

**Kraskin Invitational  
Skeffington Symposium  
on Vision**

January 19-21, 2019

***Adventures in Lenses***

Adjusting Astigmatism

Steve Gallop, OD

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***Adventures in Lenses***

**Cylinder is For Sissies**

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# Why do we prescribe lenses?

- To compensate for undesirable refractive states
  - Nearsightedness
  - Adverse farsightedness
  - Adverse astigmatism
- To compensate for poor eye alignment
- To compensate for presbyopic changes

# Are there other reasons to prescribe lenses?

- To prevent undesirable refractive states
  - Nearsightedness
  - Adverse farsightedness
  - Adverse astigmatism
- To remediate undesirable refractive states
- To prevent or remediate strabismus
- To prevent or reduce visual stress
- To enhance visual performance
- To protect, stimulate, guide and enhance visual development

“Lenses change the orders to the system.”

A.M. Skeffington, OD

“It’s not what a lens does to a person, but what a person does with a lens that matters.”

Robert A. Kraskin, OD

# Lenses are medicine.

Medicine n. 1. any substance, drug, or means used to cure disease or *improve health*.

"We feel that our vision is like a camera, but that is utterly wrong. Our brains aren't just seeing, they're actively constructing the visual scene and making decisions about it."

Dobromir Rahnev, psychologist Georgia Institute of Technology



# Surprise Discovery Reveals Second Visual System in Mouse Cerebral Cortex

Research Challenges 75-Year-Old Dogma of Mammalian Vision

By [Nicholas Weiler](#) on January 03, 2019



The visual system is probably the best understood part of the brain. Over the past 75 years, neuroscientists have assembled a detailed account of how light waves entering your eyes allow you to recognize your grandmother's face, to track a hawk in flight, or to read this sentence. But a new study by UC San Francisco researchers is calling a fundamental aspect of vision science into question, showing that even the best-studied parts of the brain can still hold plenty of surprises.

According to the standard model of visual processing, all visual information from the retina must first pass through the primary visual cortex (V1) in the back of the brain, which extracts simple features like lines and edges, before being distributed to a number of "higher order" visual areas that extract

<https://www.ucsf.edu/news/2018/12/412926/surprise-discovery-reveals-second-visual-system-mouse-cerebral-cortex>

# Some basic assumptions

- The primary purpose of the visual process is to direct action.
- The visual process is pervasive in human behavior.
- There is rarely a single “correct” Rx; there is typically a range of lenses that provide appropriate assistance.
- Most standard (compensating) prescriptions are stronger than necessary for their proposed use.
- Most standard prescriptions are inappropriate for the majority of the activities for which they are worn.
- The primary purpose of optometry is (or should be) to protect, support and direct development of the visual process.
- When confronted with any given individual statistics are, at best, useless.

# Basic Prescribing Concepts

- Prescribe for the person, not the measurements or the eye.
- Start at near and work from there.
- Prioritize prescribing for comfort, performance and development, not acuity.
- Consider a lens that allows the person to observe the natural fluctuations in acuity.
- Use balanced lenses whenever possible.
- Avoid prescribing or reduce cylinder whenever possible.

# Basic Prescribing Concepts

- One Rx is rarely good for all tasks.
  - Avoid prescribing only one Rx unless it's strictly therapeutic and therefore intended as a task-specific device.
- Compensating lenses should not be a first resort.
- Most doctors prescribe lenses based only on distance acuity.
- Lenses derived strictly on distance acuity “needs” are likely to have undesired consequences.
- If a person needs to adapt to the lenses it might be best to reconsider the Rx.

“The specific cause of astigmatism is unknown. It can be hereditary and is usually present from birth. It can change as a child grows and may decrease or worsen over time.”

(according to the AOA website)

# Translation...

We barely know why astigmatism is, and we really don't know what to do about it other than stick a lens in front of it and cross our fingers. And really, we would prefer to not talk about it if that's okay with you.

“Astigmatism is very difficult to define.”

“Astigmatism is difficult to understand.”

**A.M. Skeffington, OD**

**(from Practical Applied Optometry)**

# In my experience...

- Almost everyone has some amount of astigmatism.
- Some people seem to need compensation.
- Many have compensating lenses but seem not to need them.
- Most have astigmatism and are asymptomatic.
- Astigmatism is easy to measure and prescribe.
- Doctors prefer to prescribe without talking about it.

# Keep this in mind...

Gwiazda also suggested allowing up to 1.5D of astigmatism. Mutti noted that the BLINK study allowed only up to 1D of astigmatism. “I regretted that decision a bit, because in recruitment we saw children not qualify with 1.03D of astigmatism,” he said. “We had to turn away subjects eager to participate. I would say past 1.5D of astigmatism you’re probably highly unlikely to get acceptable acuity,” he continued.

# Experts debate, reach consensus on parameters for myopia control trials

Primary Care Optometry News, November 2016

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Cho recommended increasing it to -6 D.

Gwiazda also suggested allowing up to 1.5 D of astigmatism.

Mutti noted that the BLINK study allowed only up to 1 D of astigmatism.

"I regretted that decision a bit, because in recruitment we saw children not qualify with 1.03 D of astigmatism," he said. "We had to turn away subjects eager to participate.



Jane Gwiazda

"I would say past 1.5 D of astigmatism you're probably highly unlikely to get acceptable acuity," he continued.

The panelists had a strong consensus regarding the type of refraction used in these clinical trials, but differing opinions on the agent used.

Gwiazda noted that "cycloplegic autorefractor seems to be the gold standard, with an open field of view refractor. And cyclopentolate is probably the better choice."

Mutti agreed that cycloplegic autorefractor is used "almost universally. It's nearly impossible with an autorefractor to inject bias."

However, he would use tropicamide.

"I chose cyclopentolate in an early study when we wanted maximum cycloplegia," Mutti said. "It will also wipe out your follow-up. We have to reduce subject burden and maximize retention potential."

They must have not read Skeffington



This is what I usually tell patients...

***Your glasses have astigmatism.***

“The optimal lens is not covariant with the refractive status of the eye but is determined by the clinical understanding of the problem.”

A.M. Skeffington, OD

## Skeffington on astigmatism:

The number of patients who come because they lack acuity is relatively small. It would be interesting to have a percentage-wise study made by a few optometrists in practice as to how many of their patients come with a complaint of inadequate acuity, whose greatest need is cylinders.

It is true that patients come with complaints of discomfort. The discovery is made that cylinders restore standard acuity. The prescription is written for the purpose of restoring acuity on the basis of cylinders, when the referring complaint is more often either that of discomfort or disability to complete work. The two are the same thing...

Prescribing lenses based solely on acuity often has less to do with the person who will be wearing the lenses than with the doctor prescribing them.

“The value of the lens to the wearer is the change made in the output. True, there is a change in the input. However, this change brings about altered responses within the organism and so affects changes in the output. These output changes are the ones that lend significance to the use of lenses.”

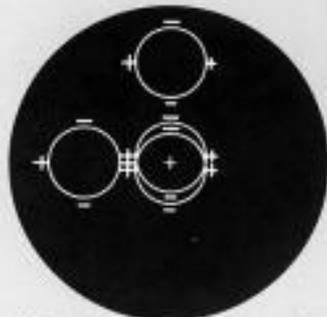
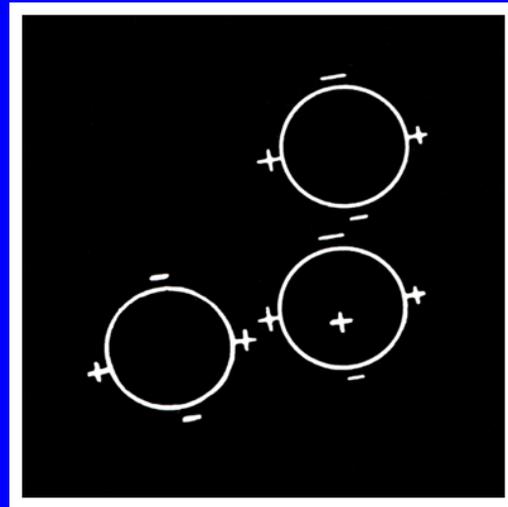
A.M. Skeffington, OD

Sometimes a prescription is a means  
to an end and not an end unto itself.

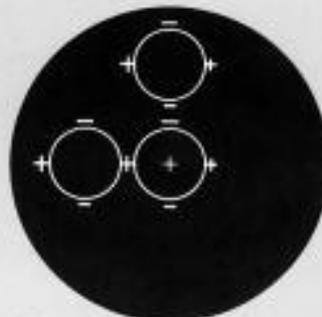
Apparently I've been a bad boy.



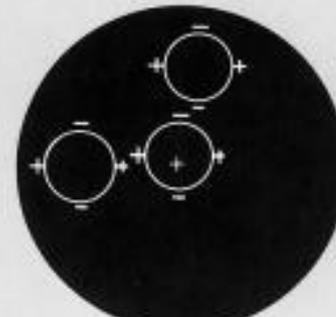
# What about K readings?



**1** The instrument is observed as being slightly out of focus: Mire images are doubled.



**2** The left side plus (+) sign of the mire circle image and the plus (+) sign of the central mire image are superimposed: Horizontal meridian setting is now completed.



**3** The horizontal lines of mire images are disconnected: Instrument is not positioned correctly at the cylinder axis.

# What's in a lens?



# How would you get from point A to point B?

Point A:

OD +5.75 -2.00 x 175

OS +7.00 -2.00 x 175

Point B:

OU +5.00

I assume each of you has one of these:



Astigmatism Exercises - How to Fix Astigmatism Fast and Naturally

# Ranya

## September 26, 2018

Ranya's parents reported the other OD Dx'd amblyopia and int LET

-7 y.o.

-First Rx age 5½

-closes one eye at times

-loses place reading

# Rx history

## **January 14, 2017 (1<sup>st</sup> Rx) MD**

OD +5.00 -1.00 x 180

OS +7.25 -0.75 x 180

## **December 2, 2017 MD**

OD +5.25 -1.25 x 180

OS +7.50 -1.25 x 180

## **May 16, 2018 OD**

OD +5.75 -2.00 x 180

OS +7.00 -1.75 x 180

All testing done with SPRx (4 mos old)

K readings: OD -2.50 x 180 OS -2.50 x 180

## **DVA**

PL: OU 20/50<sup>-1</sup> OD 20/40<sup>-2</sup> OS 20/70

OD +5.75 -2.00 x 175 20/30<sup>-1</sup>

OS +7.00 -2.00 x 175 20/50<sup>-1+1</sup> 20/30<sup>-1+2</sup> OU\*

**NVA** w/ Rx OU 20/16 @ 8" OD 20/30 @ 16" OS 20/40 @ 16"

\*DVA at end of eval OU 20/30<sup>-1</sup> w/ **Plano**  
OU 20/25<sup>-1</sup> w/ Rx

**Pursuits:** 30% OU, OD, OS

**Saccades:** 90% undershoots; Z-axis = messy

## **Retinoscopy**

Distance: OD +1.50

OS Fluctuates

Near: OD +1.00 Fluctuates

OS +1.00 Fluctuates

**Cover Test:** w/ Rx D/N 4/2 w/ PL D/N 12/12 ET

**Stereo:** (+) GF 0" 0"Randot (-) Sup

**6^ prism @ distance:** Sup – except with BUOD

Red Lens NPC: R=OD – sup OS  
R=OS – sup OD

**Maddox Rod (near)**

MR OD 3 R hyper 5eso

MR OS 2 R hyper 1eso

Attempted to modify Rx week 4 of VT – any change reported as worse than Rx

Rx'd at week 6 of VT: OD/OS +5.00 sph

One week later (11/12/18):

DVA w/ +5.00 OU

OU 20/25<sup>-3</sup> (20/30<sup>-1</sup>)

OD 20/25<sup>-3</sup> (20/30<sup>-1</sup>)

OS 20/40<sup>-3</sup> (20/50<sup>-1</sup>)

# How would you get from point A to point B?

Point A:

OD +5.75 -2.00 x 175

OS +7.00 -2.00 x 175

Point B:

OU +5.00

3 weeks after (12/3/18):

DVA w/ +5.00 OU

OU  $20/25^{-1}$  ( $20/30^{-1}$ )

OD  $20/25^{-2+2}$  ( $20/30^{-1}$ )

OS  $20/40^{-1+2}$  ( $20/50^{-1}$ )

5 weeks later (1/14/19):

DVA w/ +5.00 OU

OU  $20/25^{+1}$  ( $20/30^{-1}$ )

OD  $20/25^{-3}$  ( $20/30^{-1}$ )

OS  $20/40^{-1}$  ( $20/50^{-1}$ )

DVA w/ +4.00 OU

OU  $20/25^{-1}$

# Something to think about...

Perhaps optimal acuity should be thought of as a result of a well-functioning visual process, not a prerequisite. I have found that vision therapy often leads to improved distance acuity. I think this is because the person becomes able to make better use of the available information as the visual process becomes more sophisticated and effective as a result of vision therapy and/or a more strategic, dynamic use of lenses.

# Lenses change the instructions to the brain.

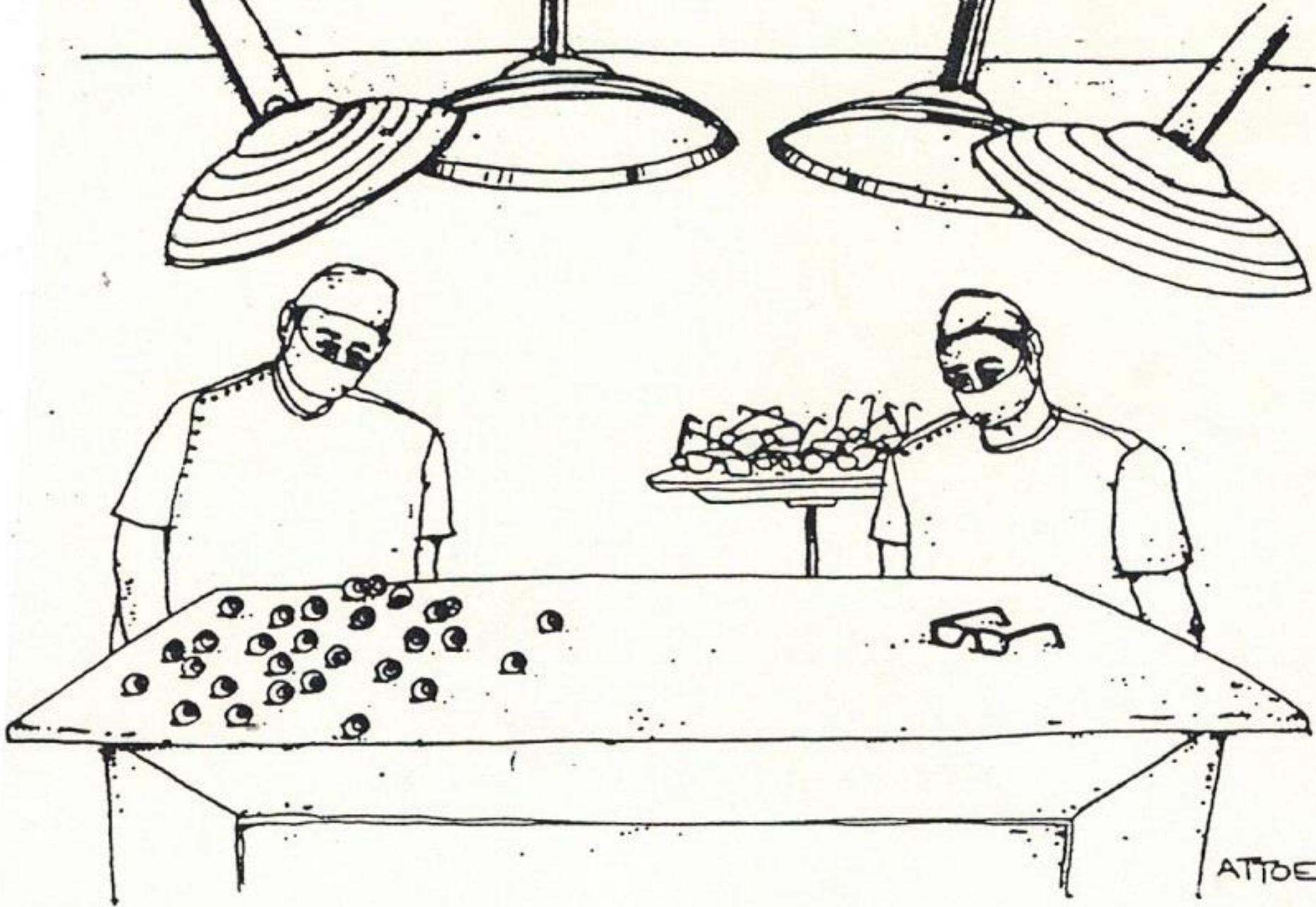
- To promote positive change and development
- To reduce stress
- To improve visual efficiency and performance
- To improve spatial/temporal processing
- To improve mobility
- To improve binocularity and accommodation
- And if you have nothing better to do...to improve acuity

Prescribing lenses based solely on acuity often has less to do with the person who will be wearing the lenses than with the doctor prescribing them.

Cylinder is greatly over-prescribed.

It never hurts to try something new.

Any change can be reversed or modified as needed.



ATTOE

*"It's no use, they keep rejecting them."*

# Something to think about...

Lenses should, whenever possible, be used to help arrange conditions and provide opportunities for the system to change for the better. Lenses are not living up to their potential when all they are intended to do is carry out tasks that the organism is deemed unable to manage on its own.

We may be selling ourselves and our patients short by the continued insistence on prescribing lenses based strictly on acuity.

Wearing lenses based solely on acuity on a full-time basis is like...

Always try to provide the greatest benefit with the least amount of interference. Maximize the therapeutic aspects and minimize the compensatory aspects of any lens prescription. Try to impinge on the natural state as little as possible when compensating. Prescribe with an eye to the future, not the past.

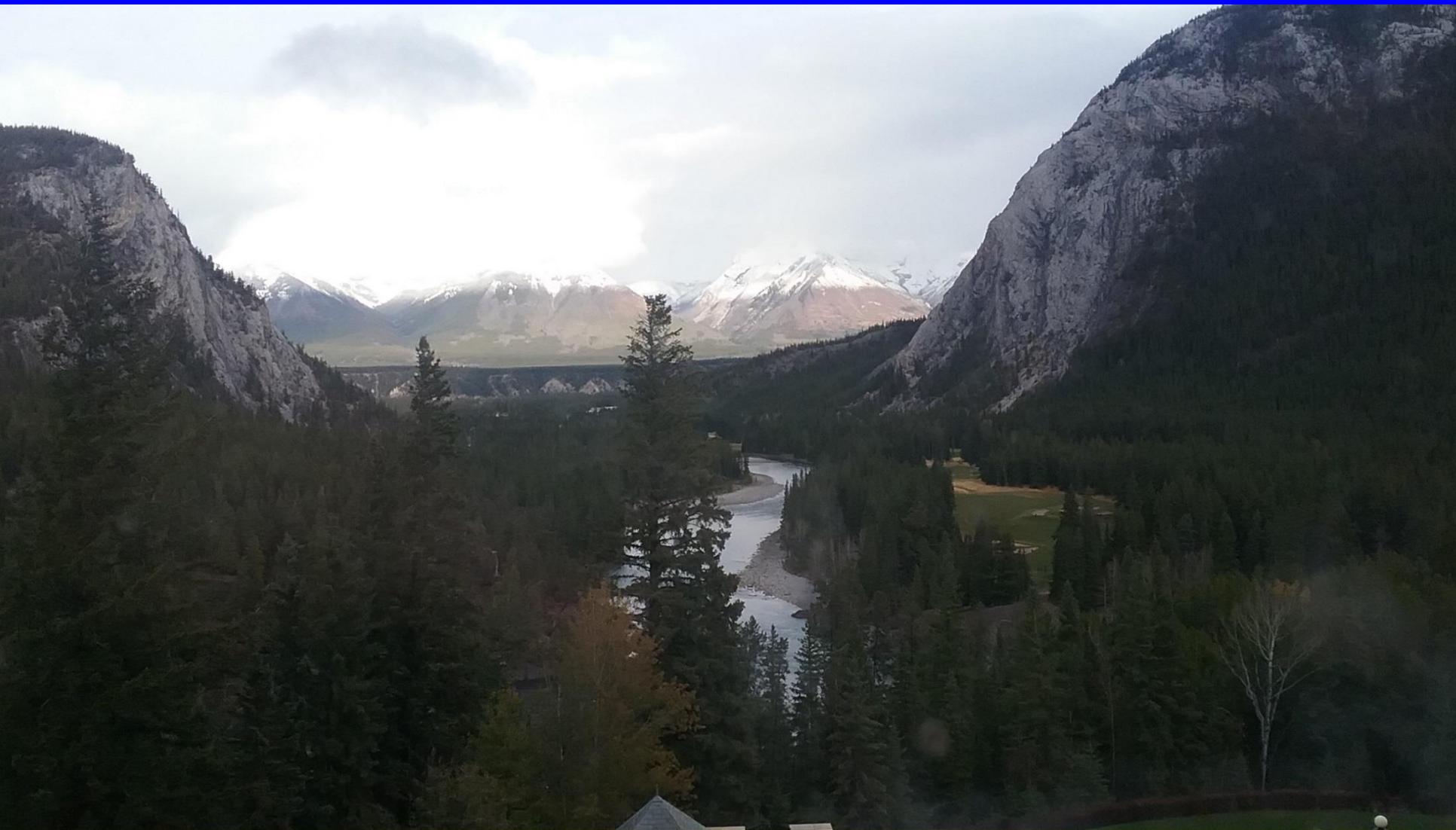
"It is by logic that we prove, but by intuition that we discover."

Henri Poincaré

(French mathematician, theoretical physicist, engineer, and a philosopher of science - late 1800s to early 1900s)

“[W]e have to remember that what we observe is not nature in itself but nature exposed to our method of questioning.”

Werner Heisenberg



Thank you for not throwing things.