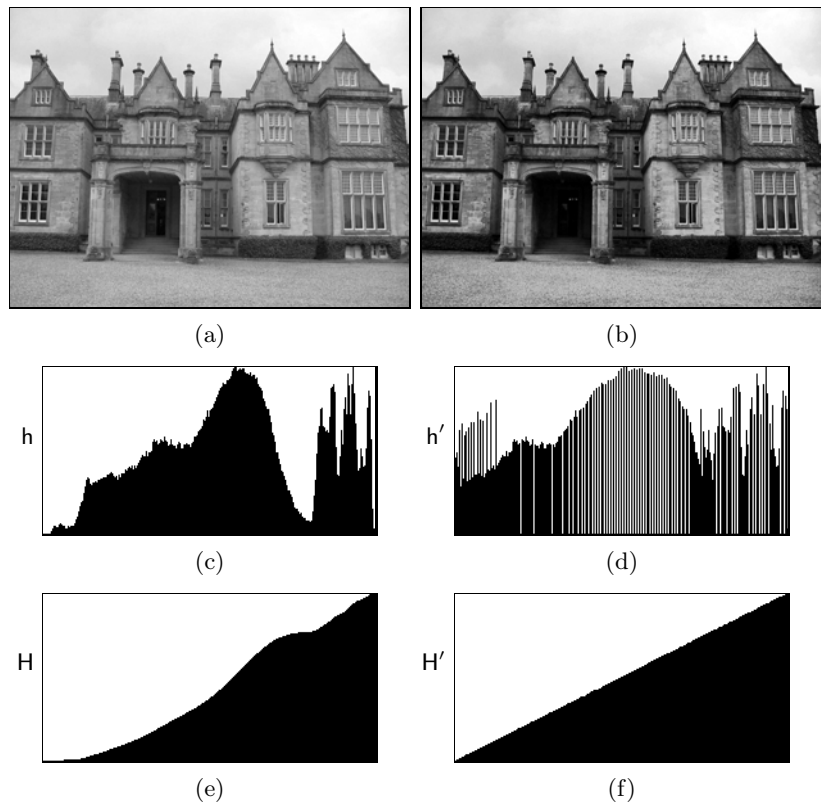


Fig. 5.10

Linear histogram equalization (example). Original image I (a) and modified image I' (b), corresponding histograms h , h' (c, d), and cumulative histograms H , H' (e, f). The resulting cumulative histogram H' (f) approximates a uniformly distributed image. Notice that new peaks are created in the resulting histogram h' (d) by merging original histogram cells, particularly in the lower and upper intensity ranges.



ImageJ by default⁵ cumulates the *square root* of the histogram entries using a modified cumulative histogram of the form

$$\tilde{H}(i) = \sum_{j=0}^i \sqrt{h(j)}. \quad (5.12)$$

5.6 Histogram Specification

Although widely implemented, the goal of linear histogram equalization—a uniform distribution of intensity values (as described in the previous section)—appears rather ad hoc, since good images virtually never show such a distribution. In most real images, the distribution of the pixel values is not even remotely uniform but is usually more similar, if at all, to perhaps a Gaussian distribution. The images produced by linear equalization thus usually appear quite unnatural, which renders the technique practically useless.

⁵ The “classic” (linear) approach, as described in Eqn. (4.5), is used when simultaneously keeping the Alt key pressed.