

Measuring With Shadow



This machine is called an Optical Comparator. It was developed by James Hartness & Russell Porter, who worked for Jones & Lamson in the Windsor-Springfield area.

Today, people use these machines to inspect parts.

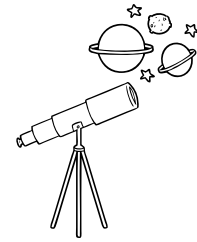
How can you measure the width between screw threads?

What about the angle?

Not easily, right?

This machine allows you to magnify and measure the outline of a shape, no matter how weird the outlines are.

Hartness built the first Vermont airport, improved telescopes, and was Governor of Vermont! And Porter was an artist and an Arctic explorer!



Jones & Lamson, 1940s



the view inside:
screw threads being examined



Illustration of James Hartness

Your Turn

Make your own shadow puppet!!

Materials:

- Masking Tape (or glue)
- Construction paper (because it's opaque and stiff)
- Scissors
- Popsicle stick

Optional:

- Markers or crayons
- Template



Cut whatever shape you'd like out of the construction paper.

You can decorate it, but remember, the decorations won't show in a shadow, but holes will! Tape one inch of the popsicle stick to your puppet shape.



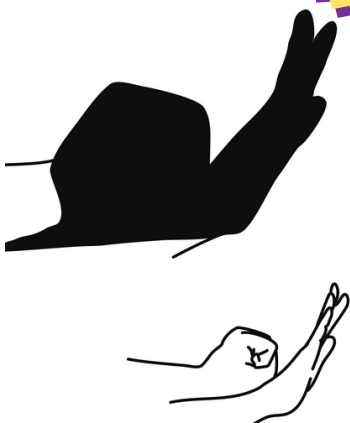
How can you make your shadows taller?

Shorter?

Blurry?

We have a homemade shadow theater and a storebought Indonesian puppet that you can experiment with!

Do you know how to make shadow puppets with your hands? Here are some ideas!



Let's use shadows to measure.

Directions:

Cut out the template of the screw and trace it onto thick paper that light won't go through, like construction paper, cardstock, or cardboard.

Most of us don't trace perfectly or cut out perfectly either. **Can you see where you were really precise or accurate?**

Shine a flashlight at the part and look for its shadow.

- How close should your flashlight be to the screw?
- Where does your shadow give you a strong silhouette?

