In [5]:

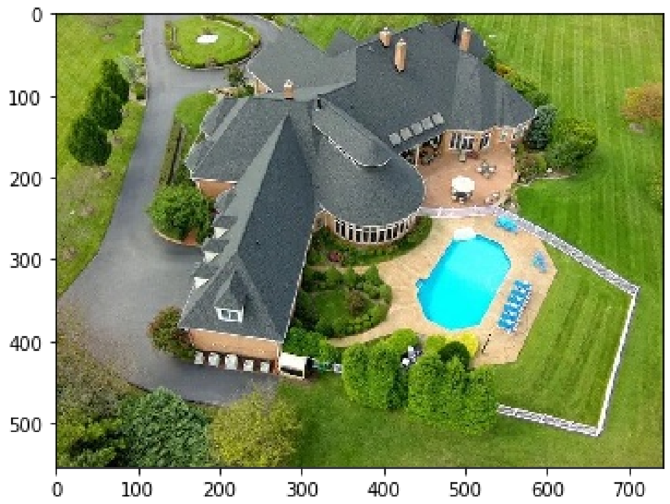
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
from skimage.io import imread, imshow
```

In [9]:

```
path = 'C:/Users/Gautam/Desktop'
```

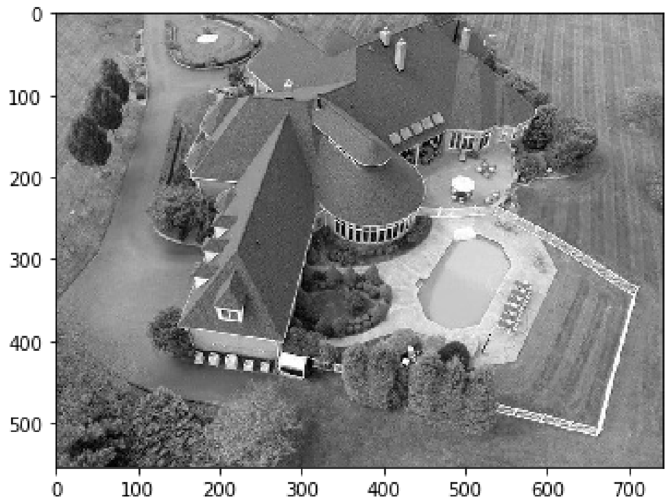
In [10]:

```
image1 = imread('{}/image.jpg'.format(path))
imshow(image1);
```



In [11]:

```
image2 = imread('{}/image.jpg'.format(path), as_gray=True)
imshow(image2);
```



In [12]:

```
print(image1.shape)
print(image2.shape)
```

```
(554, 743, 3)
(554, 743)
```

In [19]:

```
image1.shape
```

Out[19]:

```
(554, 743, 3)
```

In [23]:

```
features = np.reshape(image1, (554*743*3))
```

In [24]:

```
features.shape, features
```

Out[24]:

```
((1234866,), array([205, 220, 135, ..., 136, 141,  57], dtype=uint8))
```

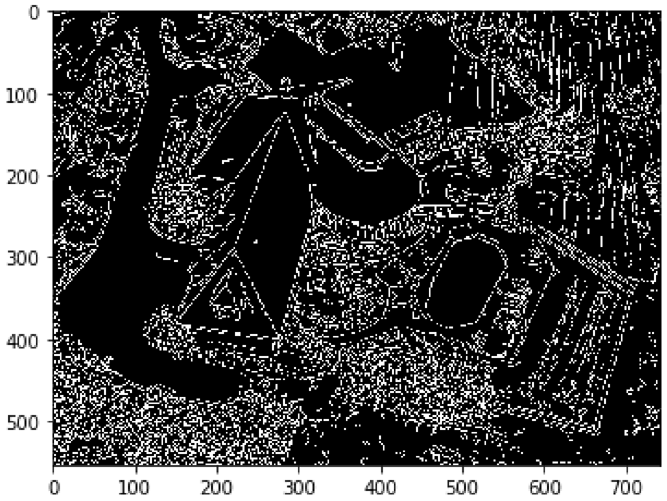
edge feature extraction.

In [27]:

```
from skimage import filters
from skimage.feature import canny
```

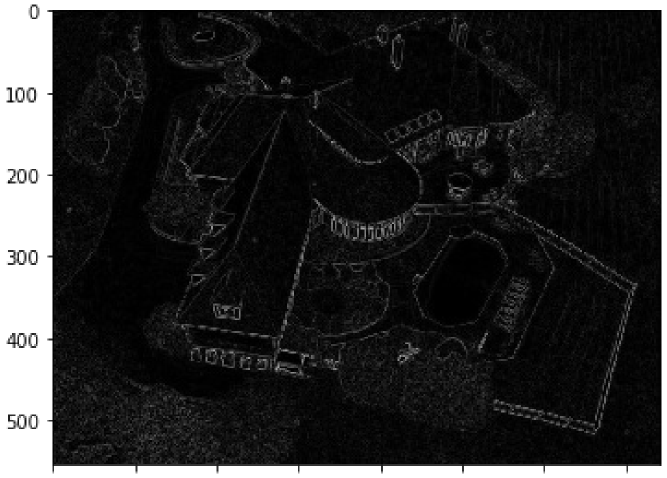
In [33]:

```
# Apply Canny detector
coins_edges = canny(image2)

# Sobel Kernel
ed_sobel = filters.sobel(image2)

imshow(coins_edges, cmap='gray');
```



In [34]:

```
imshow(ed_sobel, cmap='gray');
```



There are many other kernels for edge feature extraction but these three are the most used ones.

Region-Based Segmentation

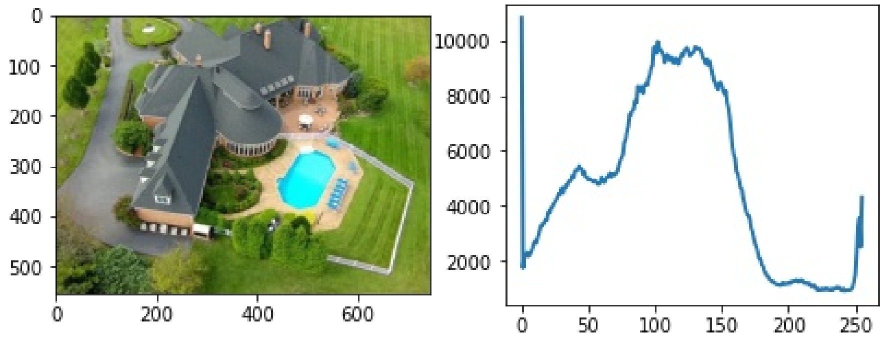
In [40]:

```
from skimage.exposure import histogram
hist, hist_centers = histogram(image1)
fig, axes = plt.subplots(1, 2, figsize=(8, 3))
axes[0].imshow(image1, cmap=plt.cm.gray)
axes[1].plot(hist_centers, hist, lw=2)
```

```
<ipython-input-40-ce9d028ec352>:2: UserWarning: This might be a color image. The histogra
m will be computed on the flattened image. You can instead apply this function to each co
lor channel.
  hist, hist_centers = histogram(image1)
```

Out[40]:

```
[<matplotlib.lines.Line2D at 0x208d8720bb0>]
```

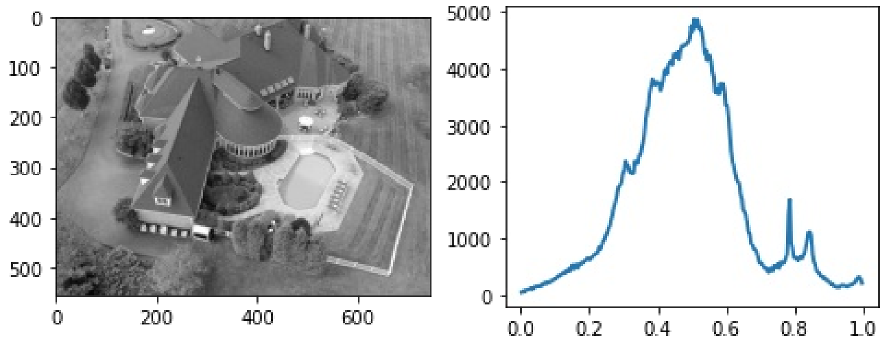


In [39]:

```
from skimage.exposure import histogram
hist, hist_centers = histogram(image2)
fig, axes = plt.subplots(1, 2, figsize=(8, 3))
axes[0].imshow(image2, cmap=plt.cm.gray)
axes[1].plot(hist_centers, hist, lw=2)
```

Out[39]:

```
[<matplotlib.lines.Line2D at 0x208d8352370>]
```



In [41]:

```
import cv2
```

Splitting the image into RGB and performing PCA

In [59]:

```
blue, green, red = cv2.split(image1)
```

In [60]:

```
from sklearn.decomposition import PCA
```

In [117]:

```
pca = PCA(300)
```

In [118]:

```
blue_transformed = pca.fit_transform(blue)
green_transformed = pca.fit_transform(green)
red_transformed = pca.fit_transform(red)
```

In [119]:

```
red_inverted = pca.inverse_transform(red_transformed)
green_inverted = pca.inverse_transform(green_transformed)
blue_inverted = pca.inverse_transform(blue_transformed)
```

In [120]:

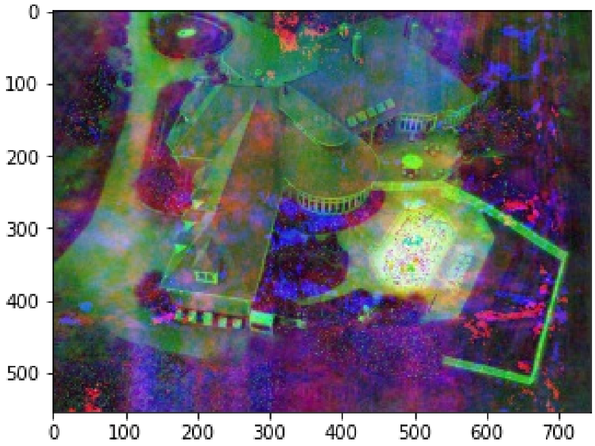
```
#compressing the image

img_compressed = (np.dstack((green_inverted,red_inverted,blue_inverted))).astype(np.uint
8)
```

In [121]:

```
plt.imshow(img_compressed)
```

Out[121]:

```
<matplotlib.image.AxesImage at 0x208ddee0a30>
```



In [ ]:

```
```