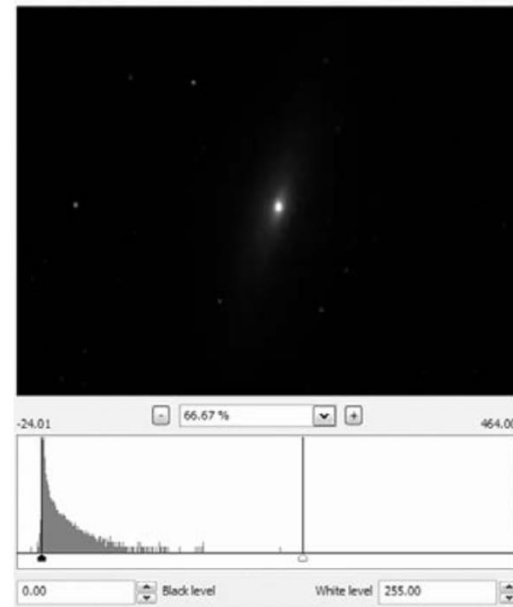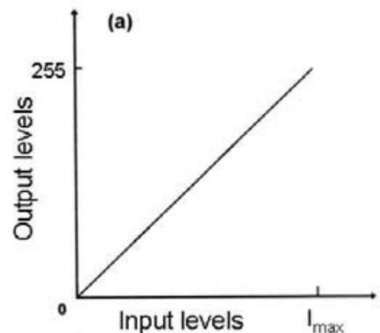# McLeanゼミ

Section 10 Exercise 2

小島裕樹

2. Explain the difference between false-color used to enhance faint optical images and false-color used to illustrate the appearance of a nebula at three near-infrared (invisible) wavelengths.

false-color used to enhance faint optical images

- When you want to see the image, the simplest approach is to give each pixel a "level" (and a color) depending on the intensity.

- For example, the weakest intensity (I_{min}) is set to correspond to 0 (black) and the brightest signal (I_{max}) assigned 255 (white) then all intermediate signals are binned into the intermediate levels. ←linear mapping

- If $I_{max} \gg I_{min}$, then the linear mapping does not have good contrast.

2. Explain the difference between false-color used to enhance faint optical images and false-color used to illustrate the appearance of a nebula at three near-infrared (invisible) wavelengths.

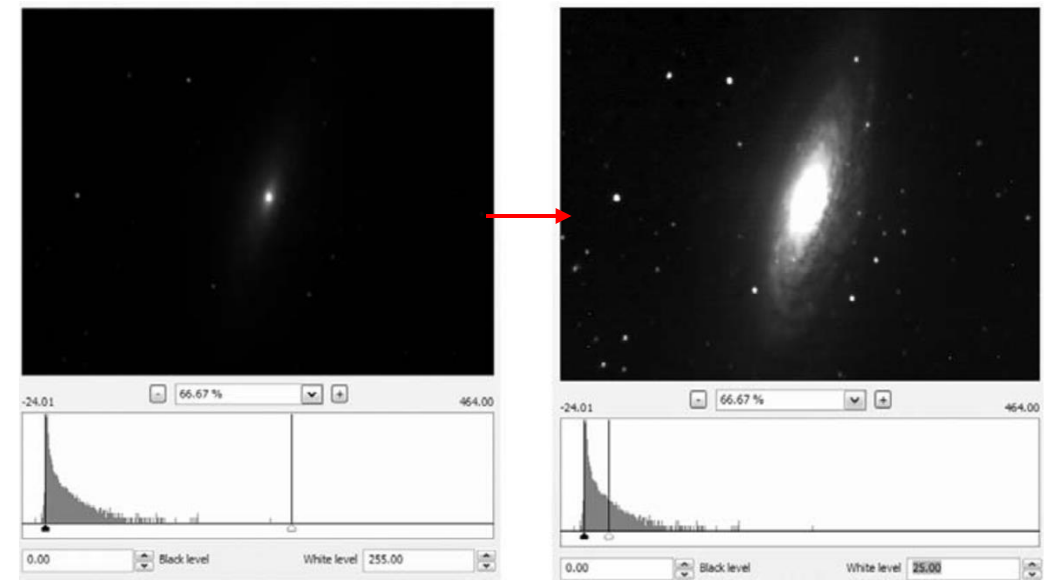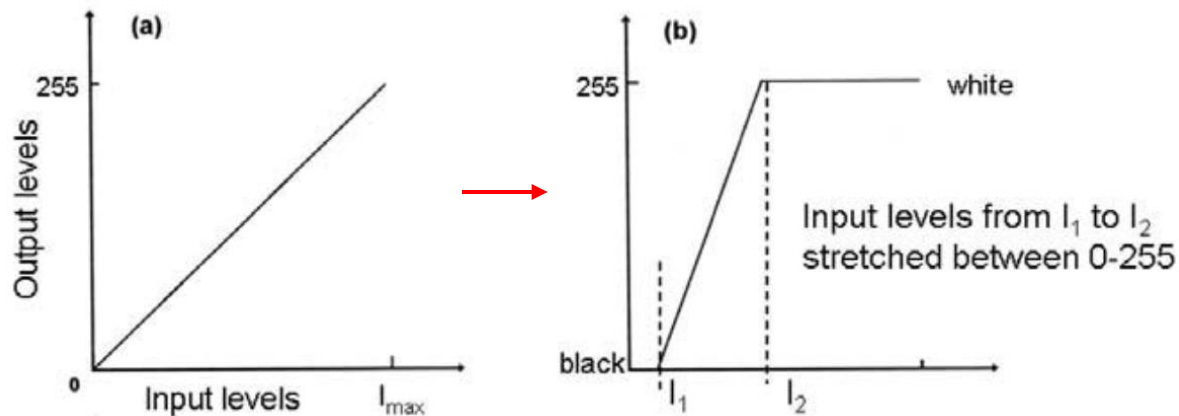false-color used to enhance faint optical images

- In such a case, by reducing the intensity level assigned to 255 (white), we can increase the contrast of faint objects.

- When the distribution of brightness in an image is represented by arbitrary colors it is known as a "false-color" representation.

2. Explain the difference between false-color used to enhance faint optical images and false-color used to illustrate the appearance of a nebula at three near-infrared (invisible) wavelengths.

false-color used to illustrate the appearance of a nebula at three near-infrared (invisible) wavelengths

- Many spectacular color images are often represented implicitly as natural color, but if you could really see these objects with your eyes they would simply not appear as colorful as shown. ←false color

- By adjusting the contrast of three images at three wavelengths until they are equal and then changing each brightness level, the color of the image can be balanced for several purposes such as to enhance nebular emission light like pink H-alpha and green oxygen, against starlight .

- Near-infrared images are color-translated by making the J, H, and K wavelengths correspond to blue, green, and red colors.

Credit:Philippe Bernhard

The "North America" and "Pelican" nebulae in real colors (left) and in false colors (right)