

so, adaptation to similar climates around the world generates arrays of equivalent life-forms from different plant groups on the different continents

these similar arrays are what we recognise as **Biomes**

thus we can recognise, say, a desert, by its characteristic vegetation without knowing what the groups are

18

1

the variation shown by plant growth-forms has long been known

Raunkiaer's System

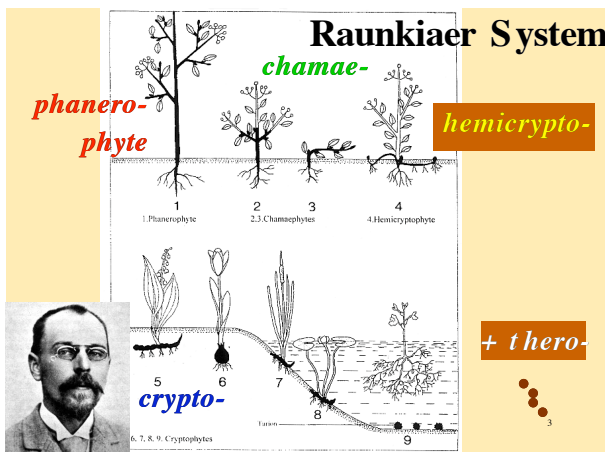
based on perennating structures

also well-known is the **non-random distribution** of these forms among the world's natural regions

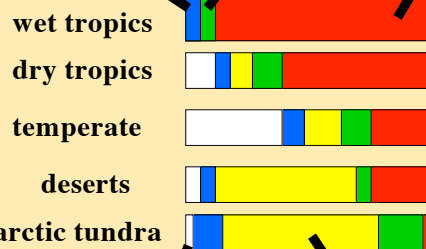
biomes have distinct and typical arrays of Raunkiaer's life-forms

18

2



cryptophyte chamaephyte phanerophyte



18

4

predominance of Raunkiaer's types suggests the **adaptive value of body forms**

e.g. Arctic - all plants cryptic; no trees

e.g. Tropics - trees, epiphytes, vines; no seeds

as well as gross body form, there are many other typical physical attributes, e.g.:

tiny leaves in desert trees
needle-leaves in taiga trees
succulents in arid climates

18

5

Global overview of Climate-types & Biomes

excellent web resource:

<http://www.life.umd.edu/emeritus/reveal/pbio/biome/lec35.html>

18

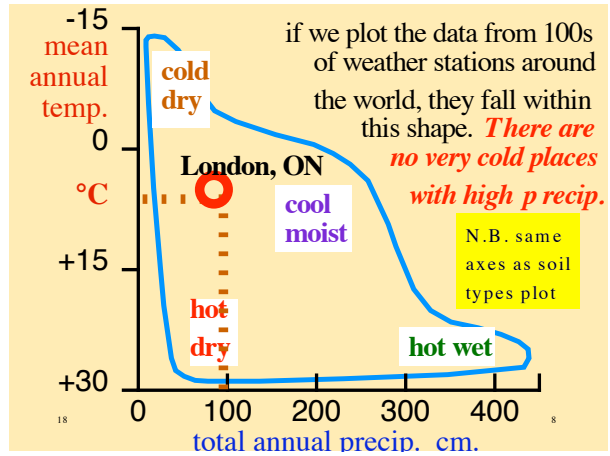
6

we have seen that the **richness** of the biota depends greatly upon
MEAN ANNUAL TEMPERATURE
 and
TOTAL ANNUAL PRECIPITATION

how are these two variables correlated around the globe?
what combinations do we find?

18

7



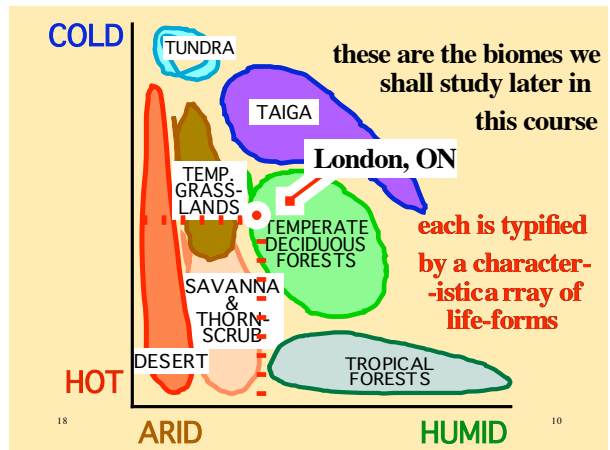
these two pieces of information allow us to **predict** with fair accuracy what the vegetation-type will be just as they allowed prediction of **P**RODUCTIVITY

recall that this is because the biota adapts to the climate as it diversifies

higher accuracy is possible when we factor in **SEASONALITY**
(see later)

18

9



18

10

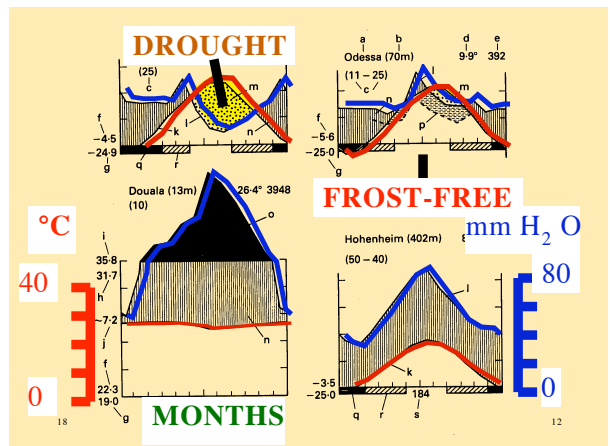
so, **mean annual temperature** & **total precipitation** predict much about the biota

but another crucial factor is **YEARLY VARIATION** in these factors - **SEASONALITY**

this is well-represented in **CLIMAGRAMS**

18

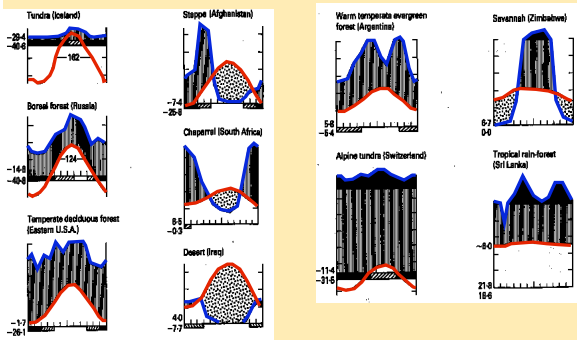
11



18

12

climate diversity around the world



18

13

the vegetation INTEGRATES all of these diverse aspects of climate:

- total annual precipitation
- seasonal distribution of precipitation
- mean annual temperature
- variation (& extremes) of temperature
- coincidence of the two seasonal patterns
- predictability of the above (year-to-year variation)

18

14

in responding adaptively to a place's climate characteristics, the various climatic zones become characterized by

A SPECIFIC ARRAY,

&

DOMINANT TYPES,

of LIFE-FORMS

with typical morphological, physiological & life-history characteristics

plus productivity, biomass differences

18

15

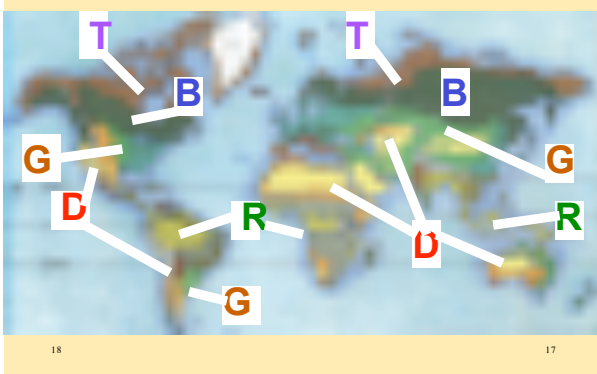
thus climate dictates what will be the gross form of vegetation - what **BIOME** will exist in a given locality

therefore, these biomes will have a geographical distribution with which we are now familiar

18

16

Earth's Major Biomes

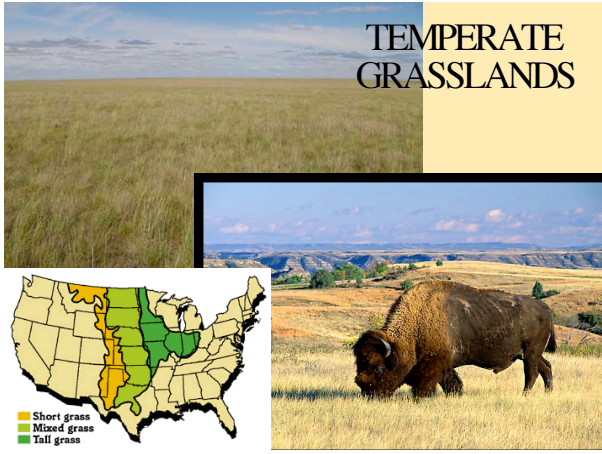
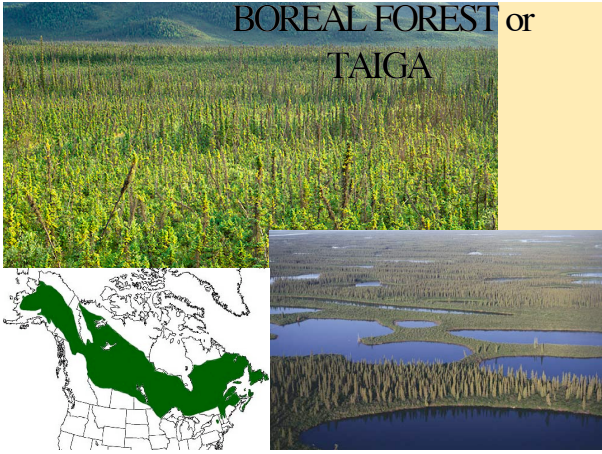


18

17

TUNDRA





globally, biomes are distributed as are the main climate zones

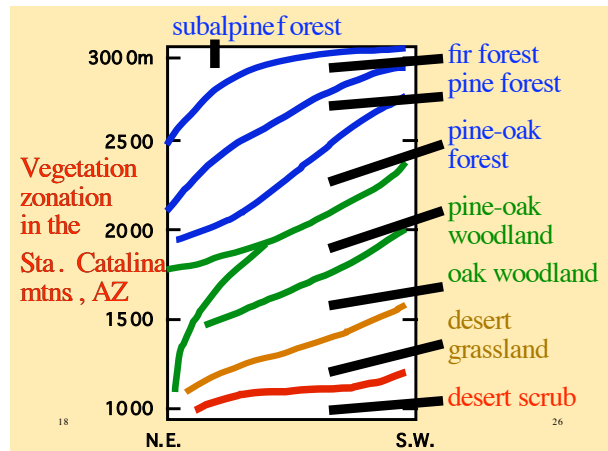
but **locally**, they are influenced by **ALTITUDE**

temperature: $6.5^{\circ}\text{C}/1000\text{m}$ or $3.6^{\circ}\text{F}/1000\text{ft}$

precipitation: mountains generate it; lower temps. mean less evaporates

18

25



18

26

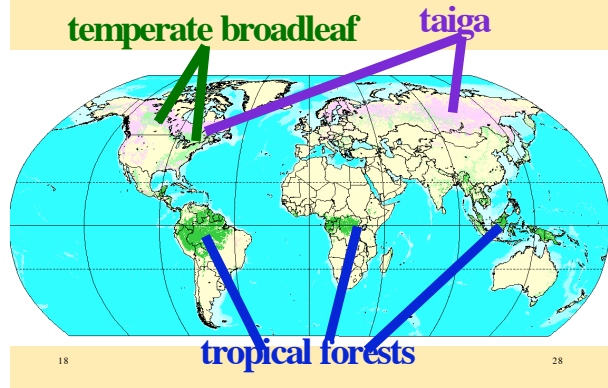
NEXT CLASS

Evolution of North America & its Climate

18

27

actual distribution of the world's forests



18

28