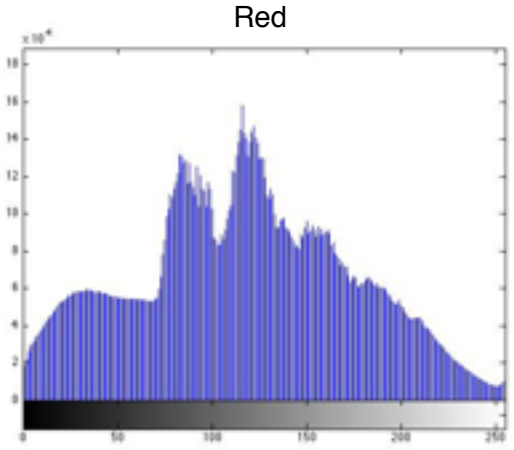
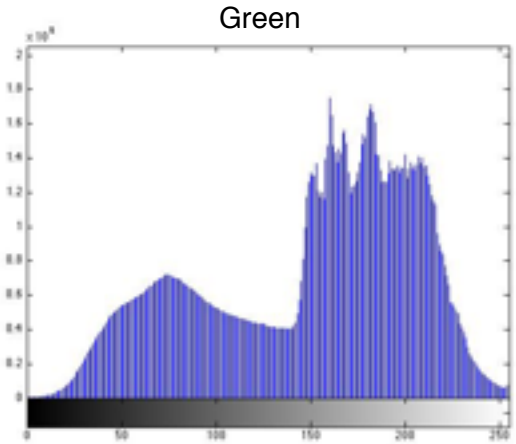
Lynne Lammers
9/17/14
EECS 448
Lab 3

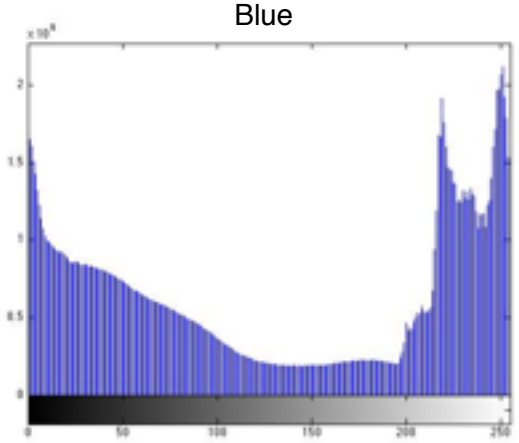
The best picture from photomatix initially (for step 3) was produced with exposure values -1, 0, 2, and 5 for frames 1-4 respectively. The default was the most visually pleasing.

The histograms for this image are shown below:

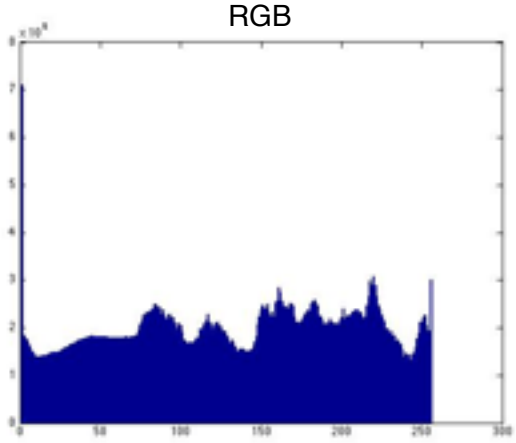




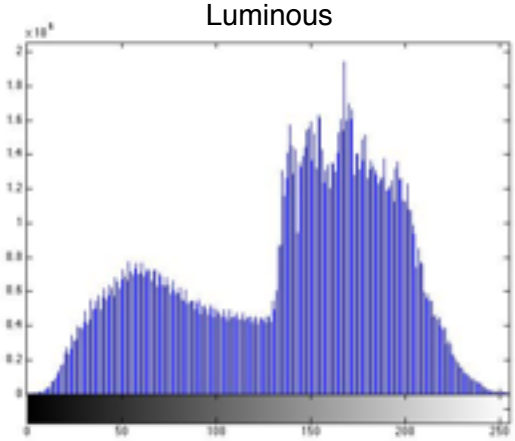
Blue



RGB



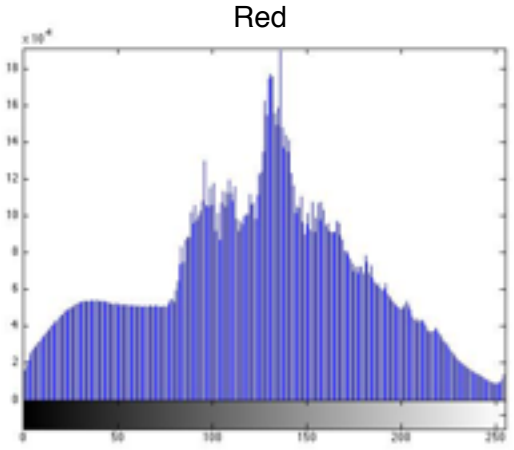
Luminous

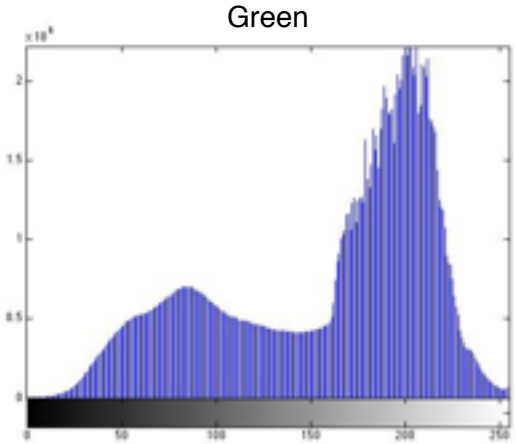


Step 3 Photo Histogram Statistics					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	116.89	150.13	129.5	132.18	137.96
Variance	3201.6	3122.1	8882.7	5256.6	3000.1
Minimum	0	0	0	0	0
Maximum	255	255	255	255	255
Median	117	164	115	136	151
1st Quartile	79	104	37	73	93
3rd Quartile	157	194	226	195	180

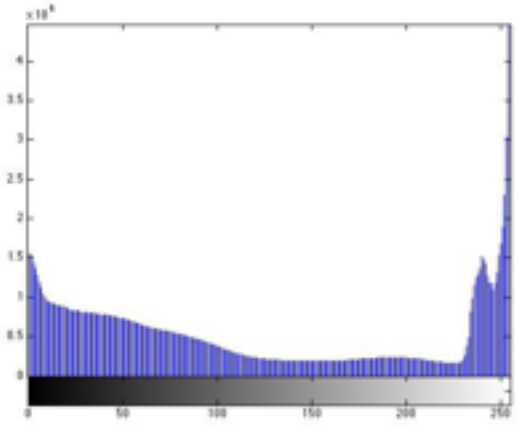
To improve the image in step 4, I slightly decreased the strength to 65, kept the saturation at 46, increased tone compression to 1, decreased detail contrast to -0.7, and increased the lighting adjustments to 3.0.

The histograms for this image are shown below:

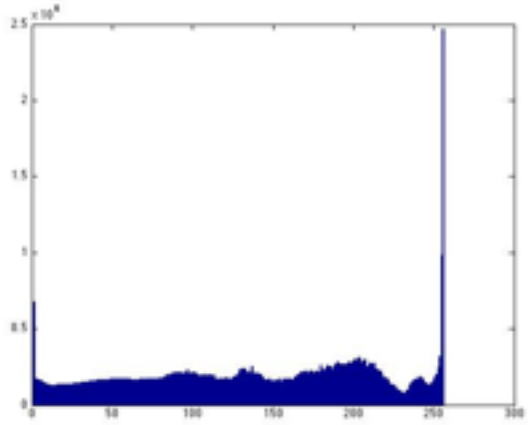




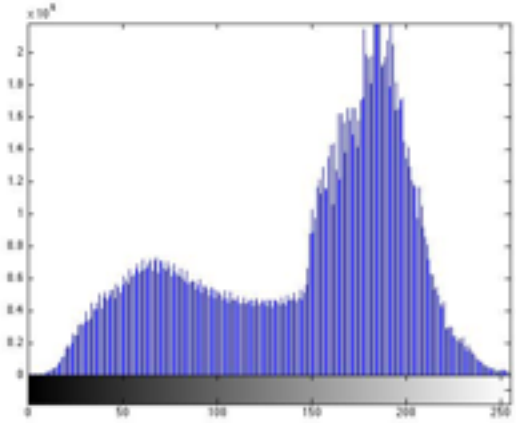
Blue



RGB



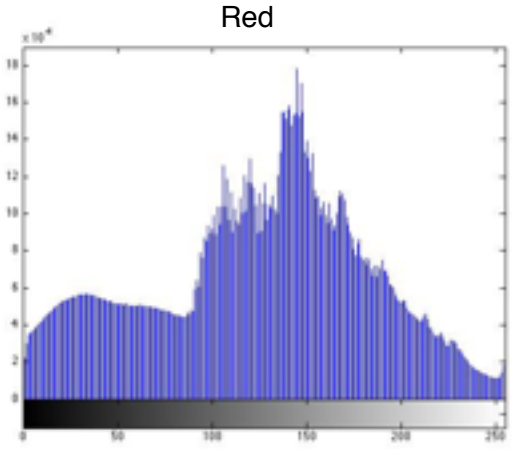
Luminous

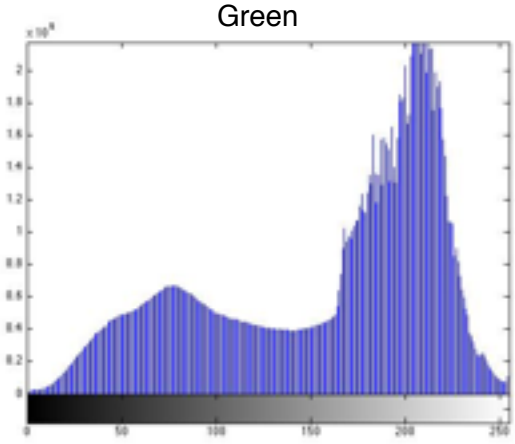


Step 4 Photo Histogram Statistic					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	122.98	158.79	137.23	139.67	145.74
Variance	3157.7	3167.5	1000.8	5661.1	3068.8
Minimum	0	0	0	0	0
Maximum	255	255	255	255	255
Median	127	180	122	143	165
1st Quartile	87	111	39	78	99
3rd Quartile	162	203	249	202	188

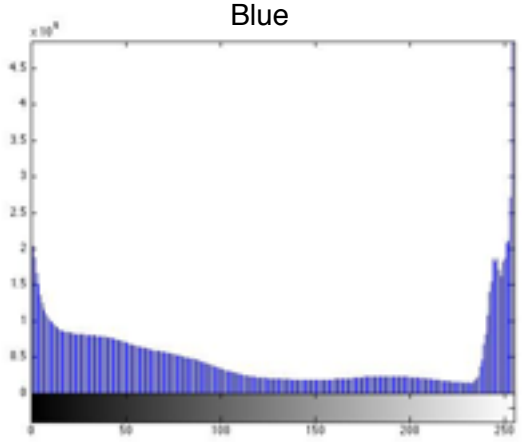
To improve the image further in step 5, I increased Smooth Highlights to 20, increased White Point to 0.401%, increased Black Point to 0.062%, left Gamma at 1.00, and increased Temperature to 1.0.

The histograms for this image are shown below:

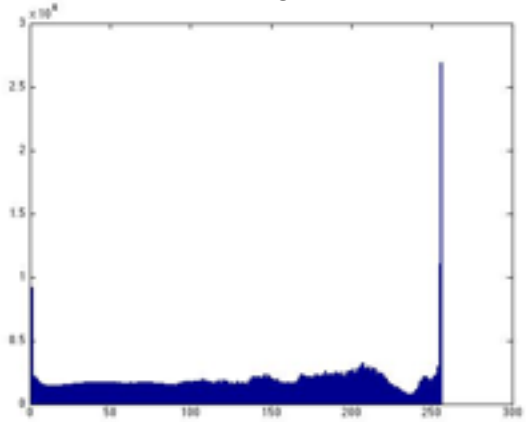




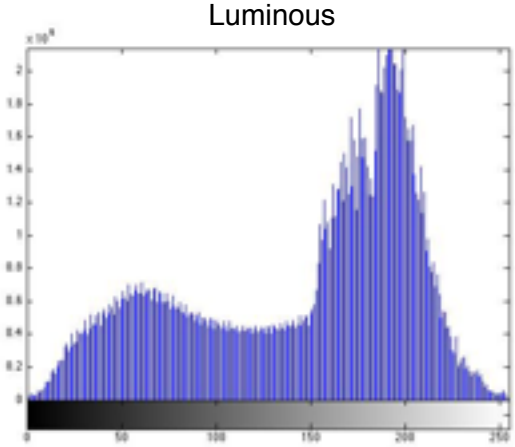
Blue



RGB



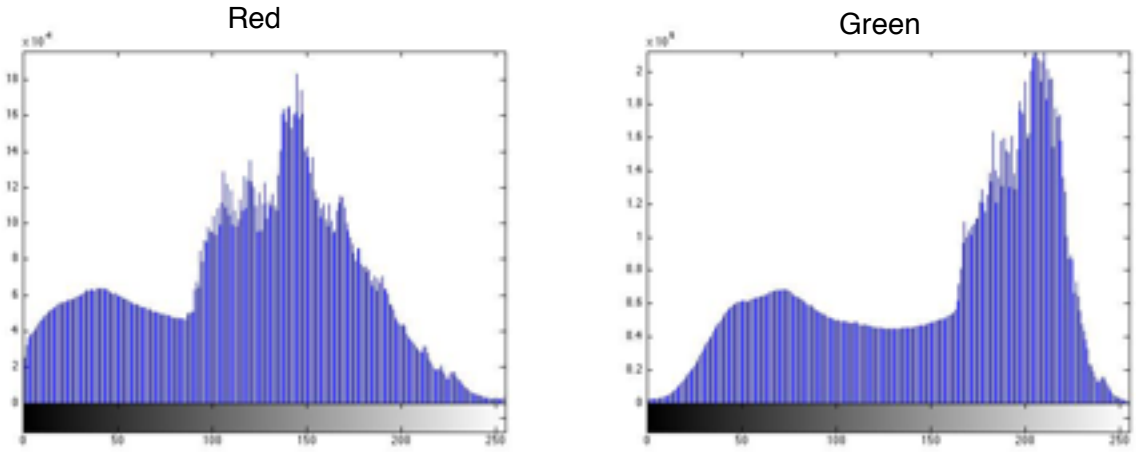
Luminous



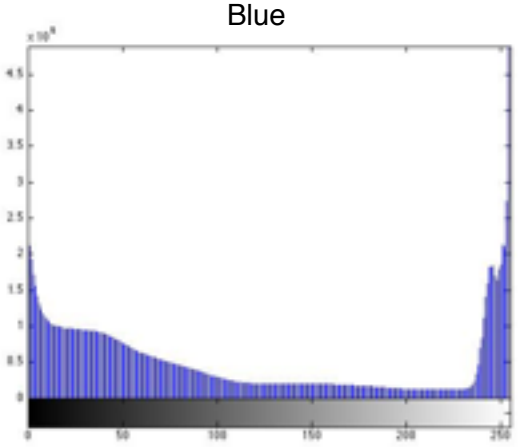
Step 5 Photo Histogram Statistic					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	125.34	148.16	135.1	139.54	145.84
Variance	3419.3	3714.7	1041.6	6039.4	3560.2
Minimum	0	0	0	0	0
Maximum	255	255	255	255	255
Median	132	181	116	146	167
1st Quartile	88	105	34	73	94
3rd Quartile	166	207	251	205	193

Using selection mode for step 6, I replaced the rocks from the image in step 5 with the rocks from Frame 3.

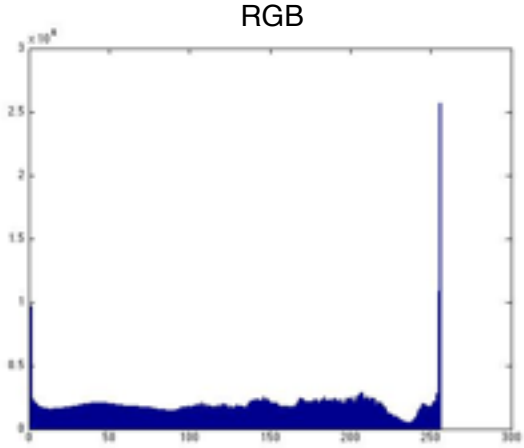
The histograms for this image are shown below:



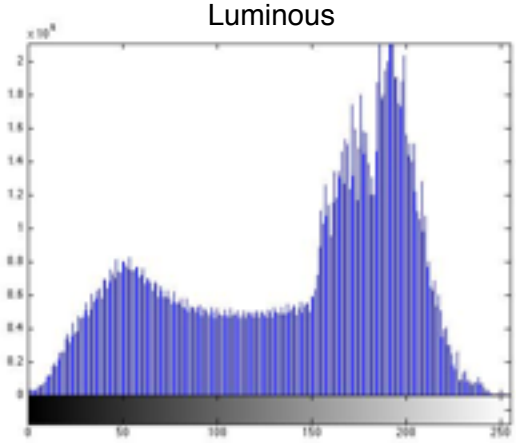
Blue



RGB



Luminous

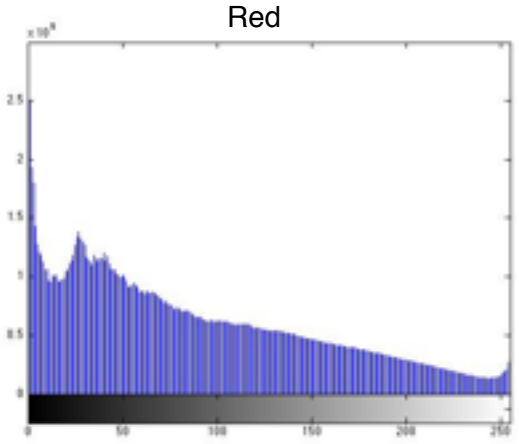


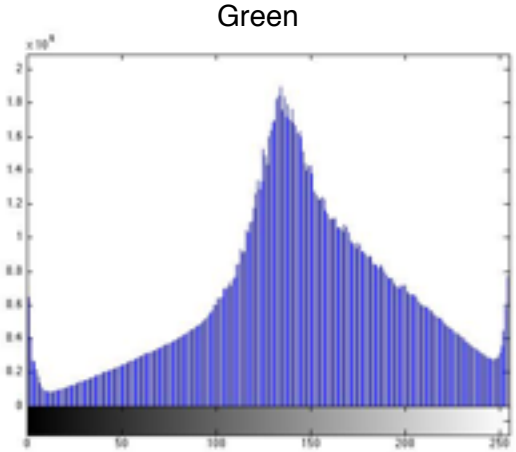
Step 6 Photo Histogram Statistic					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	118.6	152.23	130.16	133.66	139.78
Variance	3054.3	3771.3	1069.7	6035.5	3577.2
Minimum	0	0	0	0	0
Maximum	255	255	255	255	255
Median	127	175	99	139	161
1st Quartile	79	97	30	65	86
3rd Quartile	158	204	251	199	190

For step 9, I created four unnatural images. For the first unnatural image, I started with the Grunge image, which has very high strength, color saturation, tone compression, and detail

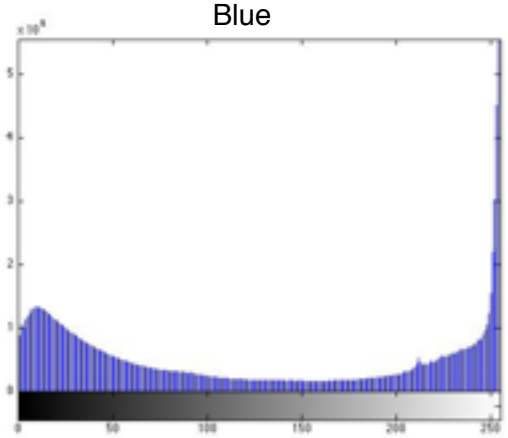
contrast, and very little smoothing of highlights. I increased the white point to 1.8% and the black point to 5.047%. I also set the temperature to -10.

The histograms for this image are below:

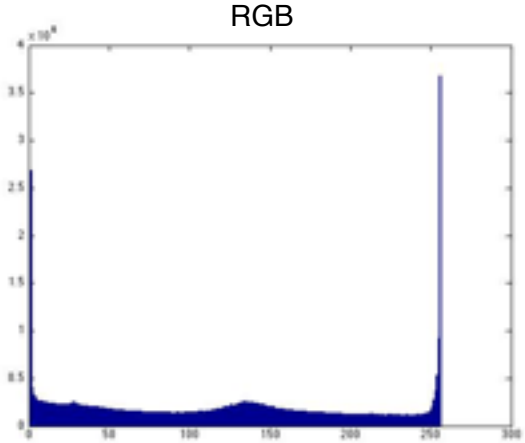




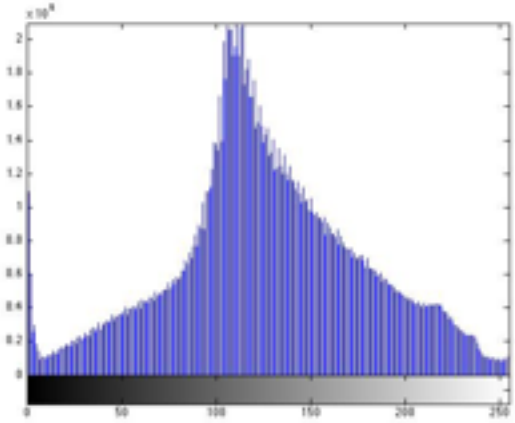
Blue



RGB



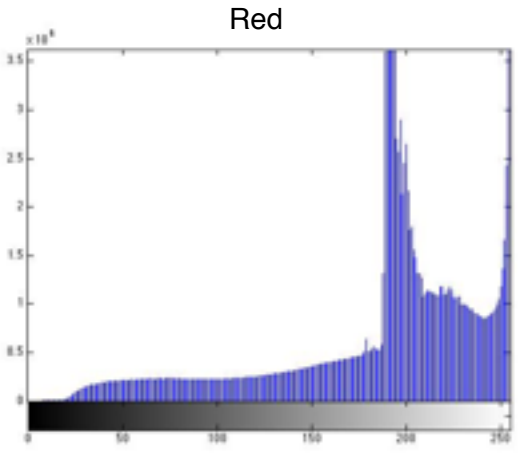
Luminous

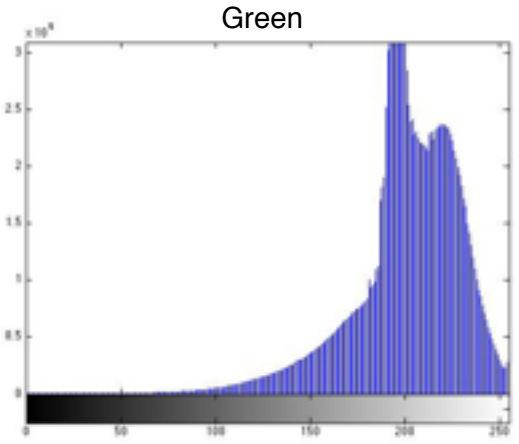


Step 9 Photo 1 (Based on Grunge)					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	80.03	145.44	142.37	122.62	125.54
Variance	4698	3137	10800	7120	2712
Minimum	0	0	0	0	0
Maximum	255	255	255	255	255
Median	63	144	164	124	122
1st Quartile	23	117	30	43	98
3rd Quartile	127	182	253	193	159

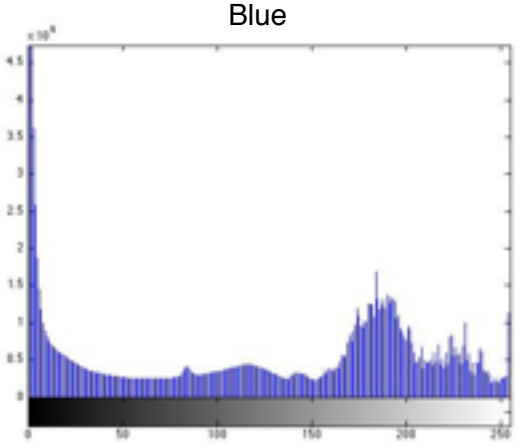
For the second unnatural image, I started with the Creative 2 image, which has very low detail contrast, very high strength, and very high tone compression. I increased the temperature to 9.6 and decreased smooth highlights to 5.

The histograms for this image are below:

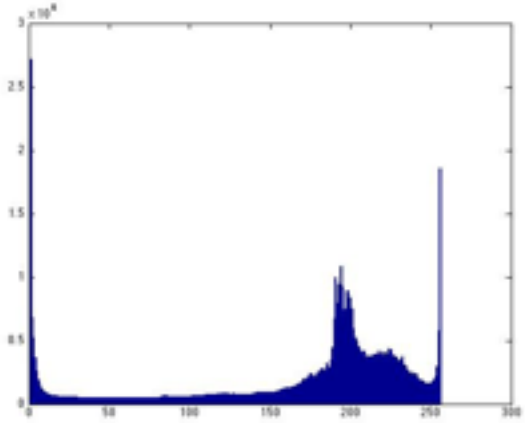




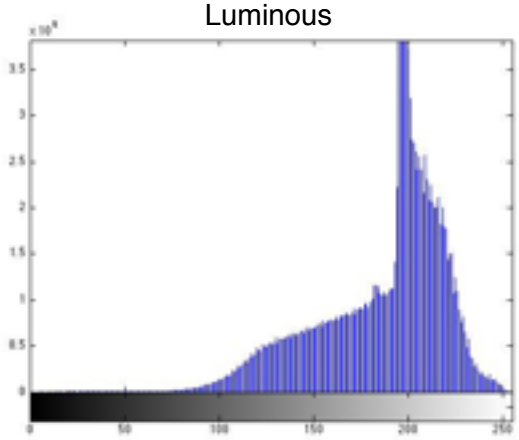
Blue



RGB



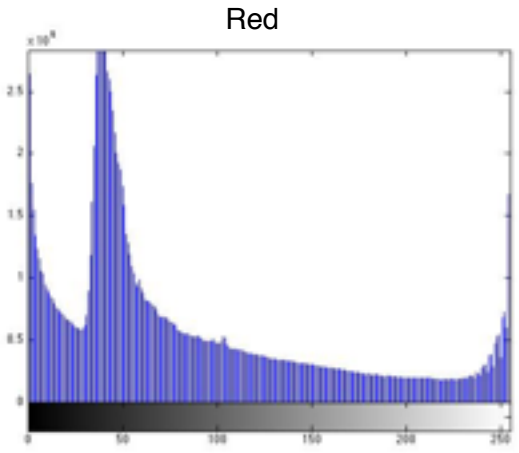
Luminous

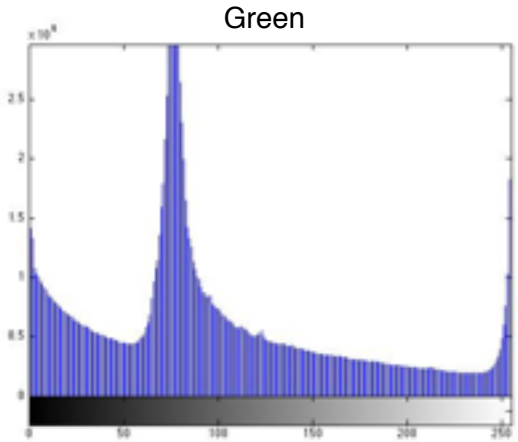


Step 9 Photo 2 (Based on Creative 2)					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	192.91	201.05	103.74	165.90	187.97
Variance	2930.3	753.9	7964.5	5825.8	934.1
Minimum	8	0	0	0	6
Maximum	255	255	255	255	254
Median	199	201	106	193	196
1st Quartile	181	191	3	138	173
3rd Quartile	233	220	188	217	207

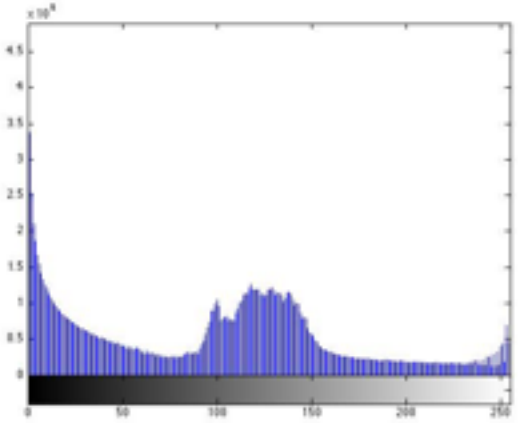
For the third unnatural photo, I started with the Surreal image, which has very high strength, tone compression, and detail contrast, as well as a max white point. I increased the temperature to 4.1 and the black point to 1.986%.

The histograms for this image are shown below:

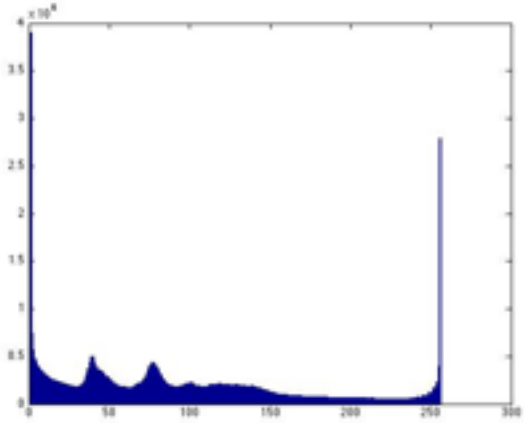




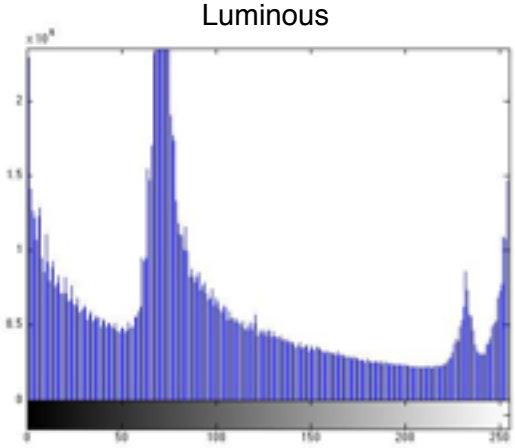
Blue



RGB



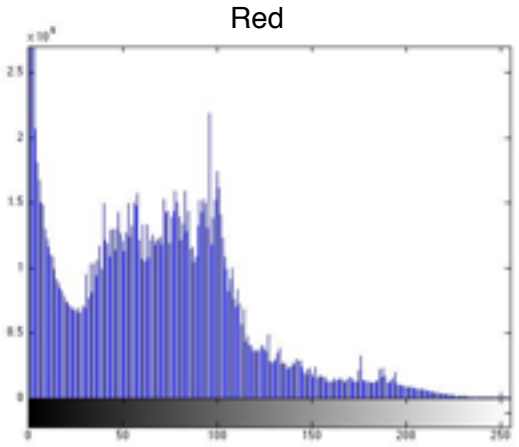
Luminous

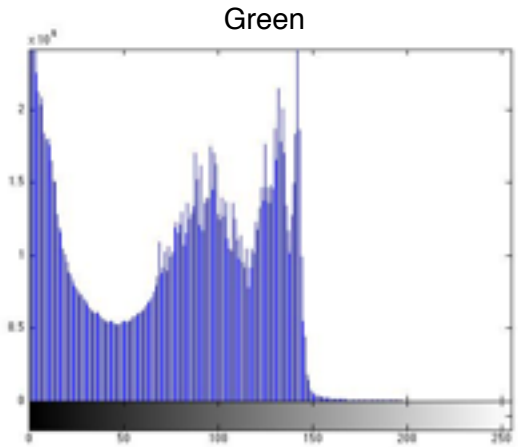


Step 9 Photo 3 (Based on Surreal)					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	88.00	107.33	85.17	93.50	99.13
Variance	6073.4	5763.3	5839.4	5989.0	5261.7
Minimum	0	0	0	0	0
Maximum	255	255	255	255	255
Median	54	83	91	77	76
1st Quartile	36	61	7	32	54
3rd Quartile	130	153	135	138	139

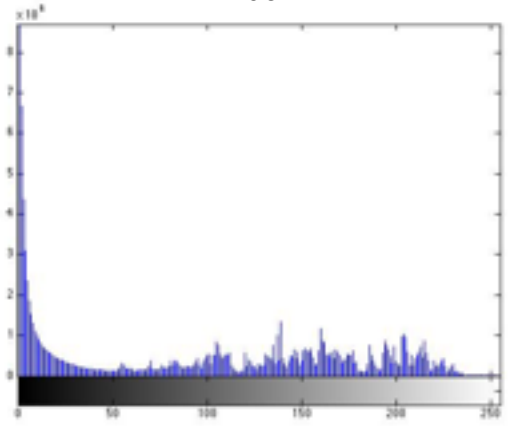
Finally, for the fourth unnatural photo, I started with deep which has high tonal range compression and low brightness. I increased the color temperature and color saturation to 10. I also increased the contrast adaptation to 7.9 and decreased the brightness to -8.2.

The histograms for this image are below:

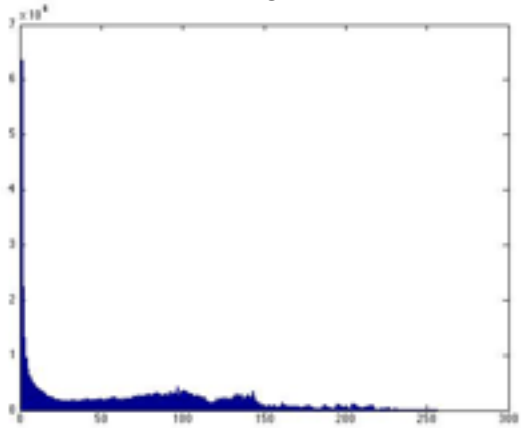




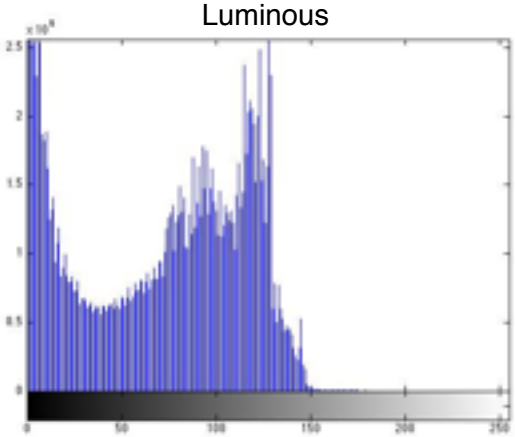
Blue



RGB



Luminous



Step 9 Photo 4 (Based on Deep)					
	Red	**Green**	**Blue**	**RGB**	**Luminous**
Mean	63.48	75.19	63.77	67.48	70.45
Variance	2232.7	2237.2	6138.0	3565.7	2023.5
Minimum	0	0	0	0	0
Maximum	255	197	255	255	197
Median	62	84	8	63	79
1st Quartile	22	26	0	7	23
3rd Quartile	94	118	139	109	111

There are several differences between the various unnatural photos, but there are some patterns that emerge that distinguish them form the more natural photos. One obvious difference is that the natural photos have much more balanced histograms. In particular, if you compare the luminous histograms for the natural versus unnatural photos, you can see that in the natural histograms, there are many mid-level values with more gradual peaks, whereas in the unnatural histograms, there are much steeper peaks and the values are less evenly distributed.

This is also reflected when you look at the first quartiles, medians, and third quartiles for these images. In the natural images, the medians mostly fall in the mid 100's, the first quartile varies between about 35 and 100, and the third quartile falls in the upper 100's or lower 200's. In the unnatural images, there is a lot more variation. The medians can be quite low, as in the last two images, or vary quite a bit between colors, as in the first two images. The first and third quartiles also vary a lot. In the first unnatural image, they span a wide range. In the second, they are quite high. In the third and fourth images, they are very low. It is clear that the medians and quartiles of the unnatural images vary much more, meaning that colors are less evenly distributed along the range than in the natural images.

The means tell a similar story. The natural photos tend to have means that are near the middle of the possible range (0-255) and all the colors tend to have similar means. For example, the final natural photo has means ranging from 118 - 152. In the unnatural photos, the means sometimes vary greatly between colors or are not close to the middle of the range. The first unnatural photo has a low mean value for red compared to the other means. The second has very high means for red and green (193 and 201) and a low mean for blue at 103. The third and fourth photos have much lower means overall. It appears that a having a small range of means across that are near the middle of the possible range of values corresponds to more natural photos, whereas a bigger range between means for colors or much lower or higher means correspond to unnatural photos.

Overall, the most consistent difference between the natural and unnatural images is the distribution and range of the values for each color. This can be seen in the histograms where unnatural photos have values that are clustered and not evenly distributed or have very sharp peaks. It can also be seen by looking at the mean, median, and first and third quartiles. Unnatural photos may have a wide range of means or have low or high means. They may also have varying medians between colors, or unevenly distributed first and third quartiles.