FIGURE 14.14. The breeding value of an individual can be measured from the average trait value in offspring produced when it mates randomly with the rest of the population. The top curve shows the distribution of the trait in the population. An individual with phenotype $P$ is chosen. It has an underlying genotypic value $G$, which is the average trait value of a set of identical genotypes, reared under the same conditions (middle curve). The chosen individual is mated with others at random, producing the distribution of offspring shown in the bottom curve. The difference between the mean of these offspring and the population mean (dashed line) is half the breeding value ($A/2$); the factor of $1/2$ arises because offspring get only one-half their genes from the chosen parent.