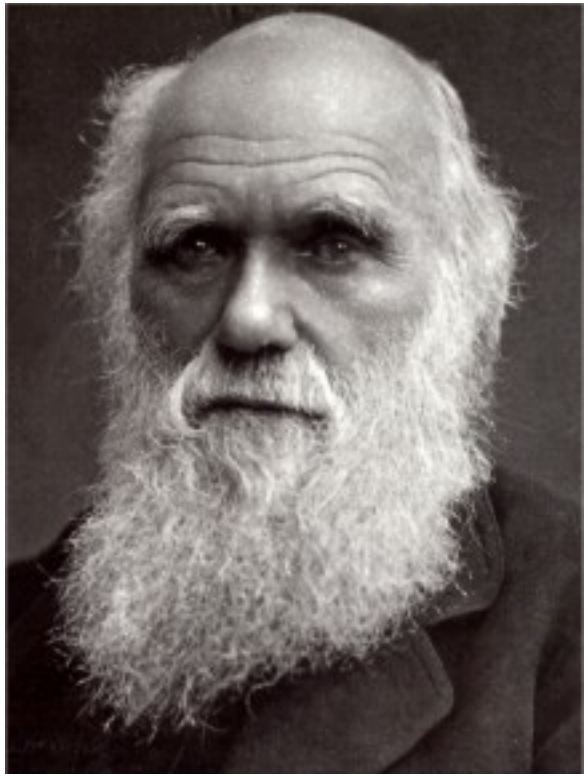
Anthro 101L:
Human Biological Evolution

Lecture 1: Intro & Scientific Method

Prof. Kenneth Feldmeier
kenneth.feldmeier@canyons.edu

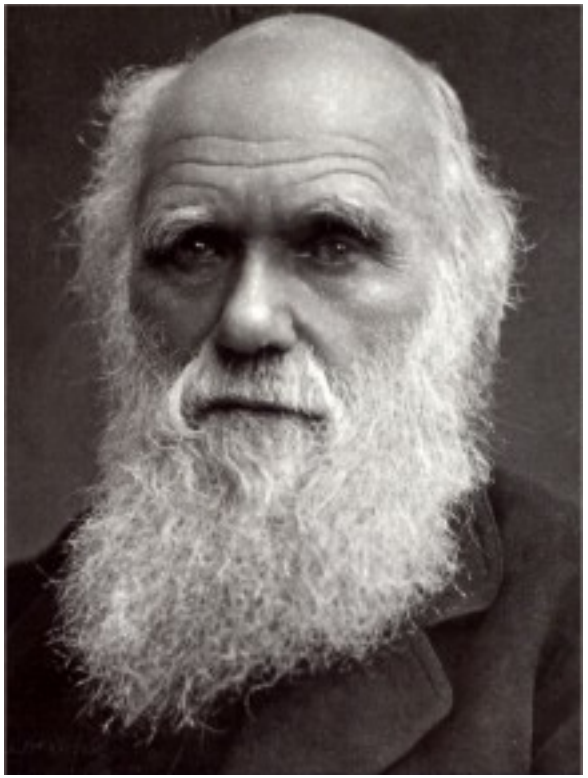
Anthropology: Study of Humans

+ How Evolution Works



To understand why we are the way we are, we need to know

- How the scientific method operates



What is Science?

- Process of explaining natural phenomena through observation and experimentation
  - Measure observed phenomena
  - Test hypotheses
  - Follow the Scientific Method

J.J. "Mad Scientist". common.wikimedia.org 02/25/08. 03/31/06 http://commons.wikimedia.org/wiki/Image:Mad_scientist.svg

What is a hypothesis?

- provisional explanations requiring verification or falsification through testing
  - proposes a causal relationship between two variables
  - Predict how X will affect Y

- **(X) Independent** variable(s) – things that are
  - Water, sunlight, soil
- **(Y) Dependent** variable(s) – things that are affected
  - Height of plant
  - Thickness of roots
  - Number of leaves

The Scientific Method

- Question
- Read
- Hypothesis
- Methods
- Collect data
  - Rigorous & replicable
  - Quantitative
  - Statistics
  - Falsifiable
- Relate back to your hypothesis

Repeat!

Theory or Law

- A **theory** explains something and is supported by a lot of testable evidence
- A **law** is a description of a phenomenon that is consistently observed under specific conditions

Why we use the scientific method

- Testable (falsifiable) hypotheses
- Replicable methods
- Competition and collaboration among scientists

- How are you going to do this?
  - Methods
  - Tools

How to Observe a Subject

- Note-Taking is Essential!
- What kinds of Data to collect about *behavior*?
- "Basic" Observations

vs.

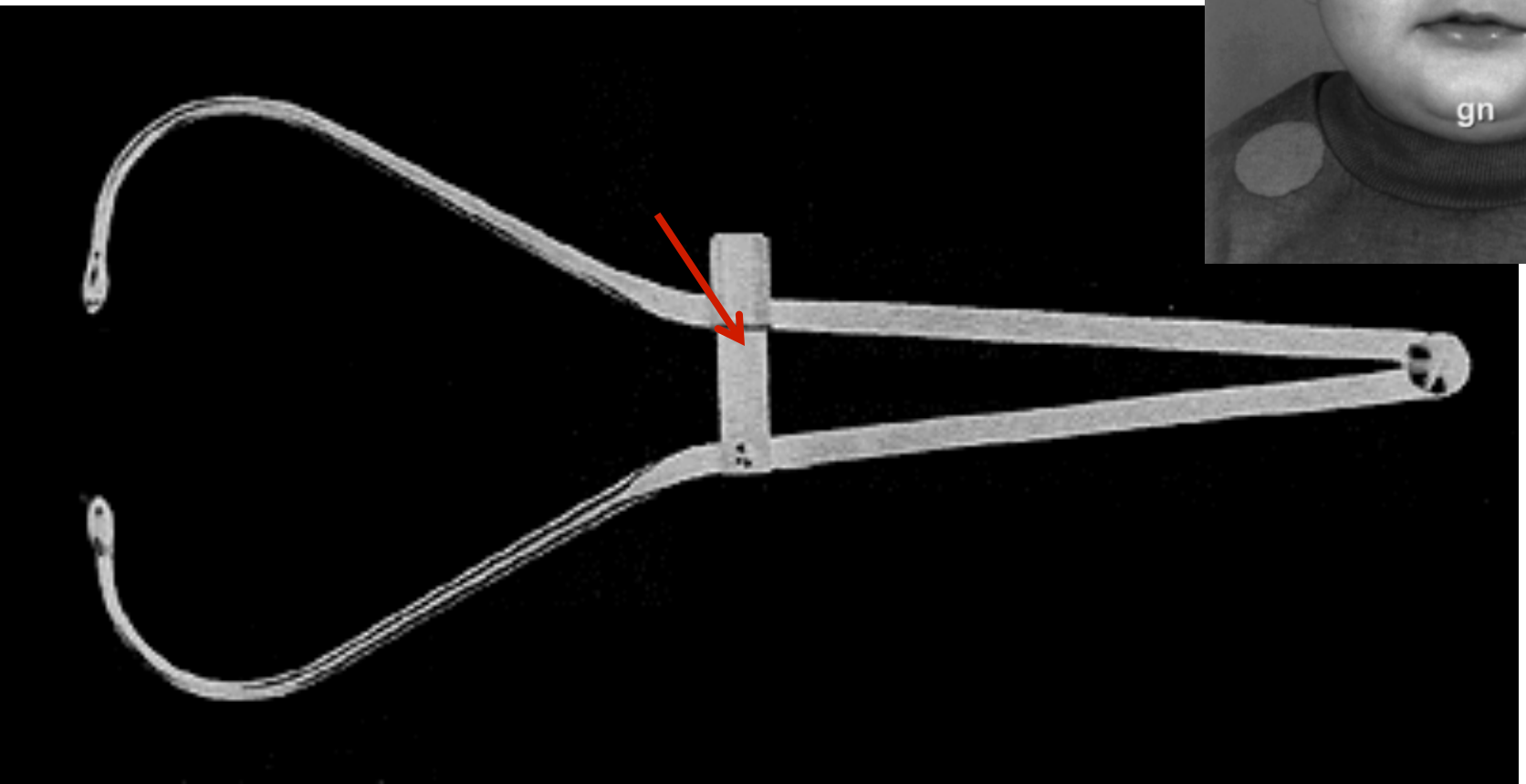
- "Behavioral" Observations
- Observer affects the Observed
- Observer Error

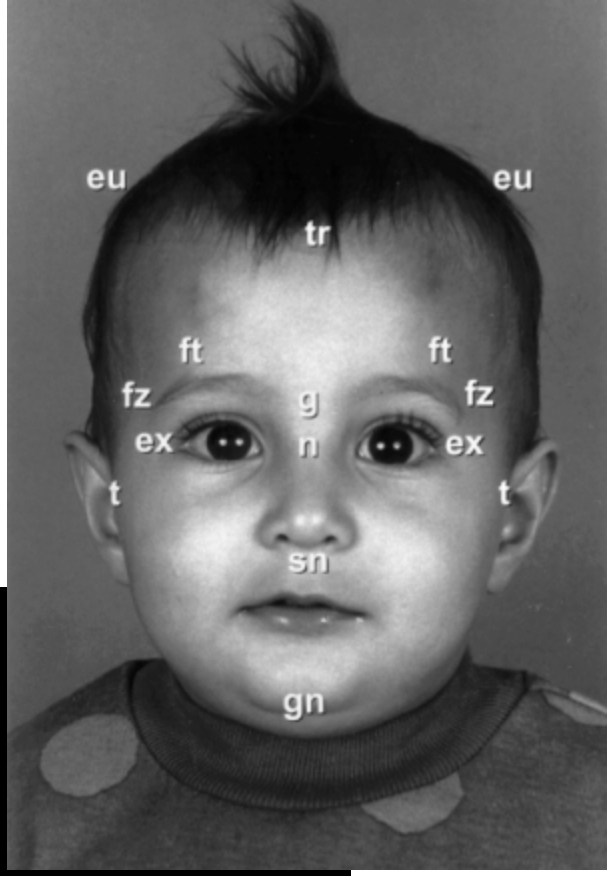
Lab Tools

Anthropometry

A.K.A “Measuring Humans”

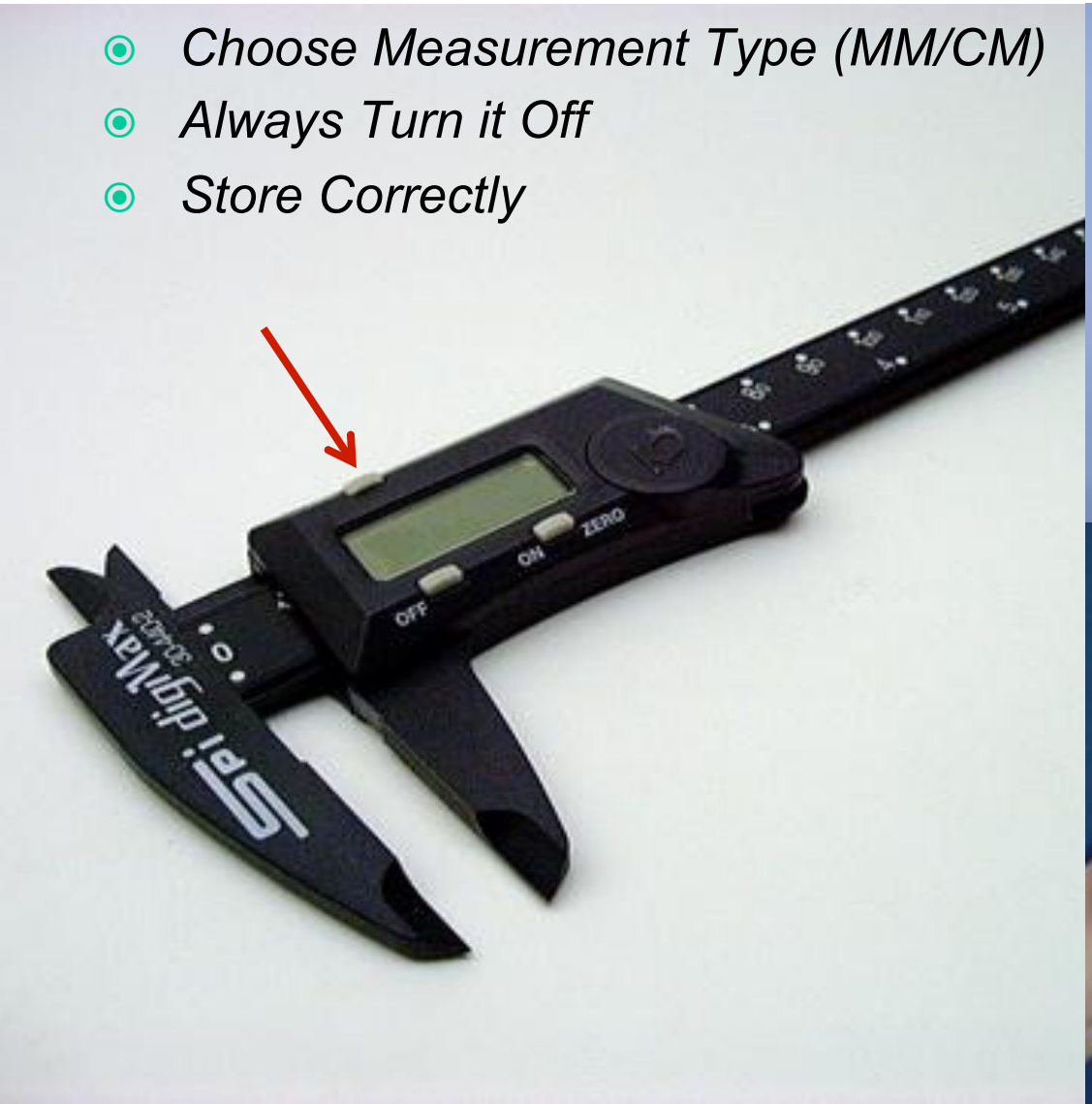
- *Spreading Calipers*





Sliding Calipers

- *Zero Out*
- *Choose Measurement Type (MM/CM)*
- *Always Turn it Off*
- *Store Correctly*



- *Osteometric Board*

Measurement Conversion

- Centimeters to Inches
  - 1 in = 2.54 cm [IN to CM=multiply] [CM to IN=divide]
- Centimeters to Millimeters
  - 1 cm = 10 mm [CM to MM=multiply] [MM to CM=divide]

Please round all numbers to TWO decimal places (i.e. 78.6666 becomes 78.67)

- 13.4 in = _____cm
- 456 mm = _____cm
- 754 cm = _____in

Your First Lab

- Get contact info from 3 people sitting near you, who are registered for the class (at the end of the table you can have groups of 5)
- Go over the handout
- You can start with you outside observations or in class stations
- The first lab is due at the end of the class