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CANALIZATION OF DEVELOPMENT
AND THE INHERITANCE OF
ACQUIRED CHARACTERS

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“Fondateur de la Doctrine d’Évolution”
in the Jardin des Plantes
Crossveinless; Waddington’s genetic assimilation experiment
Cepaea nemoralis
A rare left-leaning *Cepaea*: developmental accident 1/10 000
Prezygotic isolation: the tragic tale of the left-and right-handed snails. Successful (2 \times \text{ dextral}) versus failed (sinistral + dextral) copulations: arrows point at genital openings.
Snail-eating Asian snake, specialises on right-coil shells
Sinistrals safe from attack
Independent origins of sinistrality in *Satsuma* snails: genetic assimilation of developmental accident?
Valle de Aran – wide range of habitats
Habitat Types – Val d’ Aran
Potential and realised niche
Whiteblood mutant at different temperatures
White-blood Release

- **lab females**
  \[
  \text{X} \quad \text{X}^W
  \]

- **wild males**
  \[
  \text{X} \quad \text{XX} \quad \text{XX}^W
  \]

- **Y males**
  \[
  \text{Y} \quad \text{XY} \quad \text{X}^{WY}
  \]
Range of developmental temperatures, from 18 to 32 degrees in the wild; plus effect on wing size
Effect of wing size on mating success in D mel; large males more successful

Figure 2. Frequency histograms of the sizes of mating (closed bars) and randomly-sampled (open bars) wild male and female D. melanogaster from cherries.
White-light cage
Red light cages

![Graph showing frequency of w allele over time (weeks)]
Patchy Cage
Fig. 2  Divergence in the frequency of the \( w \) allele between the red light and white light sectors of the experimental cages, summed over all cages.
The Drosophila maze: choose up or down, dark or light, ethanol or acetaldehyde scent; plus fast and slow development

Fig. 1.—A drawing of the habitat maze indicating the position of the habitats (labeled 1–8), and the tygon tubes containing the pupae (center). The maze was continuously lighted by fluorescent ceiling lights. The temperature was 25°C and the relative humidity 50%. Chemotaxis vials, attached to each habitat, contained 47.5% ethanol (dark) or 0.5% acetaldehyde (light) and delivered the agents via a wick.
Rapid divergence by habitat choice and mating preference in the maze (expt above, control [no choice] below)
Two forms of *Coregonus* whitefish in Canadian Lakes <10ky old: large feeds on mud, small in open water – on the way to speciation; hybrids less likely to survive
Just the same story in Canadian sticklebacks *Gasterosteus*; each prefers to mate with their own type.
The Coregonus of Swiss lakes fifty years ago: do not hybridise in the wild and seen as different species.
Reduction in *Coregonus* species numbers after phosphate and mud pollution: DNA of old and new specimens show this is due to hybridisation of once distinct species.