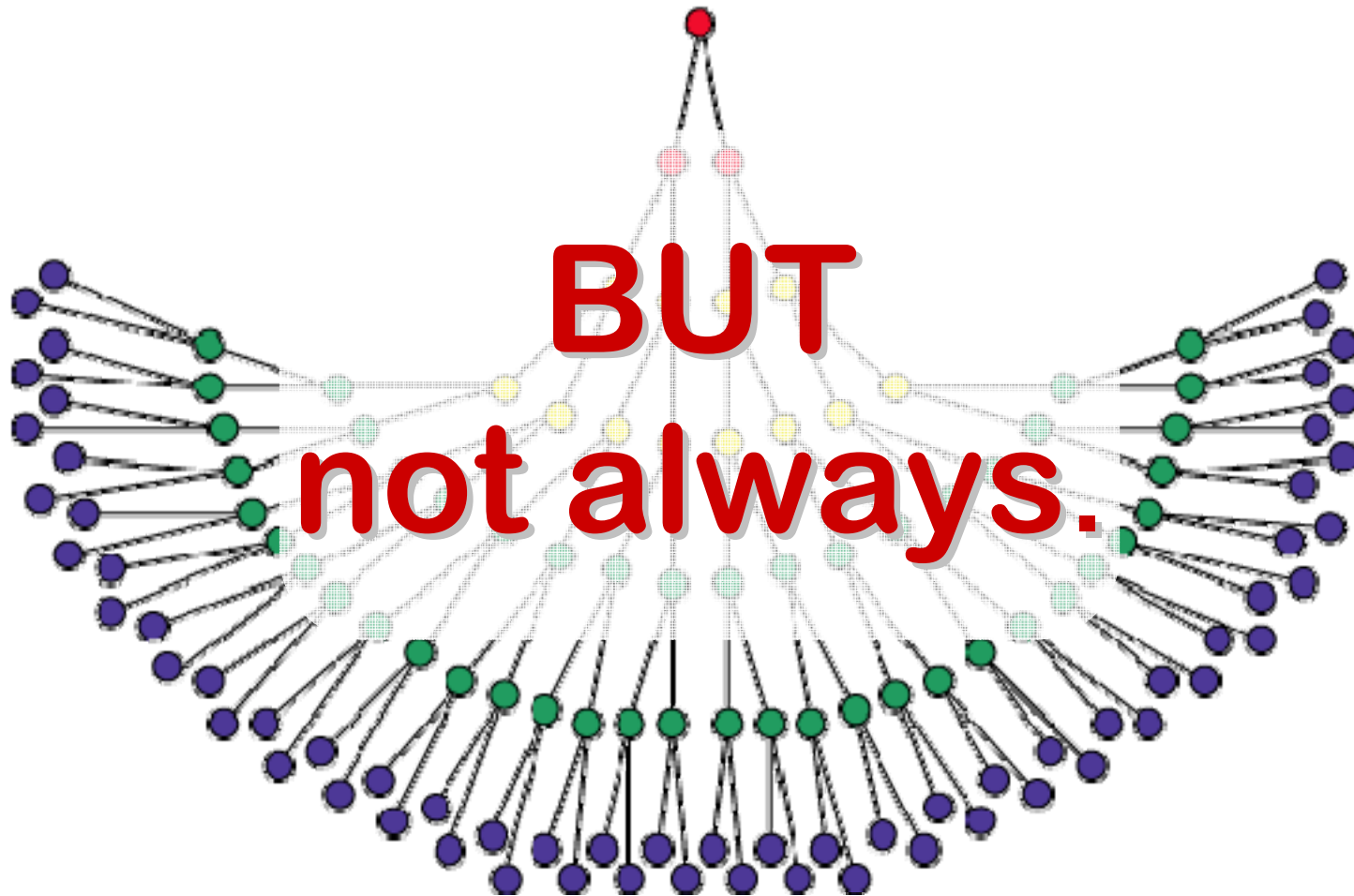
Internal gravity wave







This type of thinking is very efficient and works in many situations,



Creative activities and big findings are
based on this type of knowledge



DON'T MAKE LIGHT THIS.