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HW#5  
CSCI-437

Solution description:

First, I create an array to hold the names of the image files, then I read the first image. Next I choose four source points from the first input image and four destination points using the scale given (1pixel = 0.5cm). I store these into two separate arrays. Then I find the homography of these two arrays. Next, I create a blank canvas (np.zeros) with certain width and height values. I then warped the input image, the homography, the width, and the height. After this I call the fuse\_color\_image function that is defined at the beginning of the program to fuse the warped image onto the canvas. This will results in an orthophoto.

To stitch the rest of the images onto the orthophoto, I use a for loop. I read in the next image and convert it and the previous image into two separate gray images. I then create an ORB detector object and a matcher object. Next I call the detectAndCompute function twice, once for the current gray image and one for the previous gray image. Then I use knnMatche to find matches between these two images. The distance I use to determine if a match is good is lower than 0.8. I then convert the source points array and the destination arrays into float values with the keypoint matches and reshape the arrays. The next thing is to find the homography of these two new arrays. I then multiply the previous homography with the current homography to find a new homography. Then I warped the current image and the new homography. Once again I call fuse\_color\_image to fuse the previous warped image and the current warped image. Finally, I have to update the current image variable, the warped image variable, and the homography variable for the next iteration. At the end of it all, after the for loop, I just write the warped image to produce the output image.

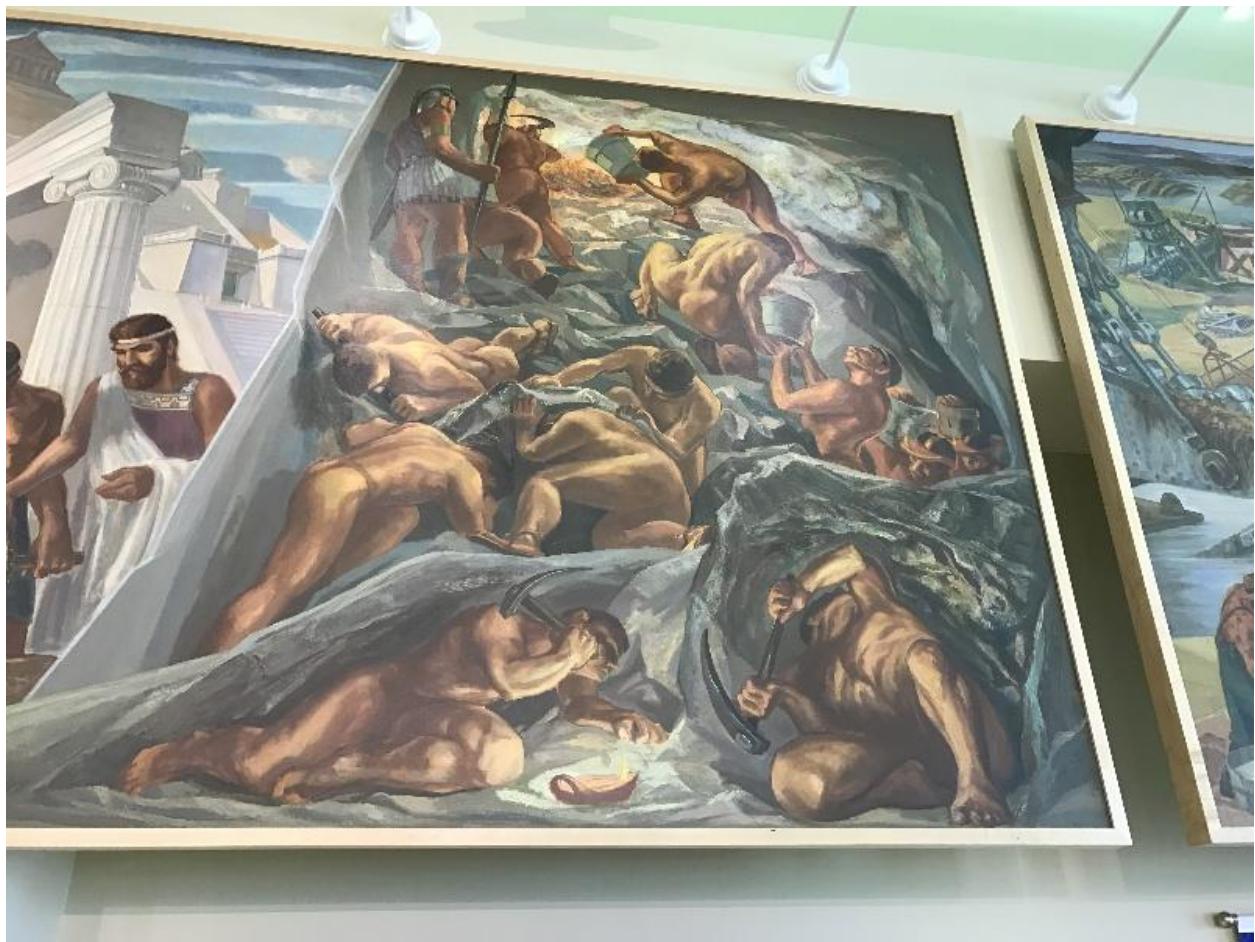
Mural input images:

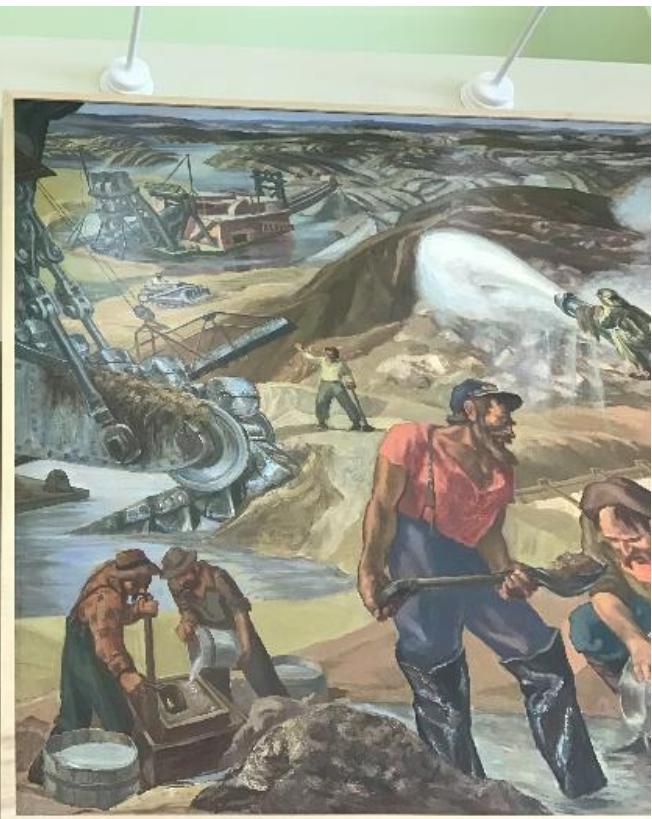
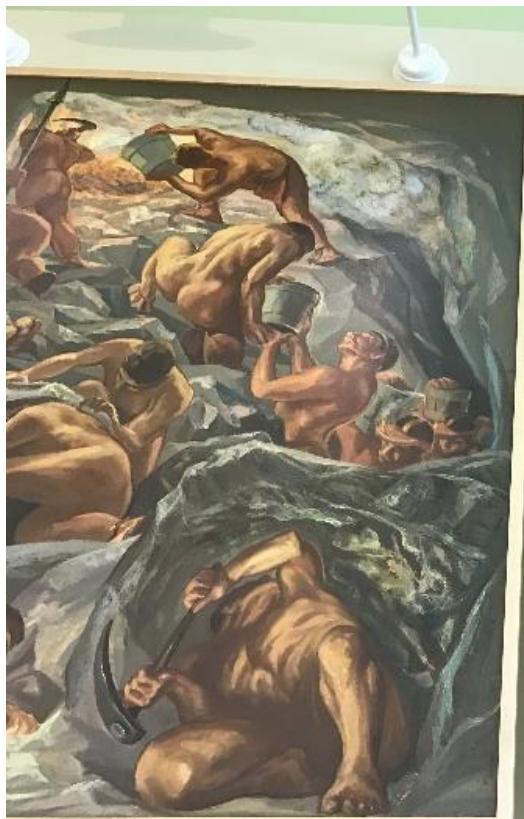
























Mural composite image:



My input images:



## GOLD

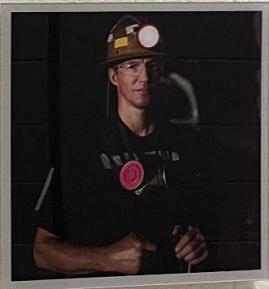
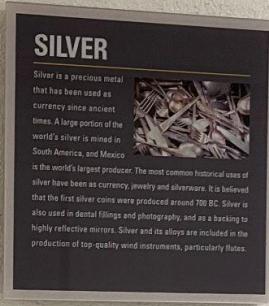
Gold has been found in many locations around the world, but South Africa was the leader in the gold-mining industry until recently. China, the United States and South Africa are currently vying for the top spot in the industry, with Australia and a handful of other countries close behind. Only platinum and diamonds are considered more valuable than gold. While gold is actually less abundant in the Earth's crust than even platinum, the even distribution of platinum means that gold is more likely to settle in deposits suitable for mining.

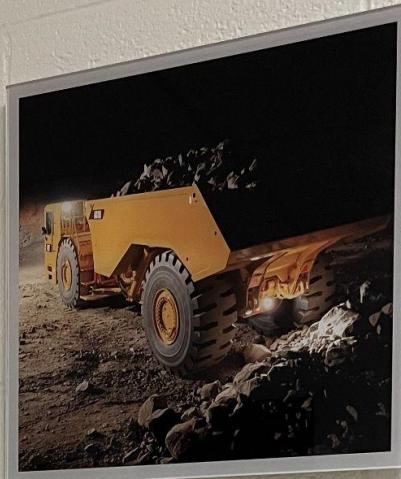


## SILVER

Silver is a precious metal that has been used as currency since ancient times. A large portion of the world's silver is mined in South America, and Mexico is the world's largest producer. Silver has been as currency since ancient times. A large portion of the world's silver is mined in South America, and Mexico is the world's largest producer. Silver has been used as currency since ancient times. A large portion of the world's silver is mined in South America, and Mexico is the world's largest producer. Silver has been used as currency since ancient times. A large portion of the world's silver is mined in South America, and Mexico is the world's largest producer.







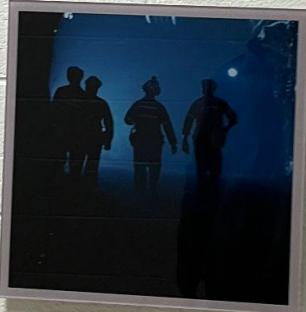


## NICKEL

The two largest nickel-producing countries in the world are Canada and Russia, who together make up as much as 70 percent of the world's nickel production.



Due to the process of its formation, nickel is almost always found with iron ore. A giant deposit of this nickel-iron combination is thought to make up the Earth's core. Nickel's primary application is as an alloy metal, used to make everything from magnets to stainless steel. However, the most notable application is the 5-cent U.S. coin appropriately named the nickel.



My composite image:

