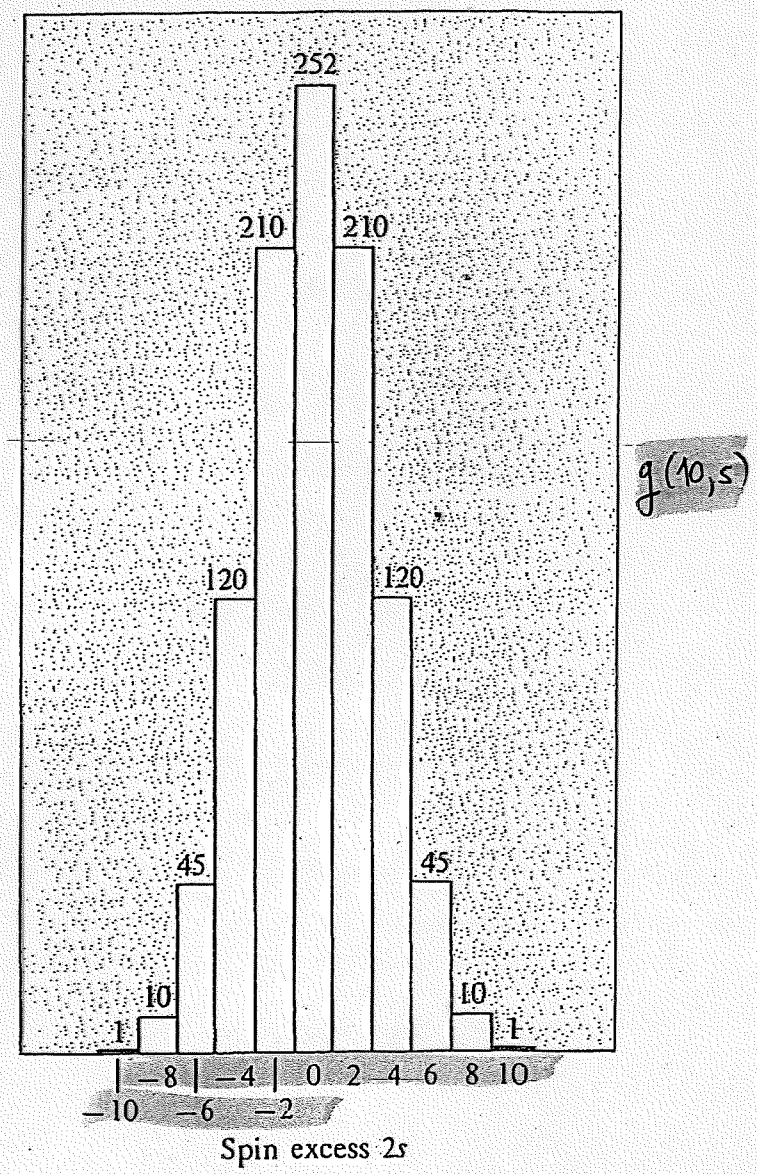

Figure 1.6 Number of distinct arrangements of $5 + s$ spins up and $5 - s$ spins down. Values of $g(N,s)$ are for $N = 10$, where $2s$ is the spin excess $N\uparrow - N\downarrow$. The total number of states is

$$2^{10} = \sum_{s=-5}^{5} g(10,s).$$

The values of the g's are taken from a table of the binomial coefficients.

Binary Alloy System

To illustrate that the exact nature of the two states on each site is irrelevant to the result, we consider an alternate system—an alloy crystal with N distinct sites, numbered from 1 through 12 in Figure 1.8. Each site is occupied by either an atom of chemical species A or an atom of chemical species B, with no provision for vacant sites. In brass, A could be copper and B zinc. In analogy to (3), a single state of the alloy system can be written as

$$A_1B_2B_3A_4B_5A_6B_7B_8B_9A_{10}A_{11}A_{12}\cdots. \tag{18}$$