Anthropometry began in 1890 and lasted approximately 20 years before being replaced by fingerprint identification. Alphonse’s father, Louis Bertillon, a famous French physician and anthropologist, largely influenced Alphonse’s knowledge and interest in the human skeletal system. Louis helped Alphonse secure a job as a clerk with the Parisian police in 1879 where he began to focus his research on the difficulty of identifying repeat offenders. Of course, at that time there was no system of identification in place. Even an understanding of fingerprints had not yet been well developed at that time. With much time on his hands to consider such a system, Alphonse Bertillon proposed a method of identification in 1879 using anthropological body measurements. With help from his father, he was able to successfully develop and implement Anthropometry in 1882. This system consisted of using calipers and other measuring devices to take 11 specific body dimensions. Alphonse took each measurement three times and recorded the average of the three on his card files. I find it interesting that Bertillonage included probability calculations that long ago. It was determined that the odds for any one particular measurement being exactly the same for any two men would be 1:4. Thus, the chances of 2 men having the same height and same foot size, for example, would be 1:4x4. The chances for all 11 measurements being shared between two individuals would be 1:411 or 1:4,194,304! At a time when the population was considerably smaller, this would indeed be very compelling evidence for identification.

In addition to physical measurements, Alphonse recorded physical descriptors of the person (i.e., hair and eye color), including any unusual markings on the body (i.e., tattoos and scars). This was known as Portrait Parle or a speaking portrait that described many personal characteristics. Lastly, Alphonse included frontal and side-view photographs of each person, which we recognize today as mug shots.

In order to make use of this information in days well before the invention of a computer database, Bertillon created categories to be able to classify and retrieve information cards that could be helpful in identifying an individual based on previous measurements taken. By 1884, Bertillon’s system was able to identify 241 recidivists. In 1888, Alphonse Bertillon was promoted to head a newly formed Department of Judicial Identity for the Paris police. Due to its success, Anthropometry or Bertillonage spread throughout the world with the United States adopting it in 1887 and Great Britain in 1894.

At this time, fingerprinting techniques were being developed for comparison purposes. Bertillon resisted the use of fingerprints and clearly favored his own method of identification. Interestingly enough, however, he was the first European to solve a murder (Scheffer case) using fingerprints in 1902. Significant errors in the Dreyfus case (1894), the Will and William West case (1903) and the theft of the Mona Lisa painting (1911) largely contributed to the demise of Anthropometry and the wide acceptance of fingerprinting. [I encourage teachers to assign these cases to students for further research and class discussion.]

THE EXERCISE:

I teach a series of forensic science courses at Edinboro University in Edinboro, PA. A prerequisite course for advanced criminalistics, a hands-on laboratory course, is introductory criminalistics. Criminalistics provides background information to students about each of the sections within a crime laboratory, crime scene investigation and reconstruction, safety, and expert witness testimony. The very first laboratory exercise I give my advanced criminalistics students each semester is anthropometry or Bertillonage. Although this technique is no longer relevant, it provides a historical backdrop of what was in place before fingerprinting. Students find this exercise appealing and a lot of fun. It is a great icebreaker for them to relax into a new course with an opportunity to work closely with classmates. In addition, this exercise gives them a sense of what it was like to identify individuals prior to the development of fingerprints. They engage in discussions about the challenges of having to take significant time to do these measurements with individuals who will likely be uncooperative. Students who are used to working with computers and digital cameras are surprised by how cumbersome it must have been to work with a manual filing system as a database and cameras that required a great
amount of light with exposure times as long as 20 minutes. Imagine having to sit still that long! For safety reasons, I use cloth measuring tapes and yardsticks instead of steel tape measures or calipers and other devices consistent with what Bertillon actually used. They are also required to record their measurements in metric (cm), which brings many criminal justice majors outside of their math comfort zone.

This laboratory naturally lends itself to significant discussions after the lab about why fingerprinting is such a better system than anthropometry. Critical thinking resulting from a comparison of the two systems should lead students to realize that people do not leave their measurements behind at crime scenes, but do leave their fingerprints. Also, discussions about the positive value of anthropometry are important to recognize that this was a starting point in an effort to be able to differentiate one person from another. Students should research and discuss the important premises Bertillon based his work on. Specifically, his claims were that the human skeletal system remains fixed from age 20 until death and that, due to the extreme diversity of the skeletal system, no two people would have exactly the same measurements. Although anthropometry lasted for only 20 years, it was the seed that allowed the science of identification to evolve as it did. It also provided us with the modern day mug shot that had not existed prior to Bertillon. Since I also teach my students legal issues relating to admissibility of evidence, I have them think and discuss what challenges Bertillon would likely face today under the standards established by Daubert v. Merrell Dow Pharmaceuticals (1993).

When doing this exercise, students should make every effort to create totally independent measurements. Many students have never worked with a metric scale before, so this is yet another benefit to conducting this exercise. I teach my students how to convert inches to centimeters, but also encourage them to download a free conversion application on their smartphones or tablets. Once the measurements are recorded, students should be asked about ways to make their identification more accurate. Certainly, averaging results for each body measurement is important to more closely target each measurement. Since this was Bertillon’s project, he took great pride and care in taking these measurements very carefully. Once the system gained popularity, however, he could no longer do all measurements and had to train people who then trained others. For them, this was simply a job, not a passion. Students should consider how this may have affected the accuracy of the system overall. As an anthropologist, Bertillon knew the importance of measuring body parts that were not subject to change. Students must realize that the measurement of a person’s waist, for example, would be subject to significant changes over time. In fact, I explain how such a measurement for me could change dramatically before and after eating at a buffet-style restaurant!

The amount of time this exercise takes is dependent in part upon how many students participate. Typically, I allow approximately 1 hour to complete the exercise. To fit this comfortably into a shorter class session, I suggest selecting fewer specific body measurements from the chart for students to focus on. The full exercise is repetitive, so having them measure fewer body parts will still provide an understanding of how the system worked, the limitations of the system, as well as the good that was derived from Bertillon’s work. There is plenty of information and images relating to Anthropometry/Bertillonage on the Internet. One of my favorite sites is:

https://criminocorpus.org/bertillon/a_uk/_summary/


Dr. Ted Yeshion is a professor of forensic science and criminal justice at Edinboro University of Pennsylvania. Prior to teaching, he worked 25 years as a forensic serologist, DNA analyst, crime scene reconstructionist, crime laboratory director and Special Agent. Dr. Yeshion also serves as the Chairman of the Science Subcommittee for the Pennsylvania Joint State Government Commission on Wrongful Convictions.
BERTILLON’S ANTHROPOMETRY

(BERTILLONAGE)

1. Write your name in Column 1 (“Characteristics of”) in the chart on Page 3.

2. On top of column 2, print the name of your lab partner who will take the first set of measurements in centimeters (cm). On top of column 3, print the name of the lab partner who will take the second set of measurements in cm. On top of column 4, print the name of the lab partner who will take the third and final set of measurements in cm.

3. Work in groups of 4. Using a cloth tape measure (metric scale side only), record the following for each student in your group:

   • Length of left foot without shoe
   • Length of right ear
   • Width of right ear
   • Circumference of head
   • Circumference of right wrist
   • Length of left middle finger
   • Length of left little finger
   • Length from left elbow to end of middle finger
   • “Wingspan” measurement – tip of left middle finger to tip of right middle finger
   • Height
   • Length of trunk

Questions:

1. Why would measurement of waist circumference not be suitable for Bertillonage?

2. Bertillon gets credit for being the first person in Europe to solve a murder using fingerprints.
   
   a. Bertillonage was only of use if a criminal was in police custody. Why?

   b. Provide a list of reasons why fingerprinting a better system than Bertillonage?

3. What specific challenges do you think Bertillon would encounter today if he attempted to have Bertillonage accepted in modern day courts under the Daubert admissibility ruling?

4. What could be done to make Anthropometric measurements more accurate?

5. Where do you begin and stop when measuring “the trunk”?

6. Explain one procedure introduced by Bertillon that is still used today.

7. Which major case was responsible for the abandonment of anthropometry? What happened in this case? Why was it significant? With which technique of personal identification was anthropometry replaced?
Bertillon's photos showing variations in the shape of the human ear.

Bertillon photographed in what would come to be known as a mug shot.

Al Capone trying to look like Bertillon.

A nineteenth century illustration showing how to take anthropometry measurements.
ANTHROPOMORPHIC MEASUREMENTS/Lab 1

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OBSERVATIONS/COMMENTS: