

Genome 562

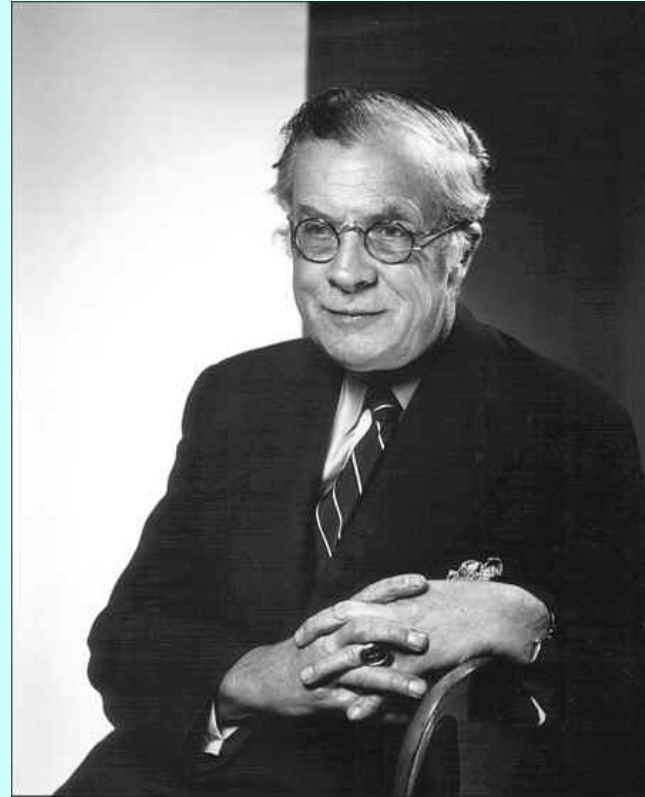
February 2017

Week 7

Julian Huxley (1887-1975)



Oxford University, 1922

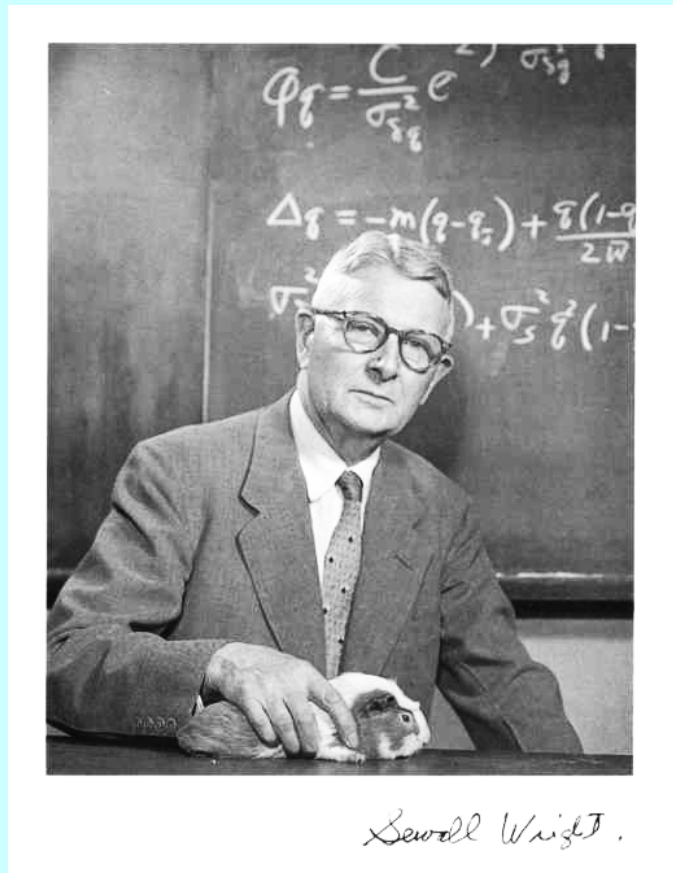


about 1960

Sewall Wright (1889-1988)



At the University of Chicago, 1929



With guinea pig and equations, 1955

Path coefficient diagram (Wright, 1921)

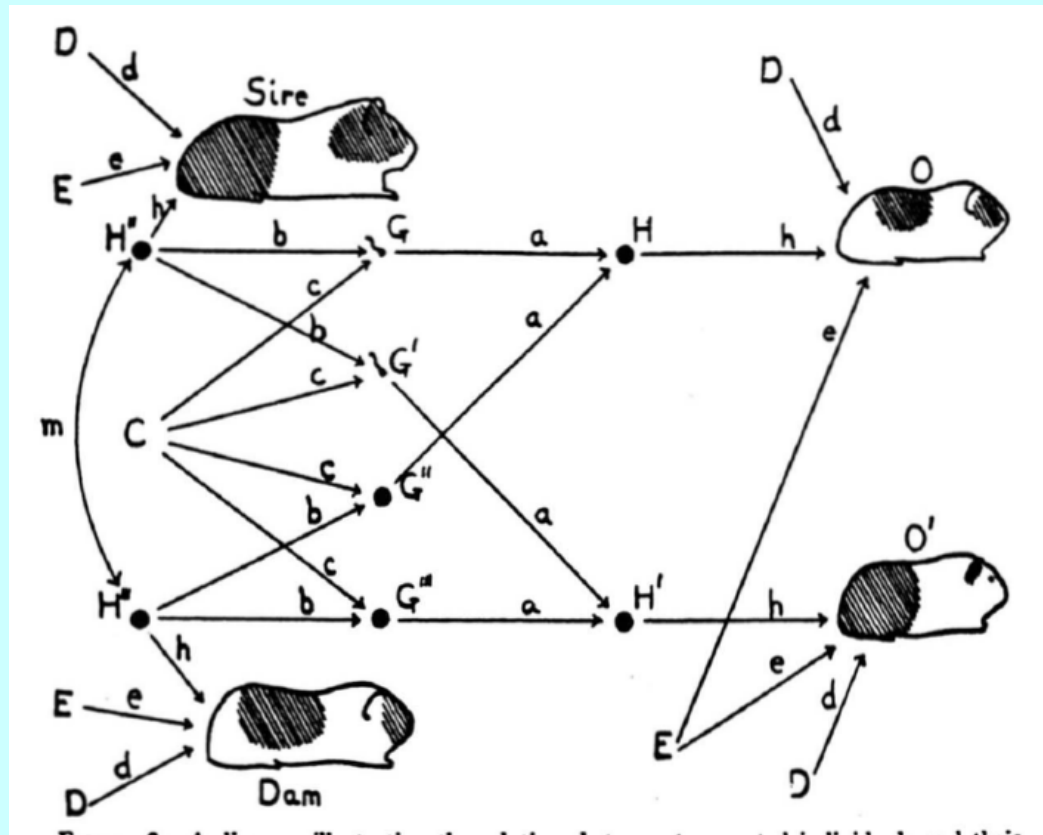
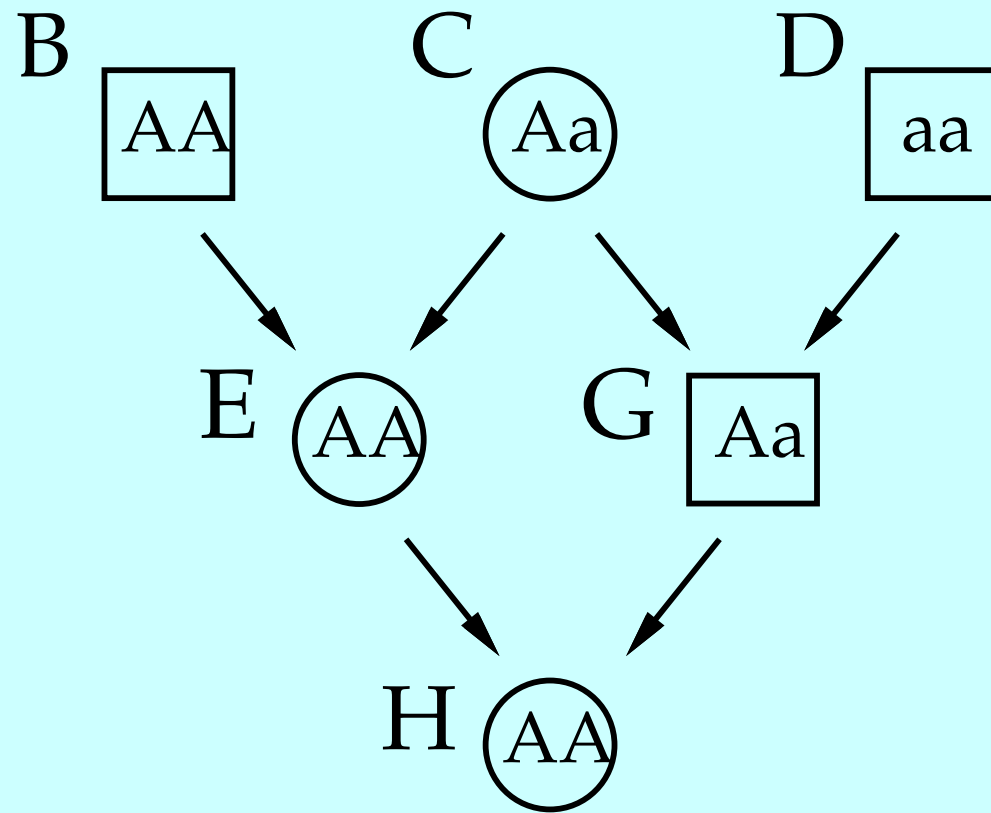
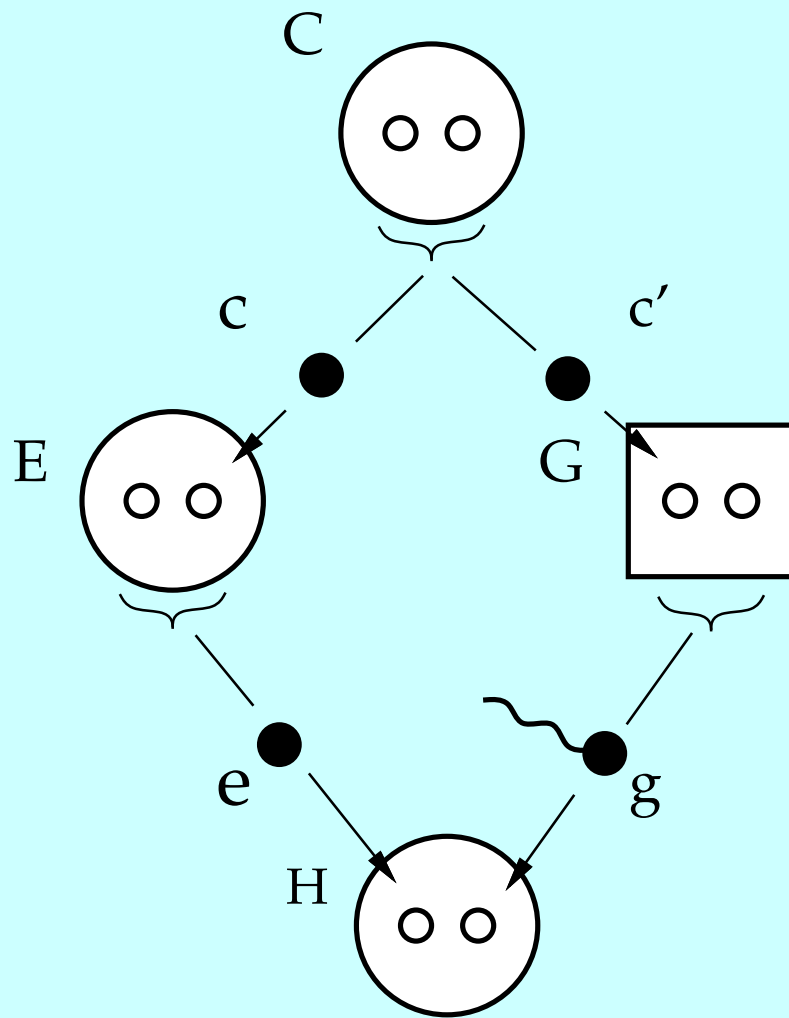
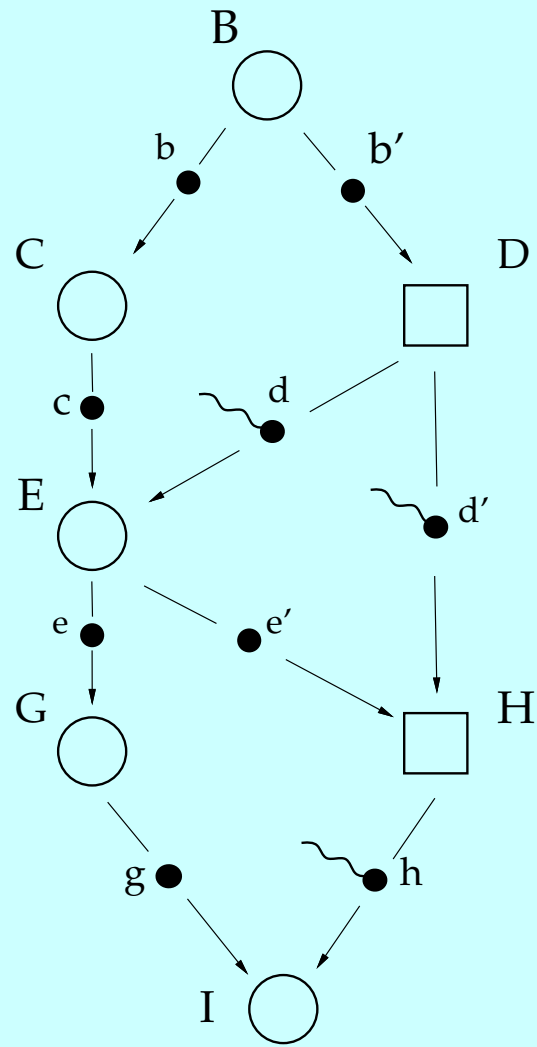
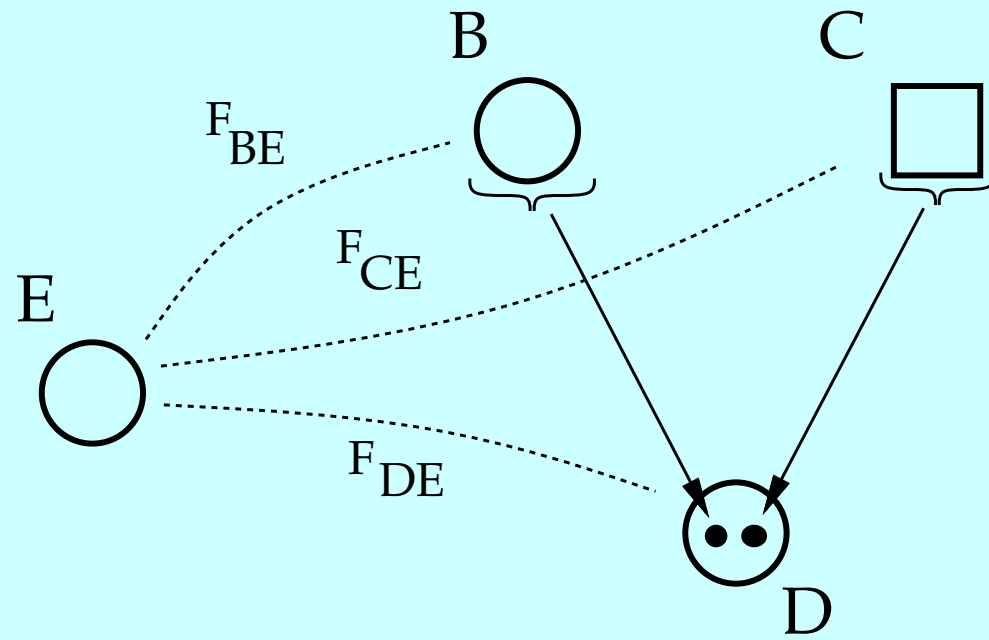


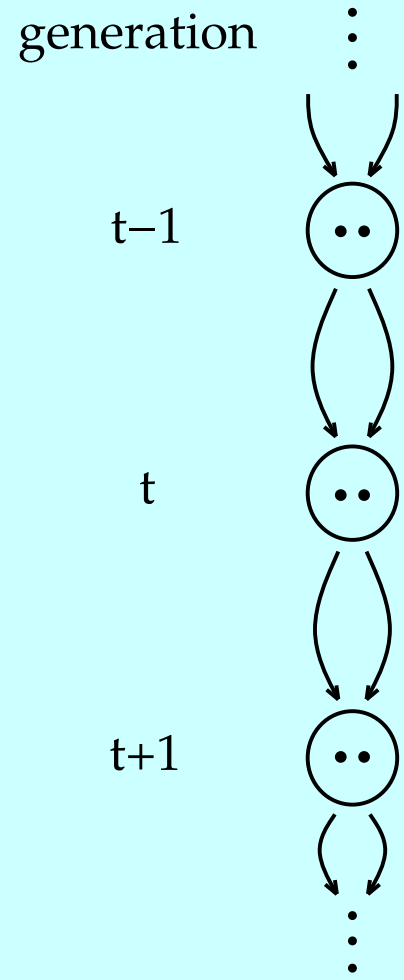
FIGURE 2.—A diagram illustrating the relations between two mated individuals and their progeny. H, H', H'' and H''' are the genetic constitutions of the four individuals. G, G', G'' and G''' are four germ-cells. E and D represent tangible external conditions and chance irregularities as factors in development. C represents chance at segregation as a factor in determining the composition of the germ-cells. Path coefficients are represented by small letters.





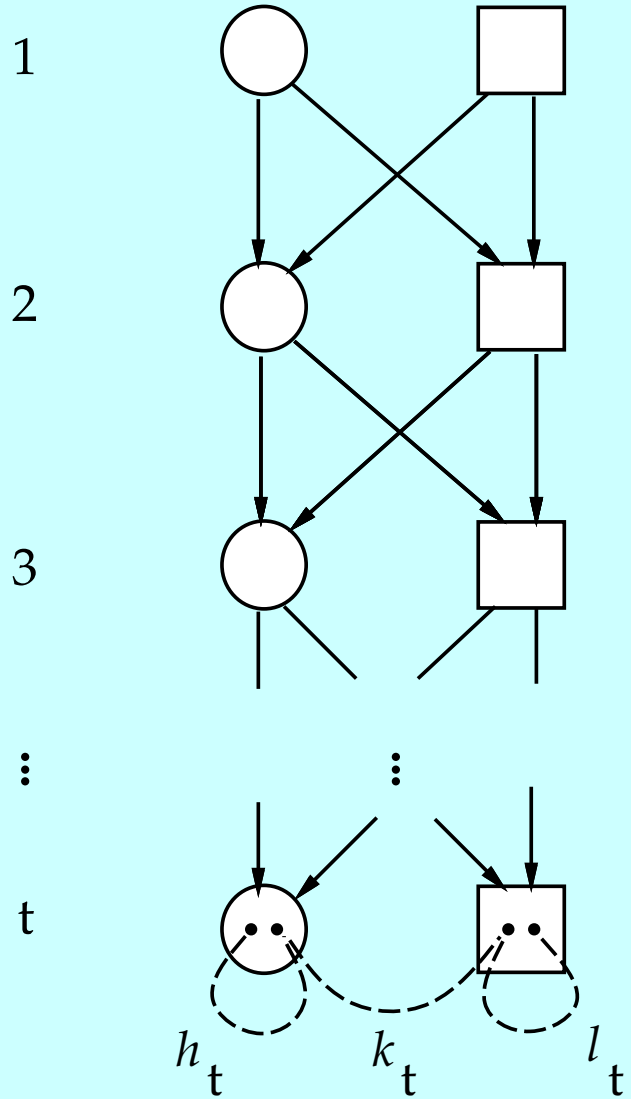




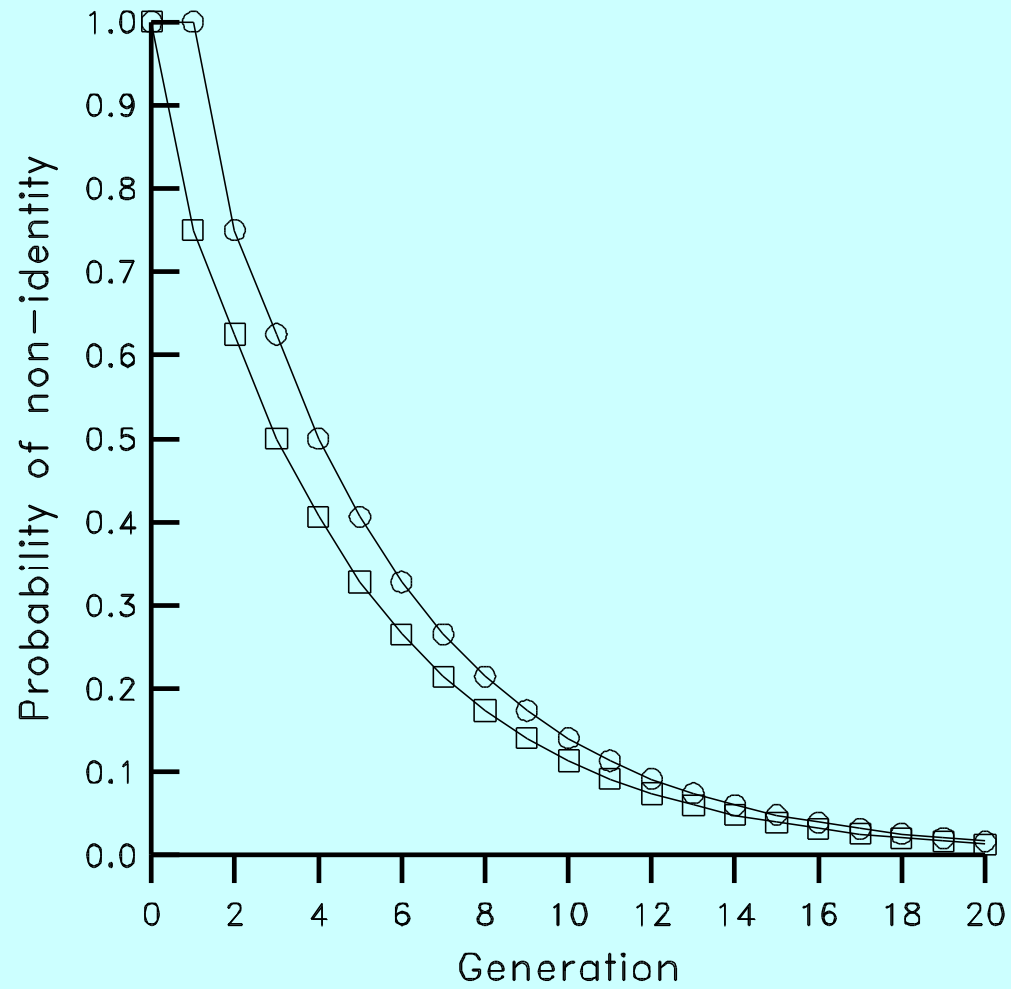


Reccurrent sib-mating

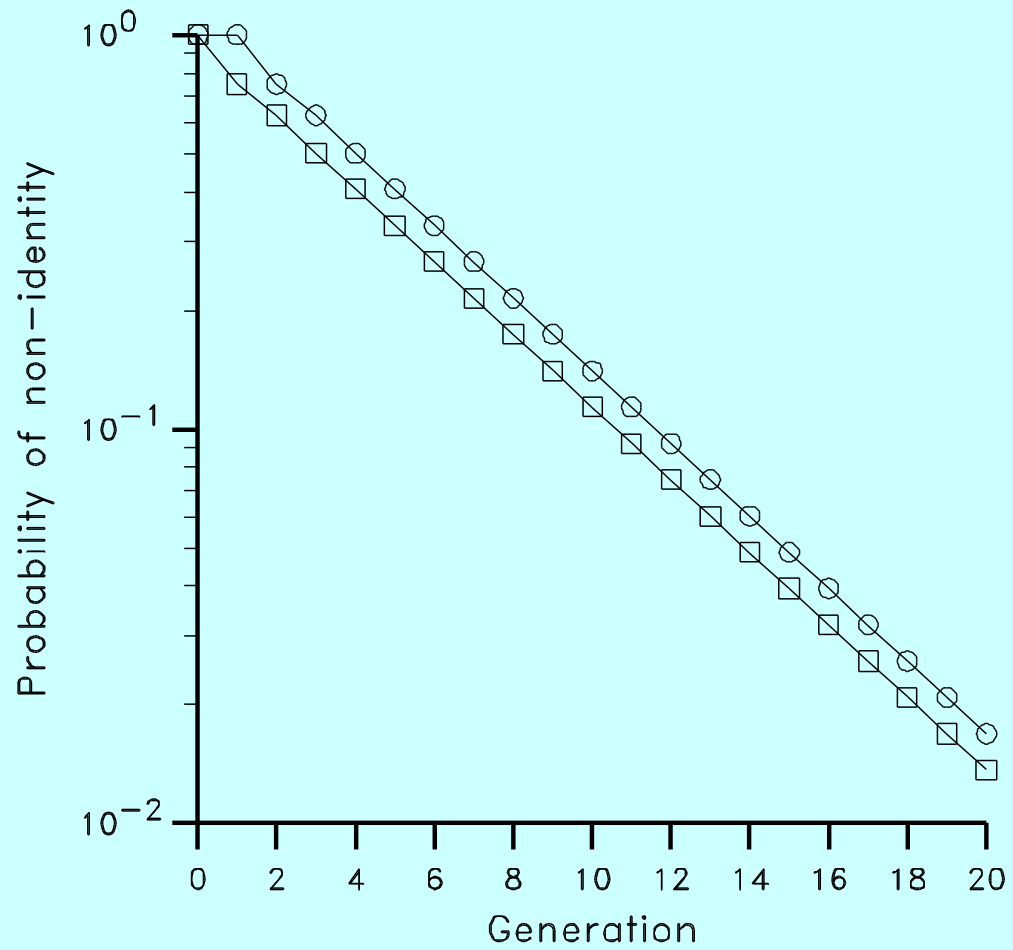
Generation



(non-)IBD from recurrent sib-mating



On a log scale ...



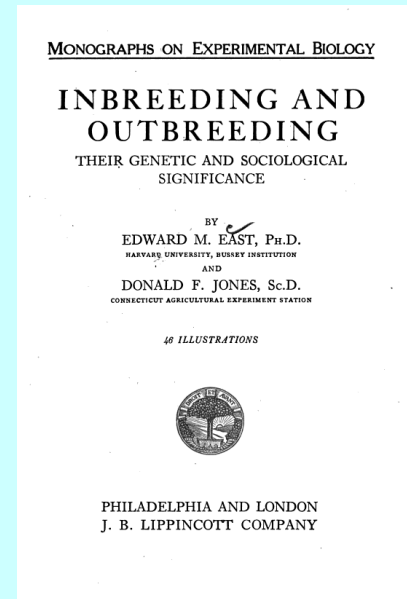
East and Jones, 1918



Edward M. East
(1879-1938)



Donald F. Jones
(1890-1963)



East and Jones, 1918

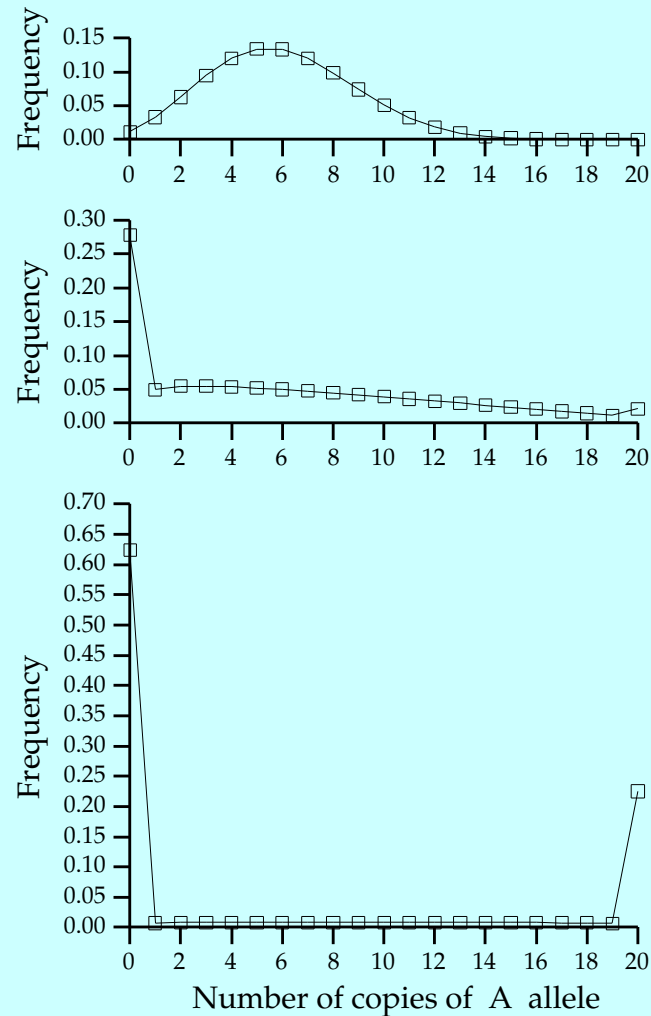
Inbreeding depression in *Drosophila*

Table 1. Inbreeding depression (I.D.) in laboratory populations of *Drosophila*. I.D. = $1-(z_r/z_o)$, where z_o and z_r are means of the random mating base, and the completely inbred population (obtained by linear extrapolation), respectively. Negative values imply an increase in character value with inbreeding.

Character	I.D. (various studies)
Competitive ability	0.84, 0.97
Egg-to-adult viability	0.57, 0.44, 0.66*, 0.48*, 0.06
Female fertility	0.81, 0.18, 0.35
Female rate of reproduction	0.81, 0.56, 0.96, 0.57
Male mating ability	0.52*, 0.92, 0.76
Male longevity	0.18*
Male fertility	0.00*, 0.22*
Male weight	0.07, 0.10
Female weight	-0.10
Abdominal bristle number	0.05, 0.06, 0.00
Sternopleural bristle number	-0.01, 0.00
Wing length	0.03, 0.01
Thorax length	0.02

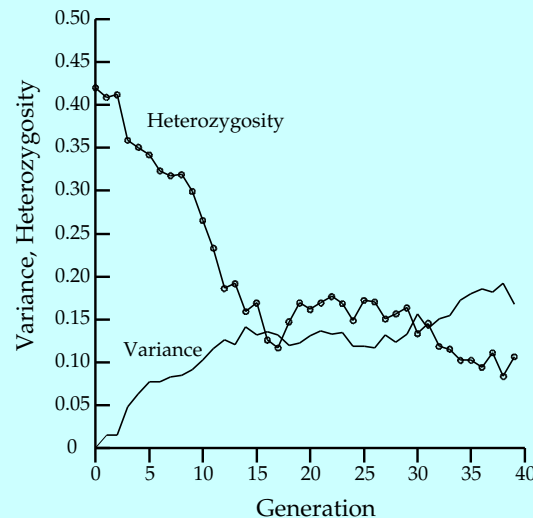
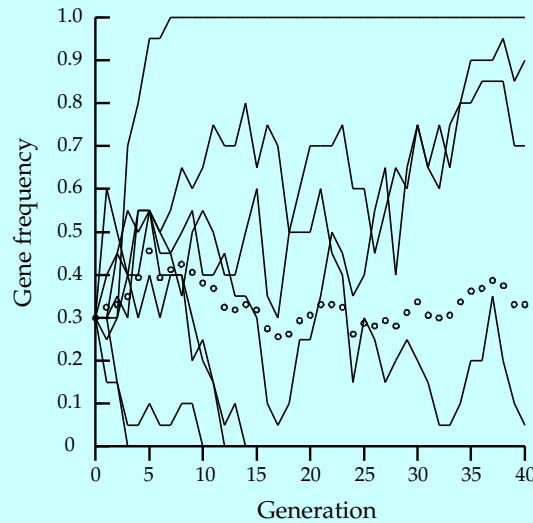
From Lynch, M. and J. B. Walsh. 1998. *Genetics and Analysis of Quantitative Traits*. Sinauer Associates, Sunderland, Massachusetts.

Distribution of gene frequencies with genetic drift



Distribution of gene frequencies (given as number of copies of the A allele out of 20) among replicate populations in a diploid Wright-Fisher model with $N = 10$ and initial frequency $p_0 = 0.3$ after 2 (top), 10 (middle), and 40 (bottom) generations. Note that when almost all populations are fixed ($T = 40$) the remaining populations are distributed nearly uniformly over the unfixed classes.

Change of heterozygosity and variance among lines



Simulated genetic drift in 8 replicates of a diploid Wright-Fisher model with $N = 10$ and $p_0 = 0.3$. The upper graph shows the gene frequencies in the eight replicate populations (lines) as well as the mean gene frequency over those replicates (circles). The lower graph shows for the same simulation the mean heterozygosity within replicates and the variance of gene frequencies among replicates.