

Darwin and Galton in the 1800s

By Amy Quarton

Discussion Questions

- What was the species problem? How did religion and science propose to answer the species problem?
- Who was Charles Darwin? How did Darwin create his theory of evolution? What were Darwin's major contributions to psychology?
- Who was Francis Galton? What were Galton's major contributions to psychology? What is eugenics?

What was the species problem? How did religion and science propose to answer the species problem?

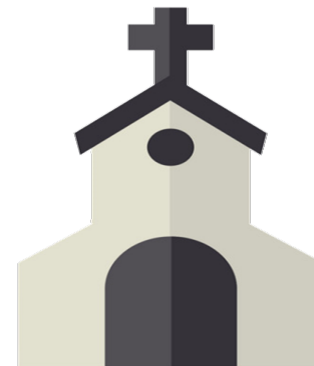
What was the species problem?

- For centuries, people have wondered:
 - Why are the earth's species so diverse?
 - Why do some species exist only in fossil form?
 - How did Noah get all those animals on the ark?



How did religion propose to answer the species problem?

- Until the **late 1500s**, religious leaders in the Catholic church in Europe also served as scholars.
- They gave the same explanation:
 - Nature was designed to be diverse, and each species was designed to fit in their environment.
 - This argument allowed scholars to simultaneously study the diversity of nature as it existed *and* believe in God.



How did science propose to answer the species problem?

- When the Scientific Revolution began in the **late 1500s**, some scholars questioned this traditional view and started to develop their own theories.
- In the **1700s** and **1800s**, the scientific method began to replace theology and philosophy as the primary means of studying the world.
- Psychology would eventually emerge in the **late 1800s** as scholars applied the scientific method to the study of mental processes and behavior.

How did science propose to answer the species problem?

#1 – Erasmus Darwin (1731-1802) said newer, more complex species develop from older, less complex species.

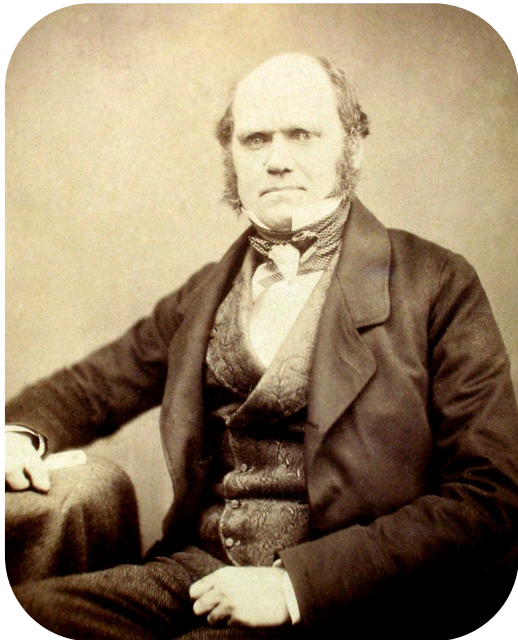
#2 – Jean Baptiste de Lamarck's (1744-1829) notion of inheritance of acquired characteristics says changes in our lifetime can be passed on to our offspring.

#3 – Charles Darwin (1809-1882) proposed his own theory of evolution.

Who was Charles Darwin? How did Darwin create his theory of evolution? What were Darwin's major contributions to psychology?

Who was Charles Darwin?

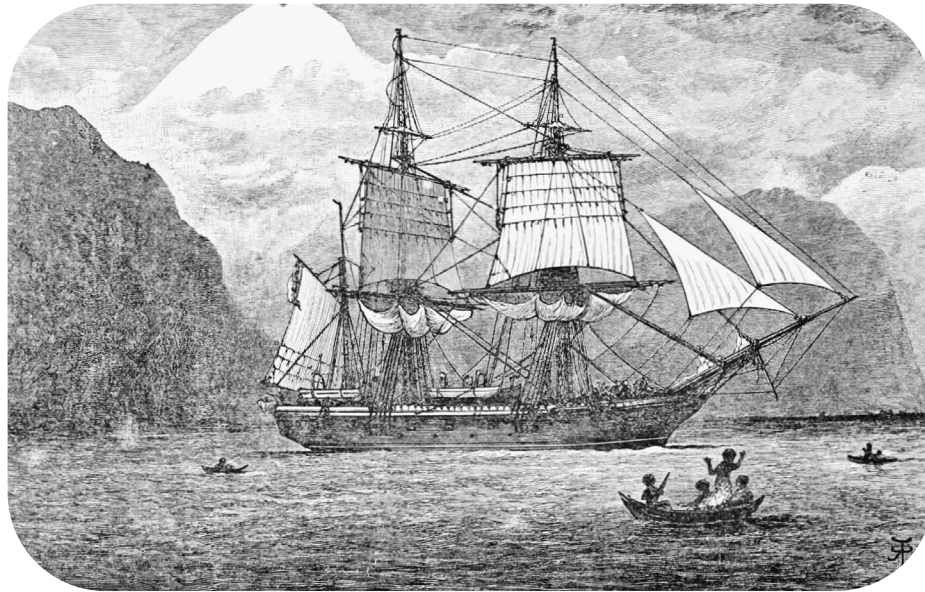
- **Charles Darwin** (1809-1882) was an Englishman born to wealthy parents.



- While studying at Cambridge University in the **1830s**, he was introduced to the natural sciences.
- He was then mentored by a botanist and a geologist, and he interacted with the best scientists of the times.

How did Darwin create his theory of evolution?

- From 1831-1836, he explored the coast of South America (including the Galapagos Islands) aboard the *HMS Beagle*.



How did Darwin create his theory of evolution?

- He wrote more than 2,000 pages of notes detailing his observations of the region's diverse plants, animals, and environment.
- He also cataloged about 1,500 species, including 4,000 bones, fossils, and dried specimens.
- He spent the next 20 years in the 1830s, 40s, and 50s fine-tuning his theory of natural selection.

How did Darwin create his theory of evolution?



Darwin's catalog of fossils

How did Darwin create his theory of evolution?

- Throughout his journey, he shipped home some of the specimens he found.
 - Unbeknownst to him, by the time he arrived home in **1836**, he was famous among zoologists and geologists.



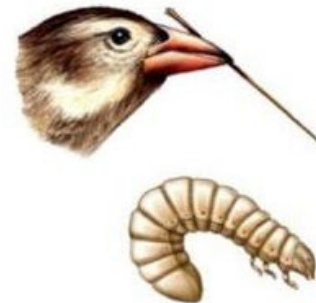
Darwin's
finch
specimens

How did Darwin create his theory of evolution?

- He noted that different islands had finches with different beaks and trees with different food.
 - Some beaks were tough and blunt; others were thinner and delicate.
 - Some trees bore nuts and seeds; others were home to insects.



Large ground finch (seeds)



Woodpecker finch (insects)

How did Darwin create his theory of evolution?

- He suspected the physical differences were due to the environmental differences.
 - The finches' beaks had evolved over time to accommodate the kind of food that was available.
 - Tough beaks are better suited for opening nuts, while thin beaks are better suited for grabbing insects.
 - The more a bird eats, the more likely it survives and reproduces, the more likely the suitable beak is passed on to offspring.

How did Darwin create his theory of evolution?

- No two members of a species are exactly alike.
- Members who have a variation that helps them survive in their environment are “selected” by nature to live and reproduce.



How did Darwin create his theory of evolution?

- These variations are passed onto to their offspring, and the cycle continues so long as the variation is beneficial.



How did Darwin create his theory of evolution?

- Members without the variation are less likely to survive.
- Over many generations, more and more members of the species receive the variation.



How did Darwin create his theory of evolution?

- In rare circumstances, genes are not copied correctly, and the resulting variation is not beneficial to survival.
 - These mutations are not passed on because the member does not survive long enough to reproduce.





How did Darwin create his theory of evolution? 10

How did Darwin create his theory of evolution?

- Note that **Herbert Spencer** coined the phrase “survival of the fittest”.
 - He suggested the “fittest” are those whose strength wins them battles for limited resources.
- Darwin, on the other hand, said survivors are those who have the right adaptations for their environment.

What is Darwin's theory of natural selection?

- In 1858, Alfred Russel Wallace (1823-1913) sent Darwin a letter outlining a similar theory.
 - It motivated Darwin to finish writing his book.
- In 1859, Darwin published *On the Origin of Species* and earned credit for the first theory of evolution.
 - The religious community resisted his theory, but the scientific community quickly accepted it.

Founders
are
promoters!



What were Darwin's major contributions to psychology?

- His theory was a catalyst for the development of:

Tests and Measurements - Studies individual differences

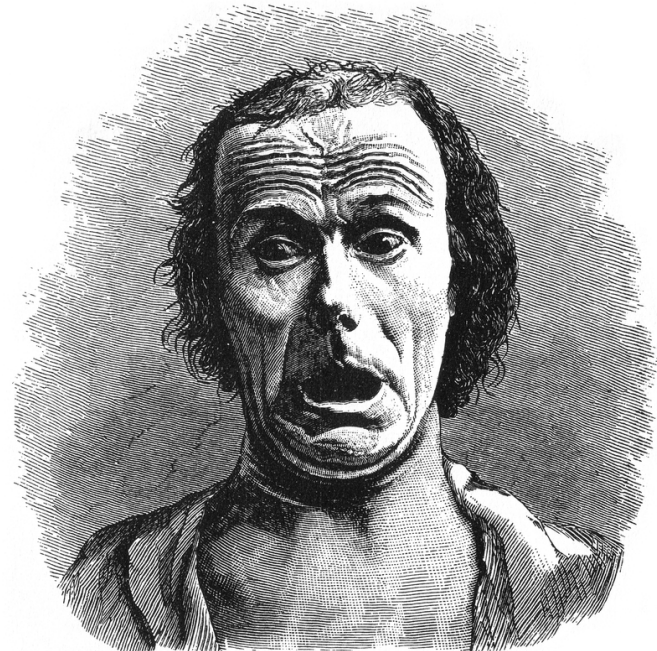
Comparative Psychology - Studies the similarities and differences within and between species

Functionalism - Studies the function of mental processes and behaviors

Evolutionary Psychology - Studies the forces that lead mental processes and behaviors to adapt

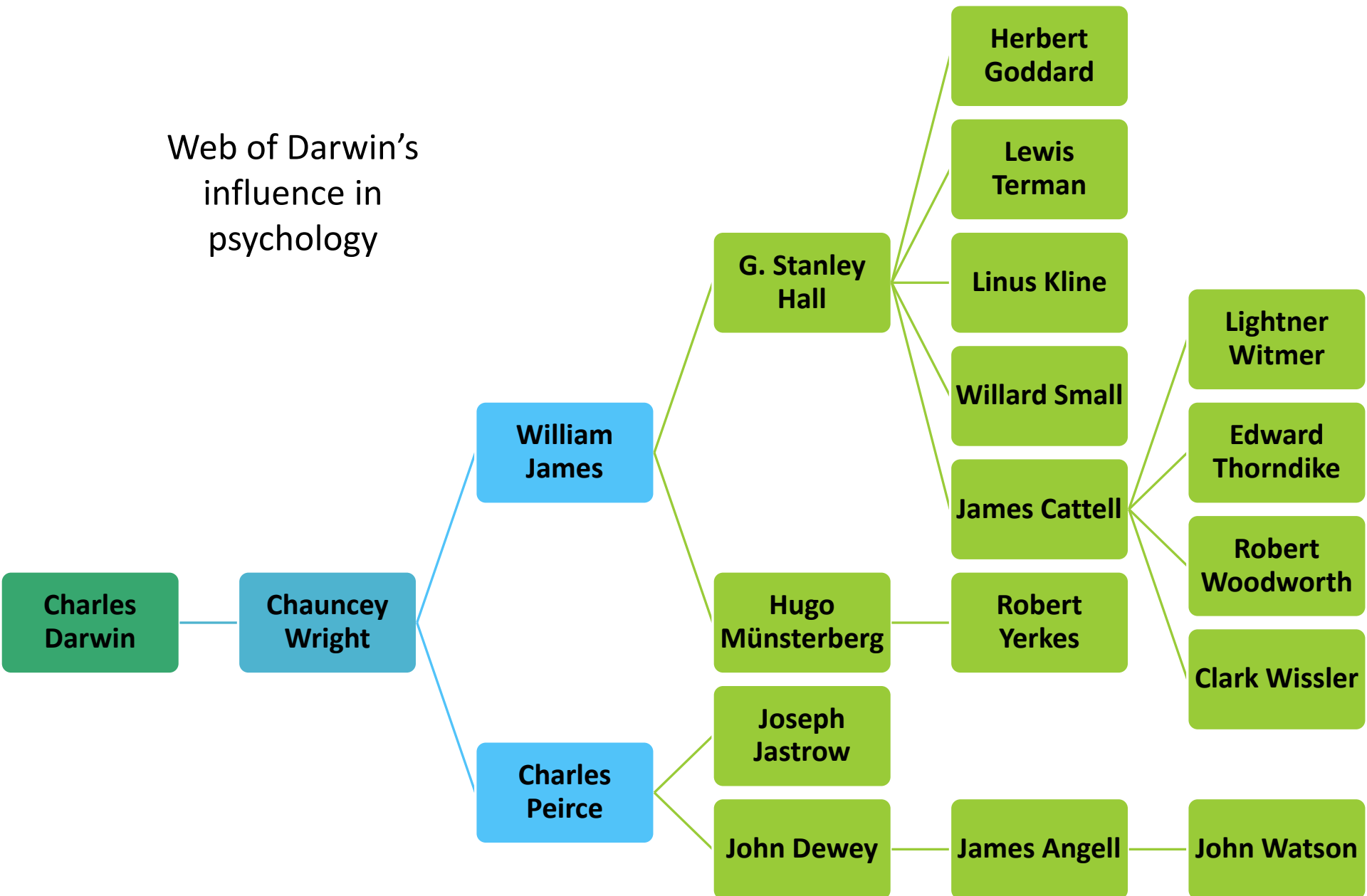
What were Darwin's major contributions to psychology?

- In 1872, he published his cross-cultural study of emotions in a book.
- He surveyed his network of contacts and found that basic emotions were expressed in the same way all over the world.



Sketch used by Darwin
to study emotions

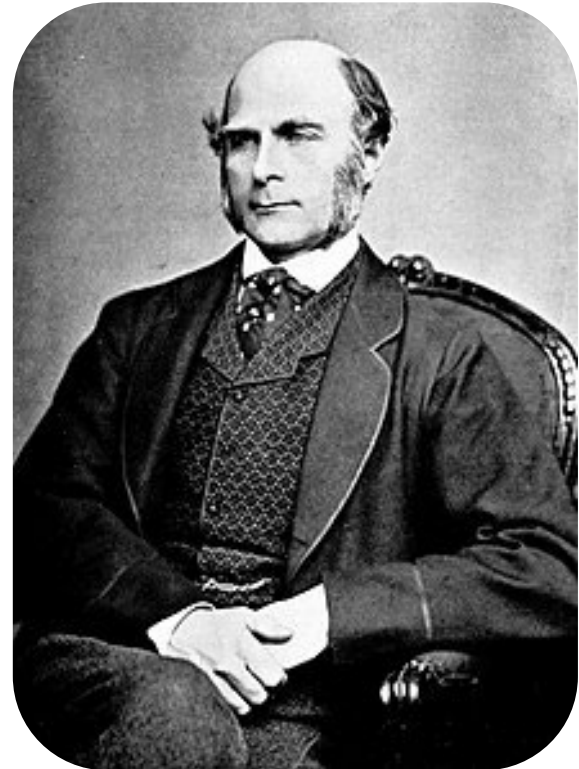
Web of Darwin's
influence in
psychology



**Who was Francis Galton?
What were his major
contributions to
psychology? What is
eugenics?**

Who was Francis Galton?

- **Francis Galton** (1822-1911) was a brilliant Englishman from the Victorian era.
- He was Darwin's half-cousin, and he was also born into a wealthy British family.



Who was Francis Galton?

- He was a psychologist, statistician, and psychometrician.
 - He is best known in psychology as a pioneer in the study of individual differences and mental testing.
 - His ideas also inspired the creation of the Pearson's r statistic.
- He was also a sociologist, anthropologist, geographer, inventor, and meteorologist.

Who was Francis Galton?

- He believed *intelligence* was an inherited ability that helped species survive.
 - The most intelligent humans and their offspring would rise to the top of society.
 - Women were intellectually inferior.
 - The environment (nurture) was *not* as important or influential as inherited ability (nature).

What is eugenics?

- Galton started the **eugenics** movement, urging societies to improve their genetic material by identifying the most intelligent people and encouraging them to reproduce.
- This idea lost its appeal after the Nazi regime's use of **negative eugenics** to discourage ethnic minorities from reproducing.
 - E.g., stigmatization, discrimination, the prevention of marriage, forced sterilization, and forced abortion

What were Galton's major contributions to psychology?

- Galton was one of the 1st scholars to use surveys.
 - In the **early 1870s**, he surveyed approximately 100 elite scientists about their personal qualities.
 - He asked about personality, physical attributes, family characteristics, upbringing, the origins of their scientific interests, and the innateness of their scientific interests.

What were Galton's major contributions to psychology?

- Galton was the 1st scholar to use twin studies.
 - He also surveyed 94 pairs of twins about their personal characteristics.
 - He found similarities between them (even those who were raised in different homes).
 - He used this as evidence of innate influences.



What were Galton's major contributions to psychology?

- He was the 1st person to measure individual differences in humans.
- He used a sensory and motor abilities test.
 - E.g., reaction time, auditory and visual thresholds, color naming, judgment of line lengths, grip strength
 - Eventually, this test would be replaced by Alfred Binet's intelligence test.

Take an auditory threshold test like the one developed by Galton:

