

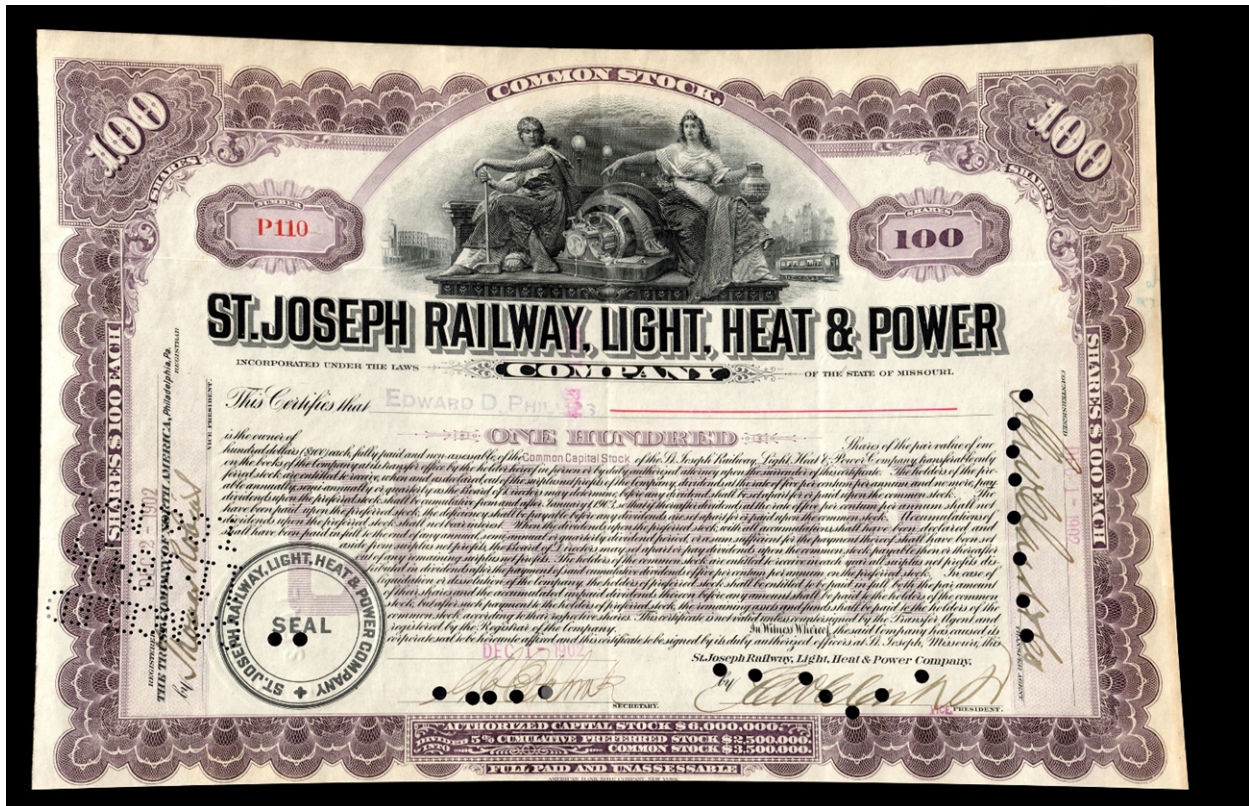
→ IMAGE MANIPULATION ←

Fix shapes using GIMP

I'm going to show how to remove distortion from images of certificates photographed with cameras or smartphones. These techniques are meant to be used in conjunction with techniques in other tutorials in this section on Image Manipulation. This tutorial shows you how to re-shape certificates using GIMP, a highly powerful FREE image editing software which competes with many excellent and pricey programs.

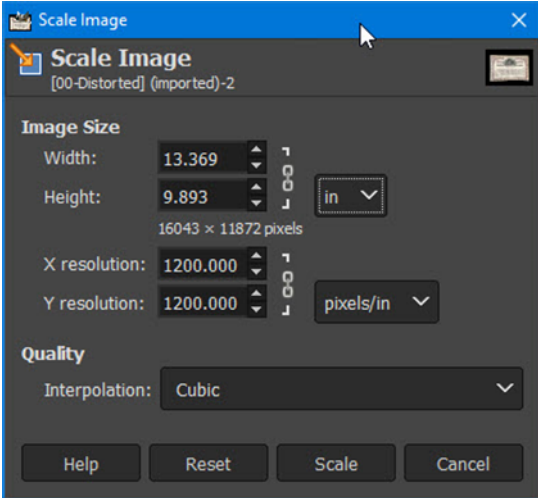
Here is an image similar to one we might take with a smartphone or camera. We are going to improve the appearance of a scanned image by removing the distortion.

Open the image in GIMP



Our file size is 21.4 megabytes. It will be a chore to work with an image of that size unless our computer has a lot of RAM and a really fast chip. Let's assess what we have.

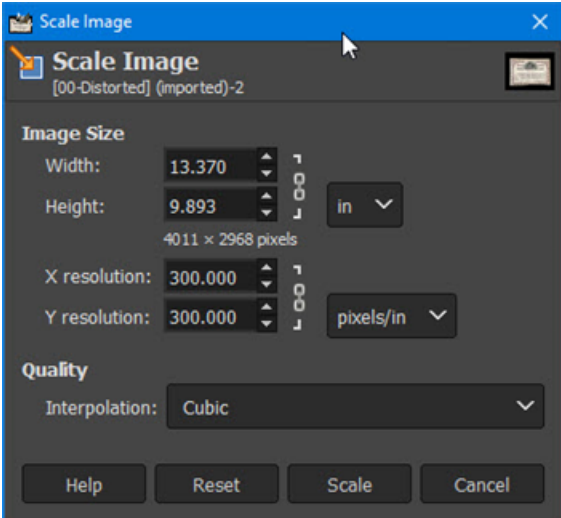
Click **Image > Scale Image** from the top menubar. A new panel opens to display size information.



We discover the image resolution is 1200 dpi. Ideally, we would like to drop that down to around 300 dpi to make it easier and faster to work with. Currently, each square inch has 1200 dots wide by 1200 dots high. That is 1,440,000 dots in a square inch compared to 90,000 per square inch at 300 dpi. That means our image has 16 times (!) more information than we need. Additionally, there is a lot of black around the image.

Let's change the resolution to 300 dpi. Record the size of the image in inches. (13.369" wide for our example.) If the Scale Image dialog box is set to pixels, change to inches.

Change either the "X resolution" or the "Y resolution" to "300." When we do that, note that the image size immediately changes to a number four times larger. Change the Width to the previous size (13.369) and click "Scale" to finalize.

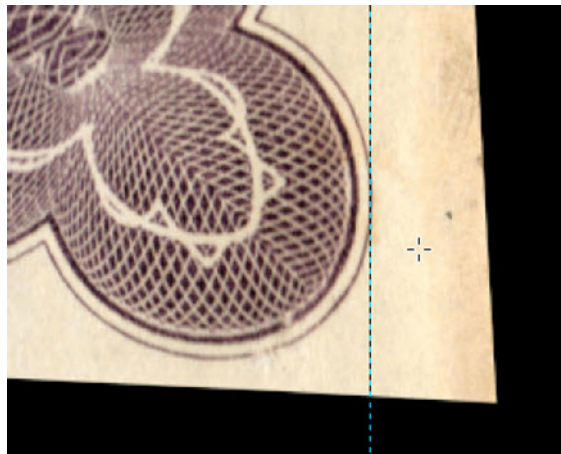


The image gets much smaller, so zoom in by holding down the Ctrl key and rolling the mouse wheel forward.

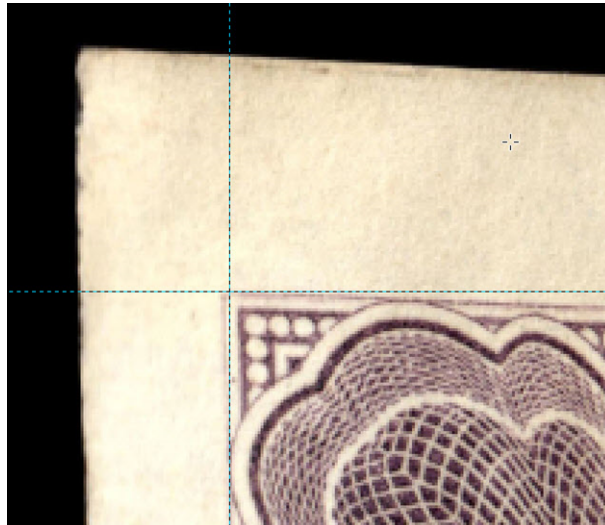
Start by making the corners of the border fit inside an imaginary rectangular box. Start by "pulling" a guideline out of the ruler at the left. Move the cursor to the left rule, click and drag a guideline out to near the left border of the image. Zoom in tight, and reposition the guideline so it just touches the left edge of the bottom "scalloped" border.



Use the bottom slider to pan the image to the bottom right corner. Pull in another vertical guideline and fit it against the right edge of the scalloped border.



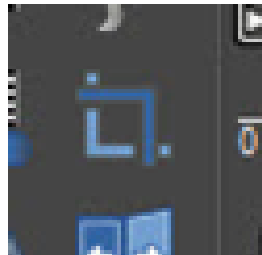
Zoom out to see the whole certificate. (Hold down the Ctrl key and roll the mouse wheel backwards.) We can see that the top left corner is the topmost point of the certificate image. Zoom into that corner and pull down a horizontal guideline from the top ruler. Place the guideline on the tip of the border.



Zoom out or click **View > Zoom > Fit image in Window**.



We have a lot of black margin around the image. Let's get rid of some of that. Click the pick tool (near the top right of the Toolbox) or click **Tool > Transform Tools > Crop** in the top menubar. Crop outside the image a short distance.



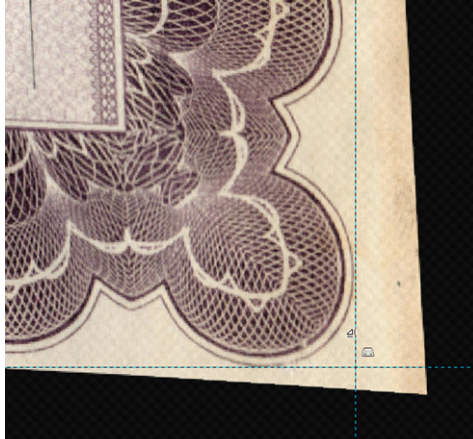
Now we will stretch the corners of the image to fit into the rectangular box we made with the guidelines. Click **Tools > Transform Tools > Perspective**. A new tool will appear that looks like this.



Additionally, a new "Perspective" dialog box opened at the top right that looks like this:



Ignore the box for the time being and move to the bottom right corner using the sliders. Click with the new tool near the bottom right corner and drag the corner of the certificate until the bottom and right borders line up with the blue guidelines like this:



Do not get in a hurry. Each movement we make is affecting about 8.3 million pixels. And since it is affecting almost every pixel in the image, most pixels will end up with new positions. Every time we adjust one corner, it will automatically affect the other three corners. Because the corners are moving, we may need to go around the image twice or even three times to place all the corners where they need to be. Patience is a virtue.

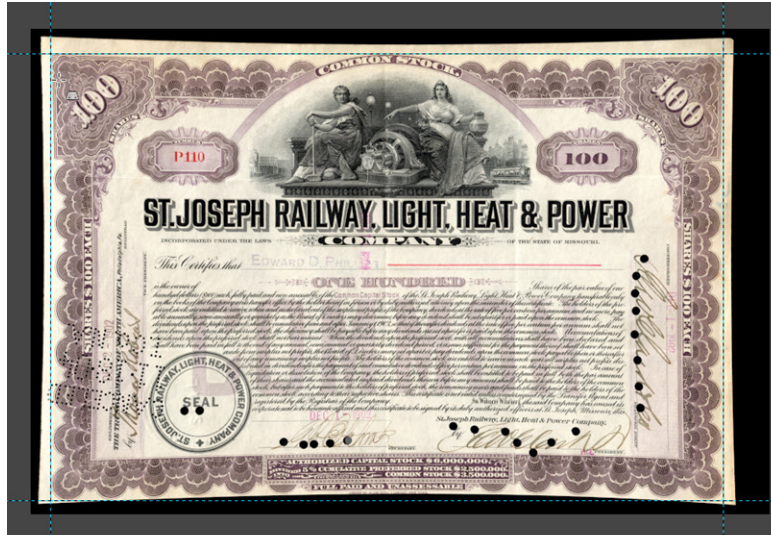
Proceed around the upper corners and then start re-adjusting. Any movements we make the second time will be small, if needed at all.

While we were positioning corners, values were changing in the Perspective dialog box. Go to that box now and click "Transform."



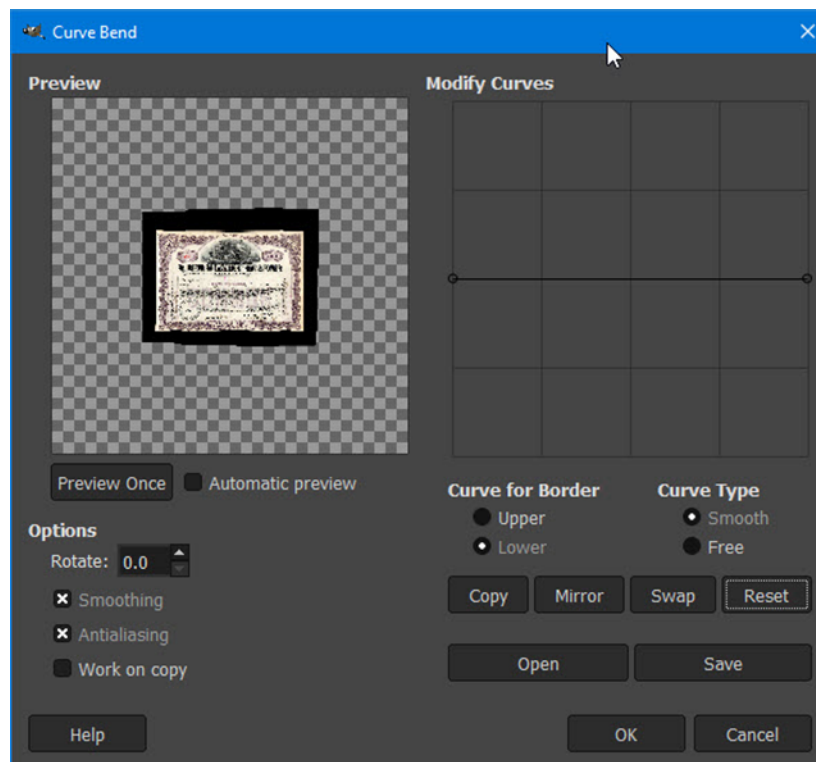
Check all the corners to confirm they are lined up with the guidelines.

Click **View > Zoom > Fit Image in Window**. The image is looking much more rectangular, but the borders along the top, bottom and sides are sucked inward. We will fix that next.

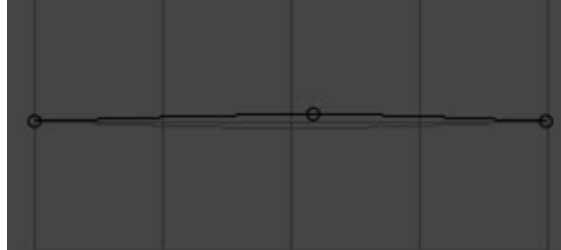


Removing the curved borders is not easy to do with exactness. However, you can do it by trial and error and get acceptably close.

Click **Filters > Distorts > Curve Bend** from the top menubar. A new "Modify Curves" dialog box will open. On the right side is a grid where we can adjust the top and bottom edges of the images. (The sides will stay intact.)



First click the "Upper" radio button. Make sure the "Smooth" Curve Type" radio button is selected. We are going to try to mimic the *shape* of the top edge of the top border. We will grab a little to the right of center, because the border is a little lower on that side. Push the line up a bit, trying not to overdo it on this tiny graph. (*It makes no sense that the graph is so small and the background is dark gray. See below.*)



The bottom edge is not curved as much as the top. Click the "Lower" radio button. Click near the middle of the line and pull it down, but less than the top. When satisfied, click "OK."

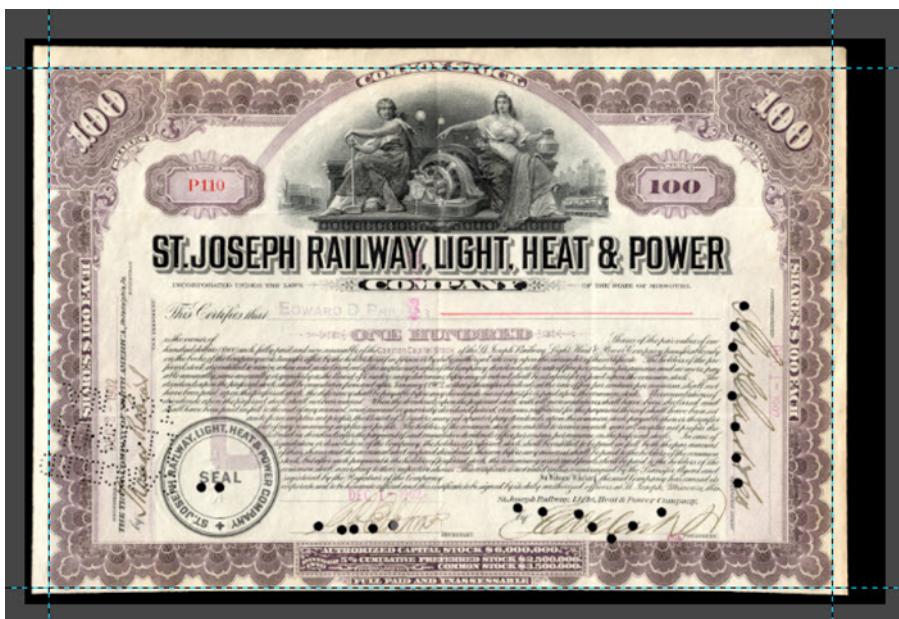


Wait a few seconds for the transformation to take place. If not satisfied, undo with Ctrl+Z or **Edit > Undo Curve Bend** from the top menubar and try again.

Select **Image > Transform > Rotate 90° clockwise** on the top menubar to rotate the image so the sides are now top and bottom. Repeat the previous steps to mimic the curves in the border.

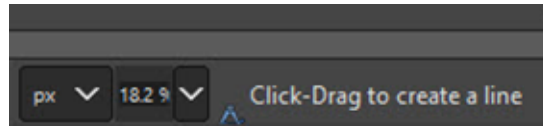


Select Image > Transform > Rotate 90° counter-clockwise.



Until now, we have ignored the scale of the image in order to keep from getting distracted by the harder task of making the image look rectangular and free of distortion. The outside edges of the border measure 11.2 inches wide by 7.43 inches tall on the actual certificate. Let's measure the image.

Select **Tools > Measure** from the top menubar. In the bottom left corner is a small box that shows what units are being used by the program. Click the down arrow and change to inches.

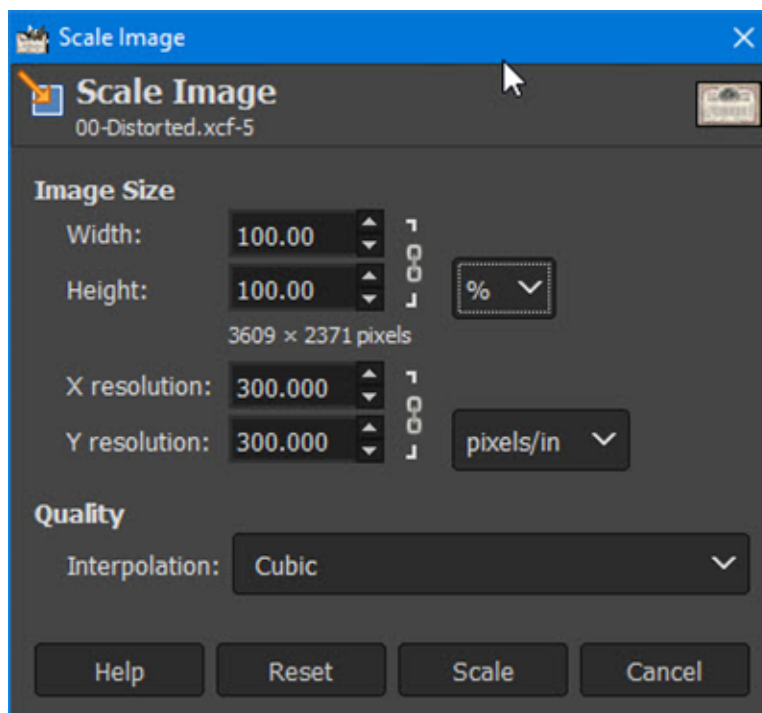


Click the cursor of the measure tool on the left hand guideline. Hold down the Ctrl key and the line will automatically stay level. Click again on the right guideline and look to the box at bottom left for the measurement. It reads 10.947 inches.

Repeat the process to acquire the vertical size (7.263 inches for our example.) We can discover how much to scale the image in both width and height by dividing the target sizes by the actual sizes.

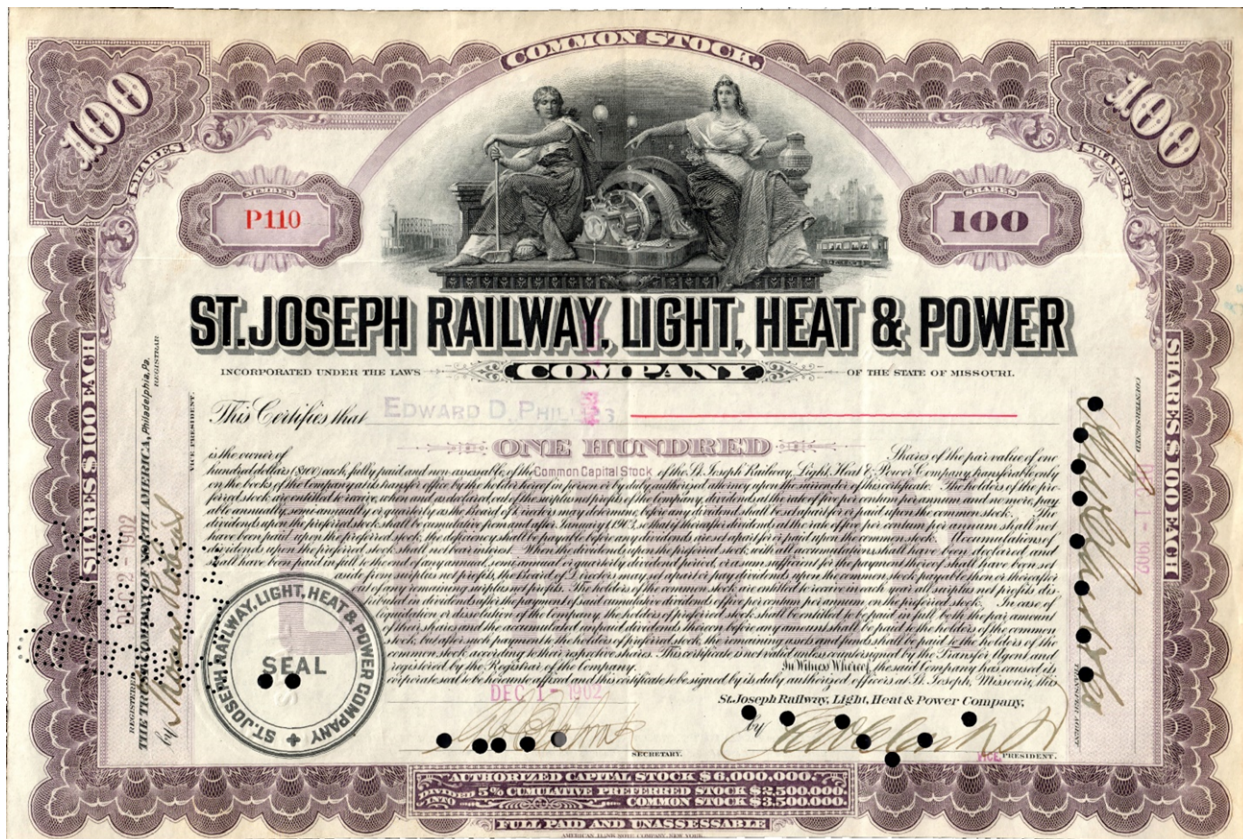
- Width: $11.2 / 10.947 = 102.3\%$
- Height: $7.43 / 7.263 = 102.3\%$

Select **Image > Scale Image** from the top menubar and change the "Image Size" units to percent.



Insert 102.3% in the width and Height boxes and click the "Scale" button.

We can now crop the image and select **File > Export As** from the top menubar. and save as a new file name. Give the image a new name and save as a JPG and we're finished.



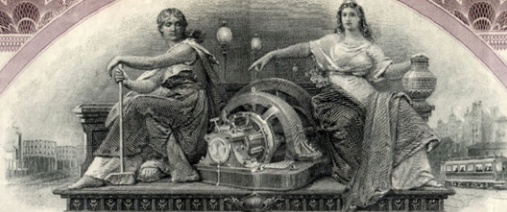
COMMON STOCK

100

100

SHARES
P110

SHARES
100



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INCORPORATED UNDER THE LAWS OF THE STATE OF MISSOURI

This Certifies that EDWARD D. PHILLIPS is the owner of ONE HUNDRED shares of the par value of one hundred dollars (\$100) each, fully paid and non-assessable of the Common Capital Stock of the St. Joseph Railway, Light, Heat & Power Company, hereinafter referred to as the Company, the books of the Company are kept in the office of the Secretary at St. Joseph, Missouri, and the same are open to the inspection of the holder of the stock at all times.

The dividends upon the preferred stock shall be cumulative from and after January 1, 1913, so that if the dividends are not paid in any year, the same shall be paid in the next year. The dividends upon the preferred stock shall be payable to the holder of the stock at the office of the Secretary of the Company at St. Joseph, Missouri, on or before the first day of January in each year. The dividends upon the common stock shall be payable to the holder of the stock at the office of the Secretary of the Company at St. Joseph, Missouri, on or before the first day of January in each year. The dividends upon the common stock shall be payable to the holder of the stock at the office of the Secretary of the Company at St. Joseph, Missouri, on or before the first day of January in each year. The dividends upon the common stock shall be payable to the holder of the stock at the office of the Secretary of the Company at St. Joseph, Missouri, on or before the first day of January in each year.



By Wm. H. Victor Secretary
By Wm. H. Victor President

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