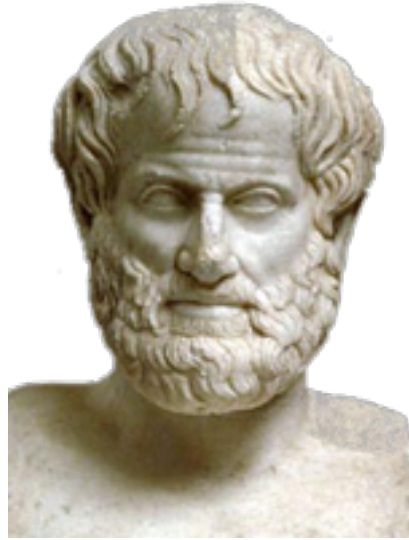


# **Darwin's Influence**

**evolution, individual differences, and intelligence**

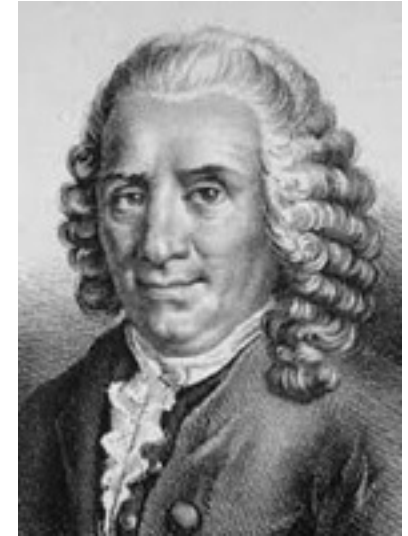
# briefly biology



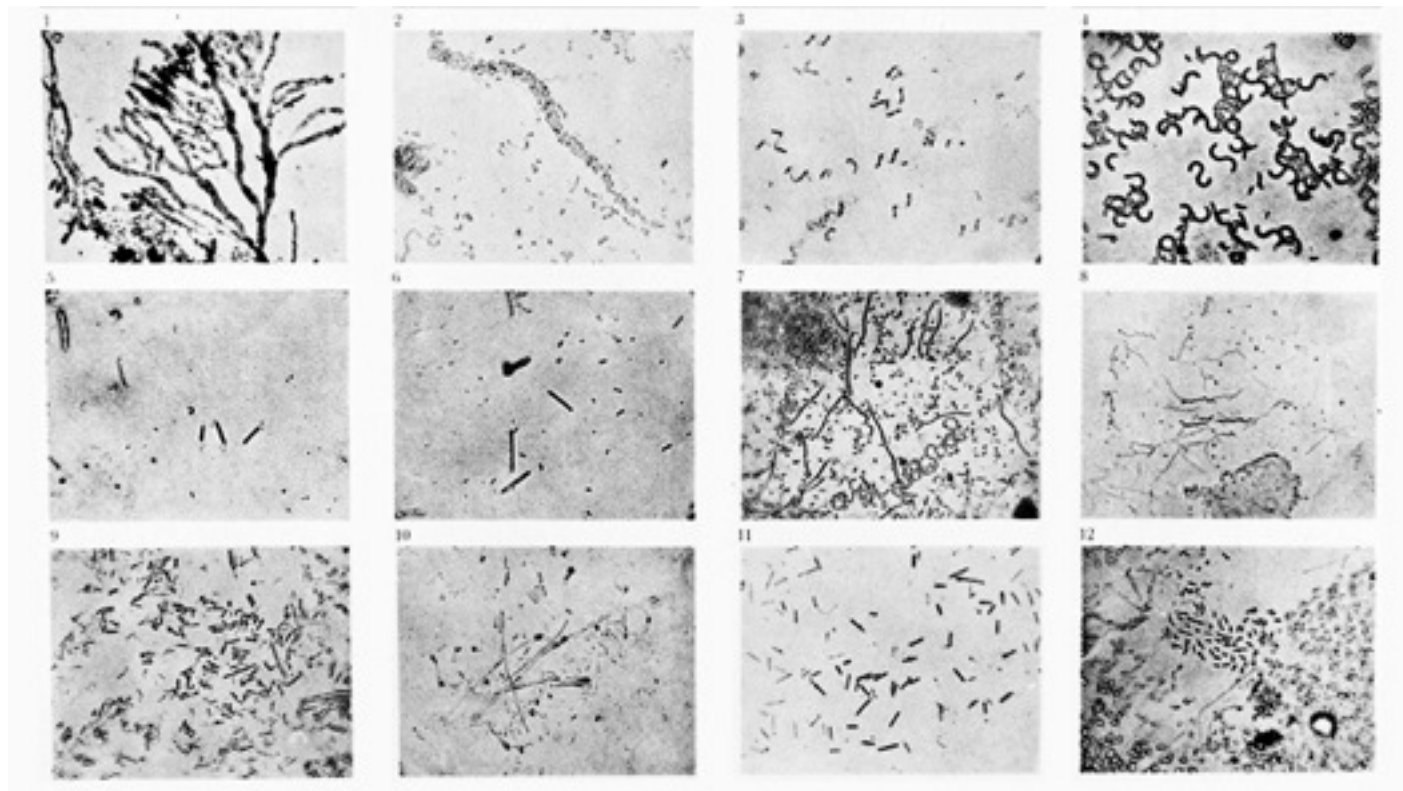
**Aristotle**



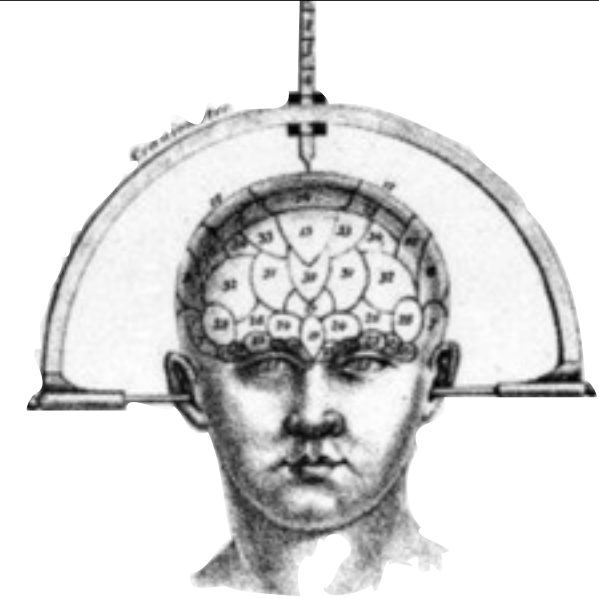
**Harvey**



**Linnaeus**







**the modern synthesis**

# evolution, an old idea



**Anaximander**

# **evolution, an old idea**



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**pseudo-evolution theory: first men birthed from fish**

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## Anaximander

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## Empedocles

changed by **two forces: love & strife**  
random pairings result in organism  
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influence of Plato and Aristotle overrides speculations  
(forms / species are immutable)

**by 1800's evidence began to shift in other direction**



# **pre Darwin**



**Goethe**

**a species can gradually transform into another  
environmental pressures**

# pre Darwin



**Goethe**

**a species can gradually transform into another  
environmental pressures**

## **Philosophie Zoologique**

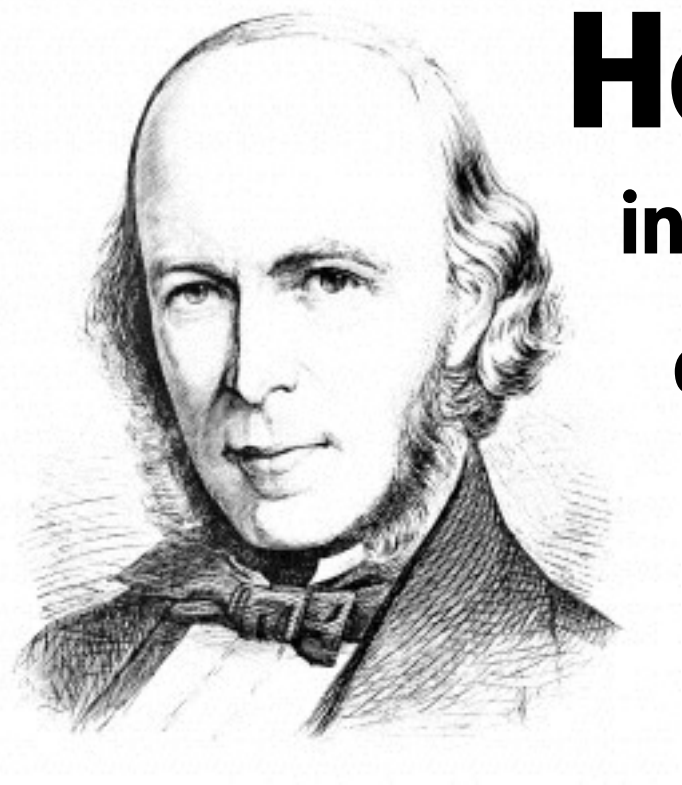
species change according to their own  
efforts throughout their lifetime

## **"inheritance of acquired characteristics"**

traits acquired during and organism's  
lifetime get passed on to offspring



**Lamarck**



# Herbert Spencer

**influenced by Lamarck, generalizes t.o.E of everything**

**differentiation: complexity arises out of homogeneity**

**human intelligence is due to this process**



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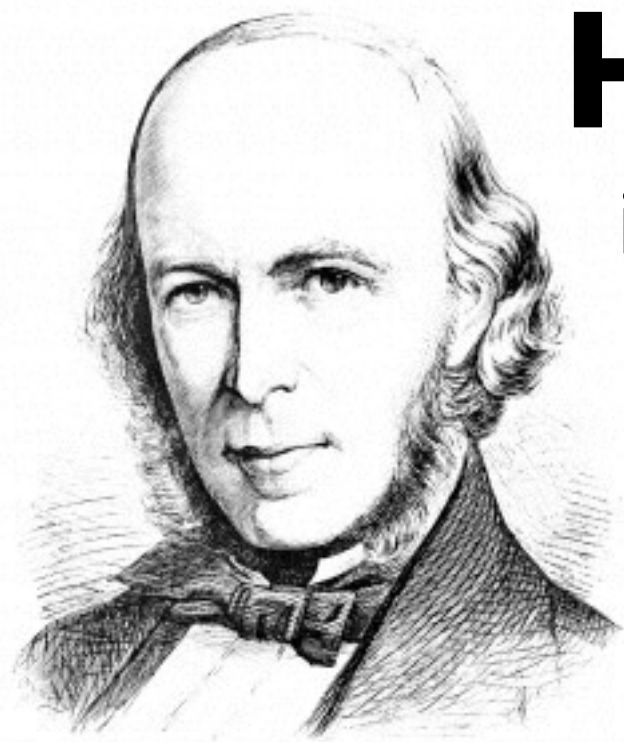
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**evolutionary associationism**





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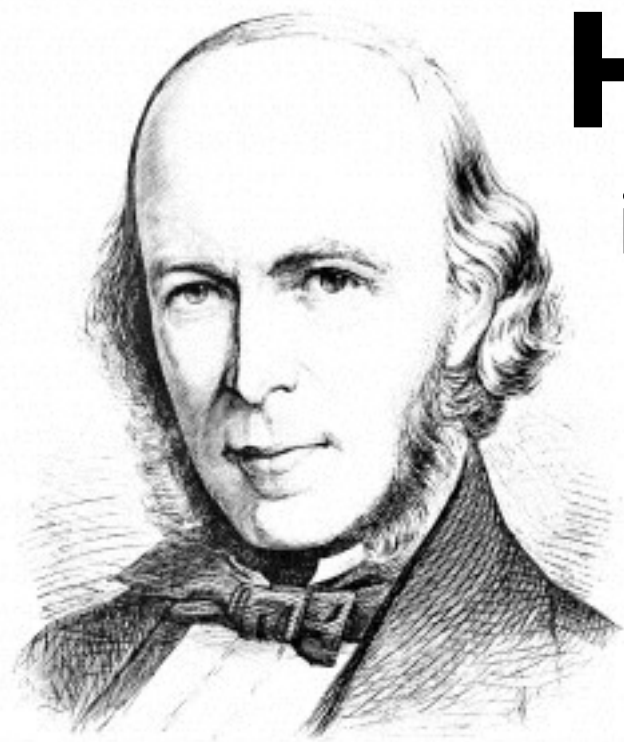
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## Social Darwinism

evolutionary principles as applied to societies

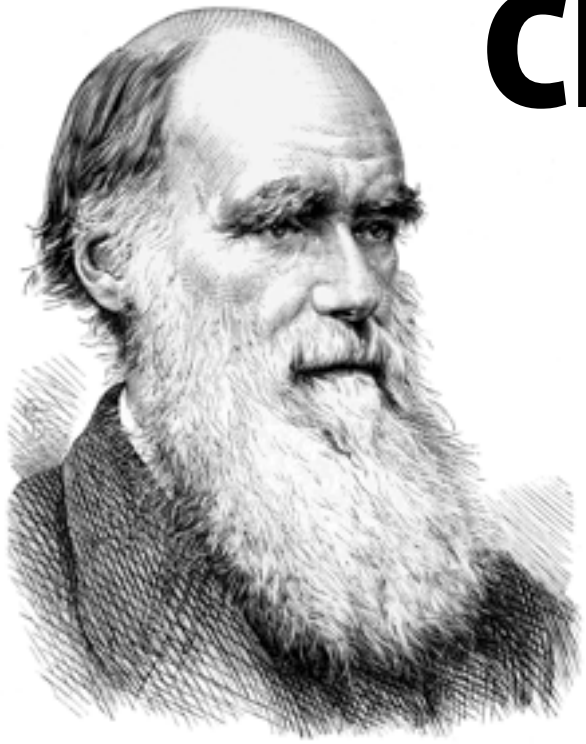
survival of the fittest

***laissez-faire* governments = Capitalism**

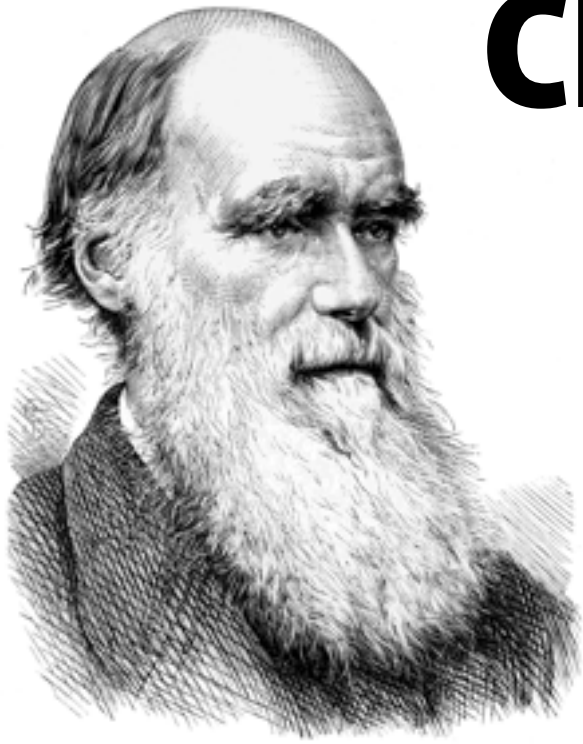
*"thus the weak members of civilized societies propagate their kind.  
No one who has attended to the breeding of domestic animals would  
doubt that this must be highly injurious to the race of man"*

# **Charles Darwin**

**these are the voyages of the HMS Beagle**



# **Charles Darwin**

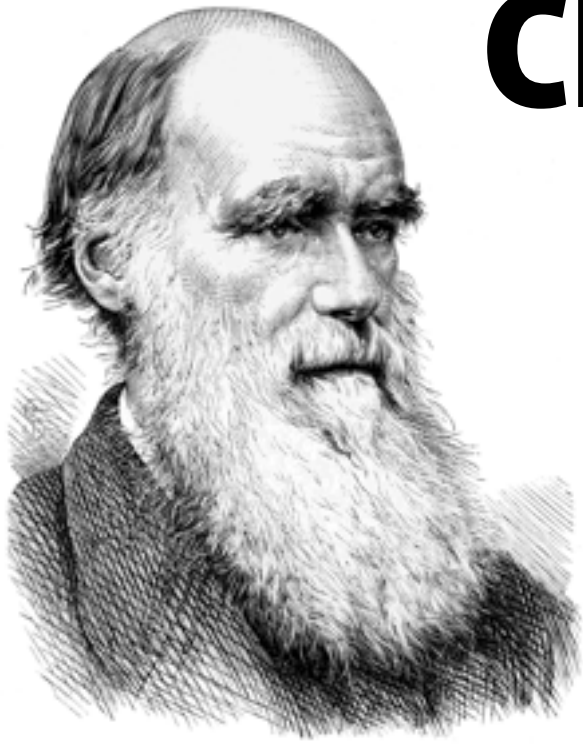


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**upon returning struggled to find a mechanism  
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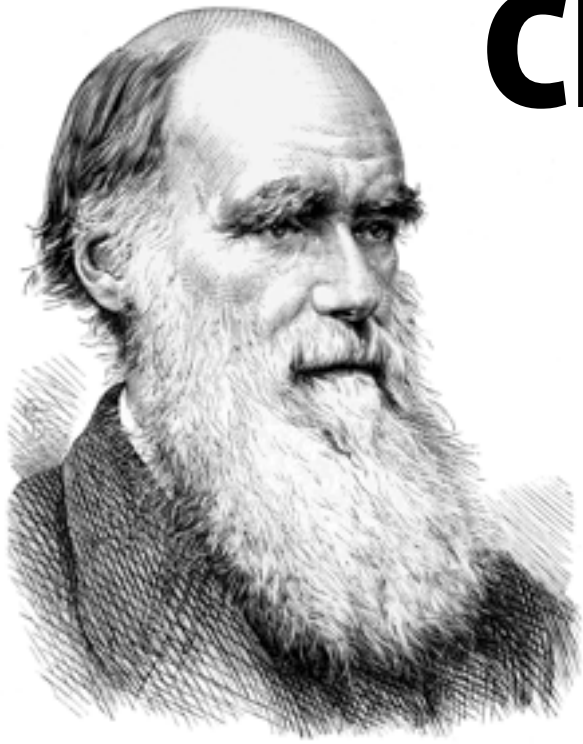
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**Thomas Malthus: *Essay on the Principle of Population***



**the external constraints on  
human population growth  
war, famine, disease**

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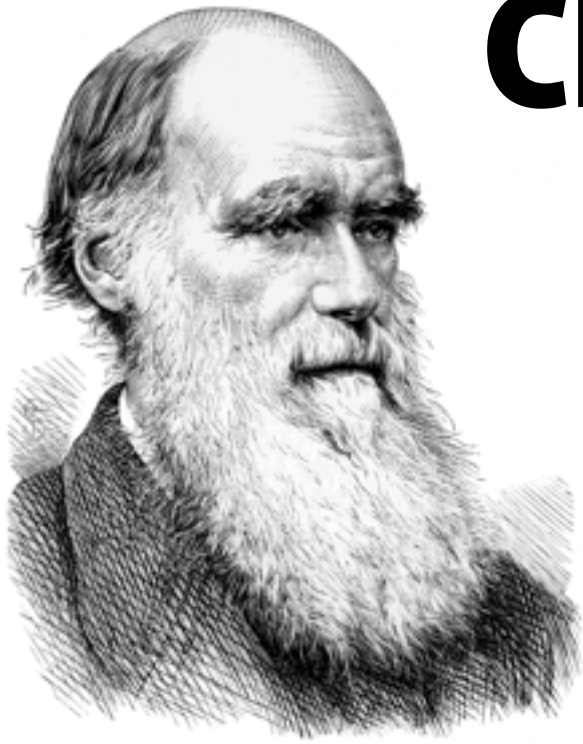
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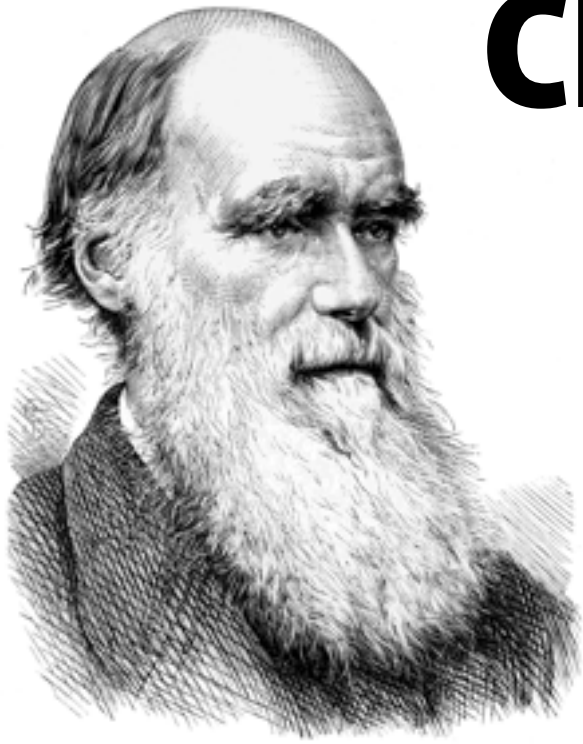
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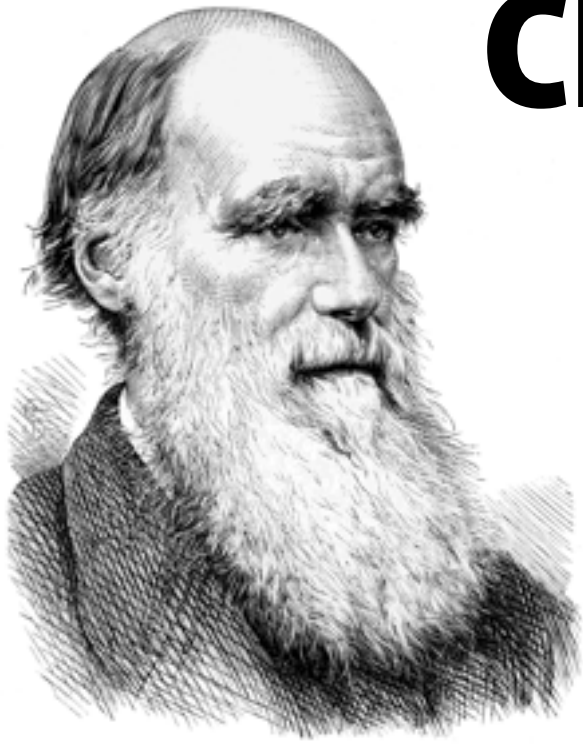
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**early issues**

Darwin's theory of Evolution requires time (300m yrs)

material mechanism (+ Gregor Mendel = modern synthesis)

Thomas Malthus: *Essay on the Principle of Population*



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# **influence of Darwin**

**search for fitness characteristics places emphasis on the individual**

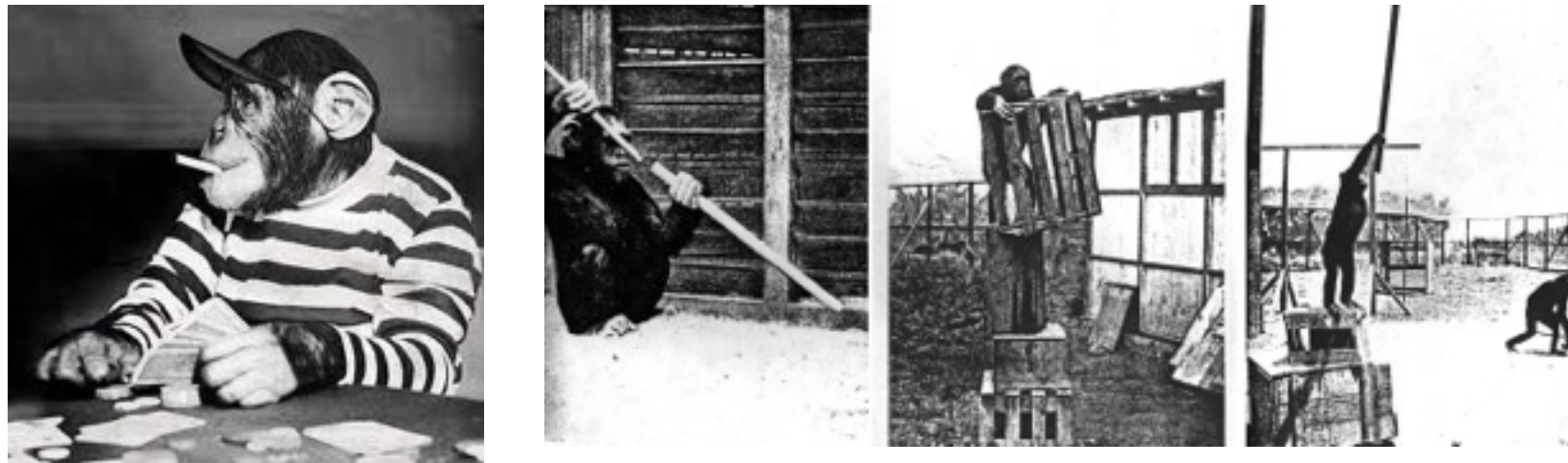
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**developmental, psychobiology, learning, tests and measures, behavioral genetics, evolutionary psychology**

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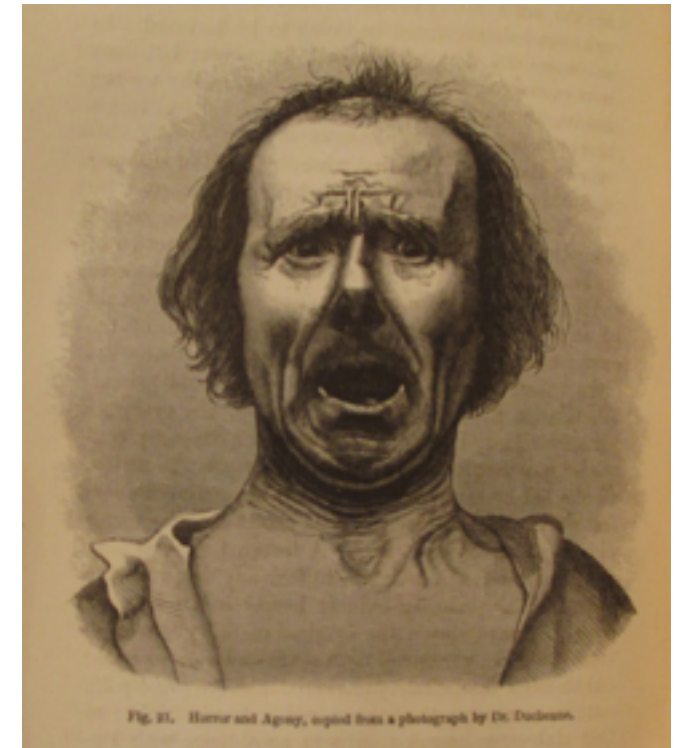
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## *The Expression of Emotions in Man and Animals*

basic forms of human behavior and emotion evolved because they are advantageous

some expressions weaker forms of behavior that have over time gained communicative value



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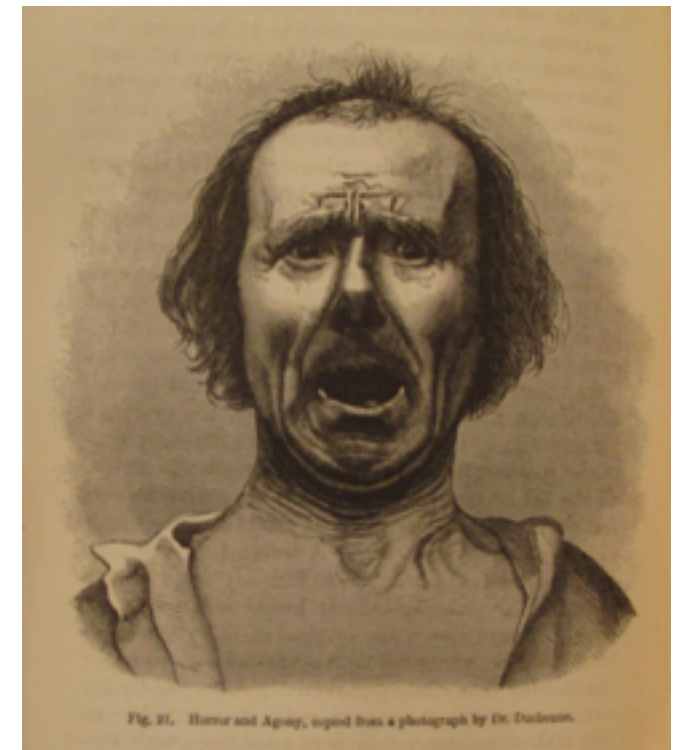
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contemporary primitives as link to modern man  
intellectual inferiority of women

Homo frontalis v. Homo parietalis  
females of most species resemble young  
selection men: intellect; women: sexually attractive



## *The Expression of Emotions in Man and Animals*

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# Francis Galton

**The inheritance of character and ability**

**sought to investigate the keys to Darwinian evolution (accidental variation, selection, and adaptation) in human individuals and races**

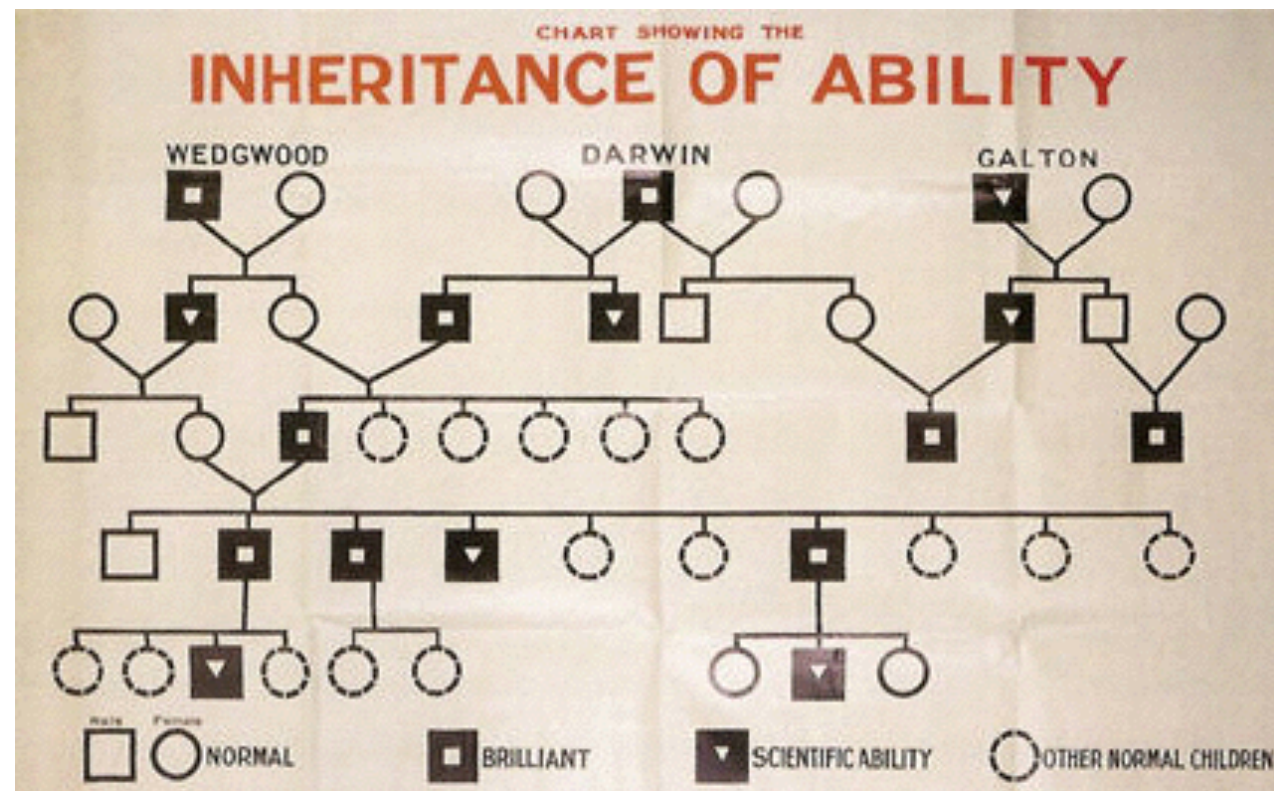


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### *Hereditary Genius*



individuals inherit specific forms of genius, criminality, imbecility, artistry, & ability

among first to use survey methods





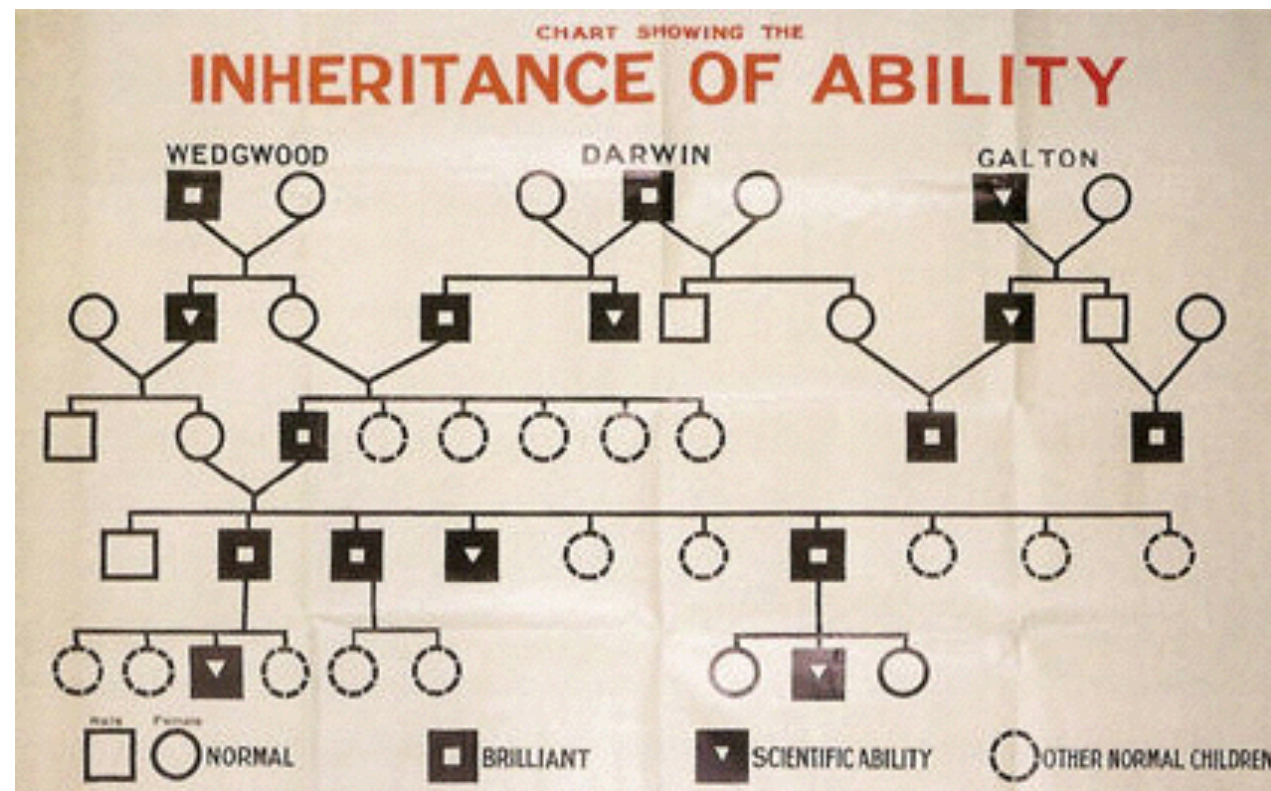
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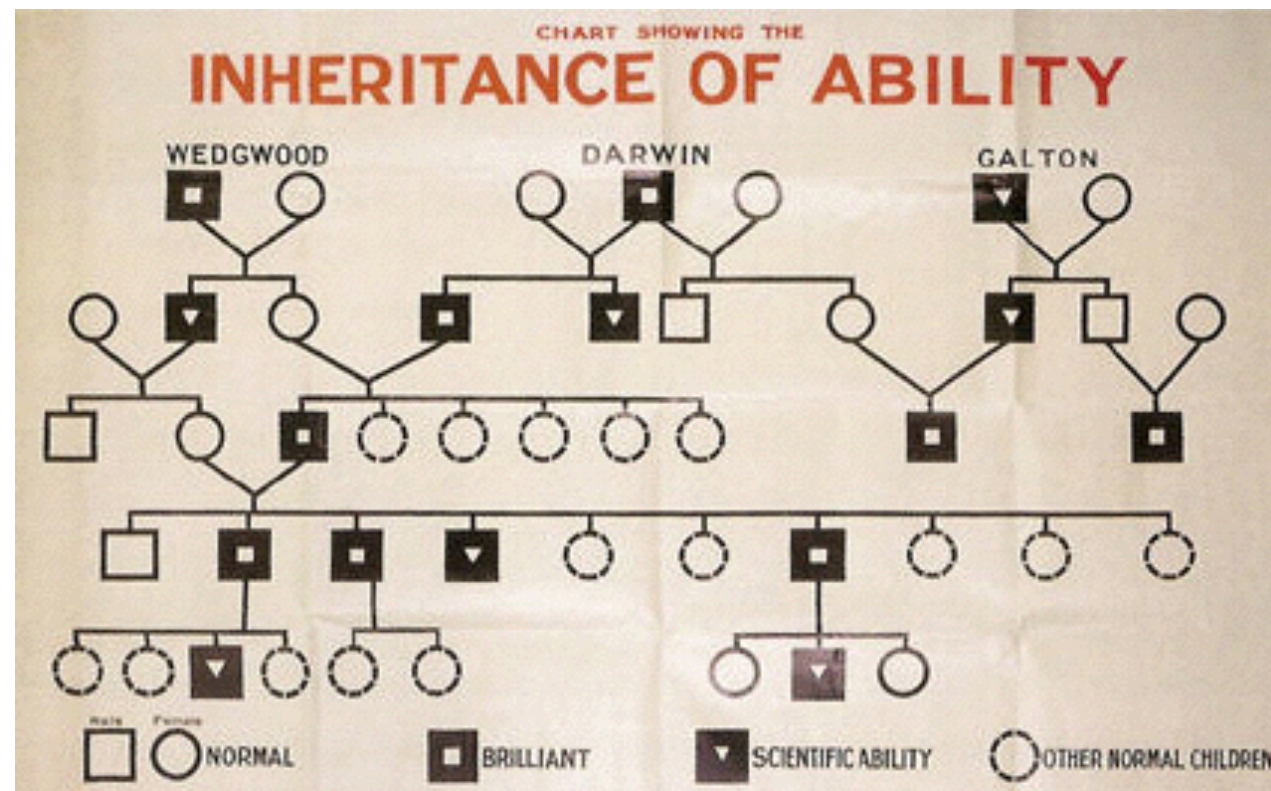
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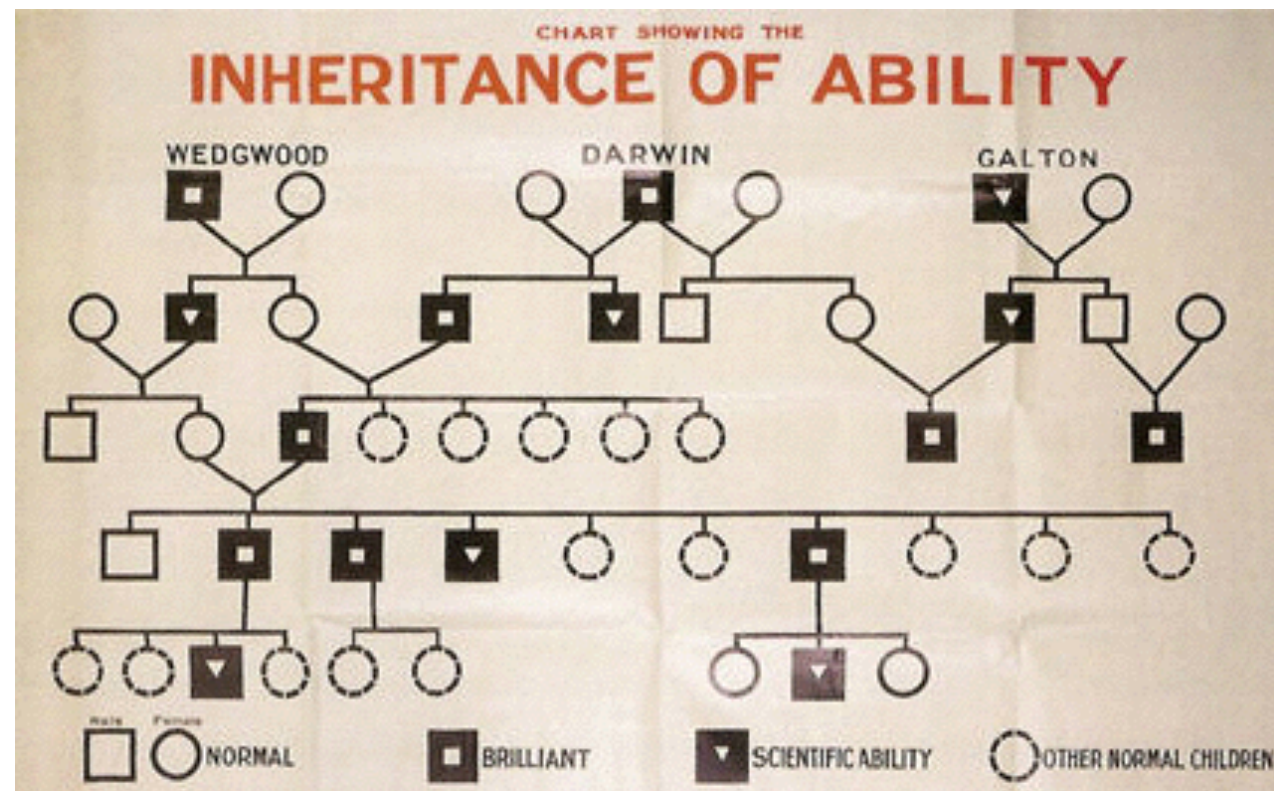


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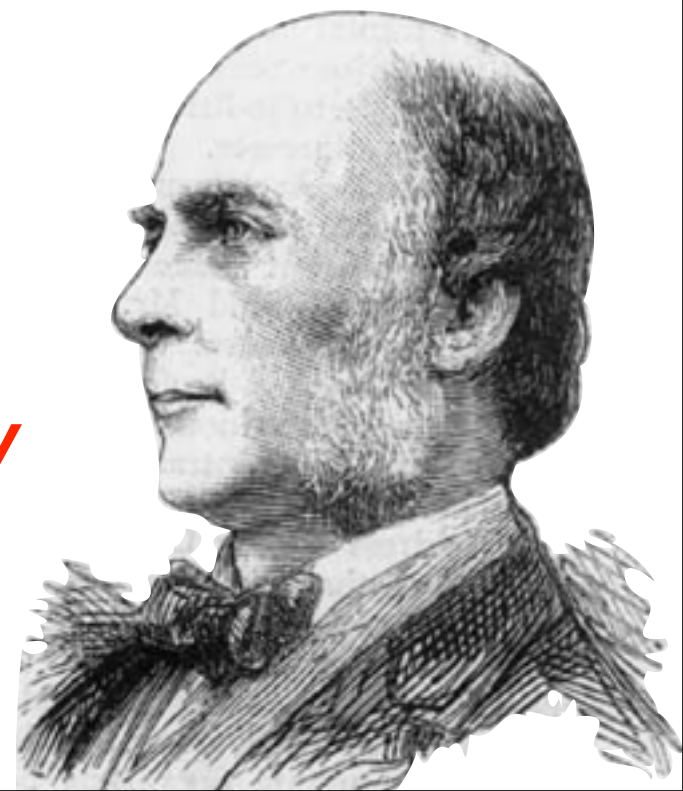
among first to use survey methods

**nature** v. nurture

### Eugenics

*the science which deals with all influences that improve the quality of a race; also with those that develop them to the utmost advantage*

*a new biological foundation for society*





# Psychometrics

**not your grandfather's intelligence test**

**equated sensory acuity w/ intelligence**

**focus on anthropometrics**



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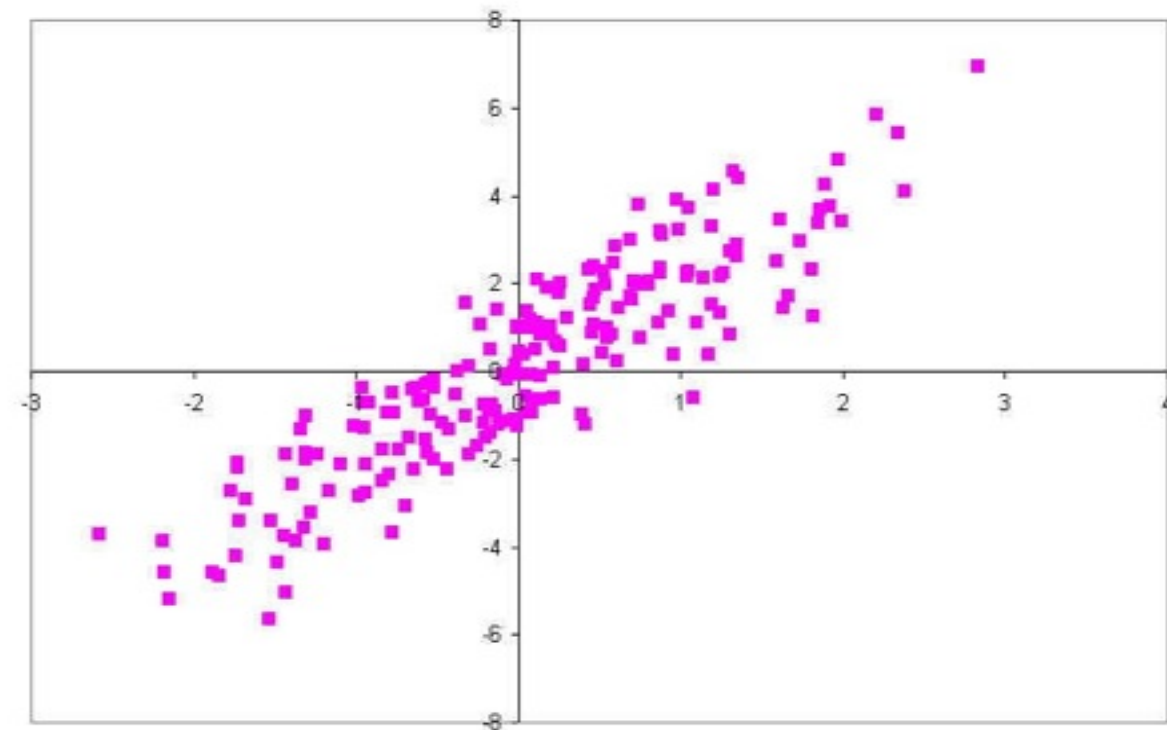
**focus on anthropometrics**

**major contributions to statistics**

**no one to one correspondence  
between measures, how do you  
quantify? **probability.****

**standard methods for relation  
of two variables**

## Relational data



**the coefficient of correlation**

# Intelligence Testing



**J. McK. Cattell**

**student of Galton and Wundt**

**need to apply measures and tests to large populations**

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**hand strength, two- point threshold, amount of pressure required to cause pain, ability to discriminate between weights, reaction time, accuracy of bisecting a 50-centimeter line, accuracy in judging a 10-second interval, and ability to remember a series of letters.**



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**American Men v. British Men (of science)**

**eminent men on the decline**

**Galton emphasized heredity, Cattell argued for lack of opportunity**

# Binet



**closer to your grandfather's intelligence test**

**Commissioned by French Government in 1904 to study mentally challenged**

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**views on intelligence: not a single ability but several**

**heredity might place upper bounds on intelligence, but experience influences individual ability**

**everyone can grow intellectually**

# **Binet-Simon scale**

**Assessment of intellectual deficiency**

**motor development and other cognitive abilities**

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**distinguish among levels of intelligence in normal children**

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**includes young adults, introduces idea of “intellectual age”**

**Binet’s concerns were primarily applied / education (mental orthopedics)**

# general intelligence

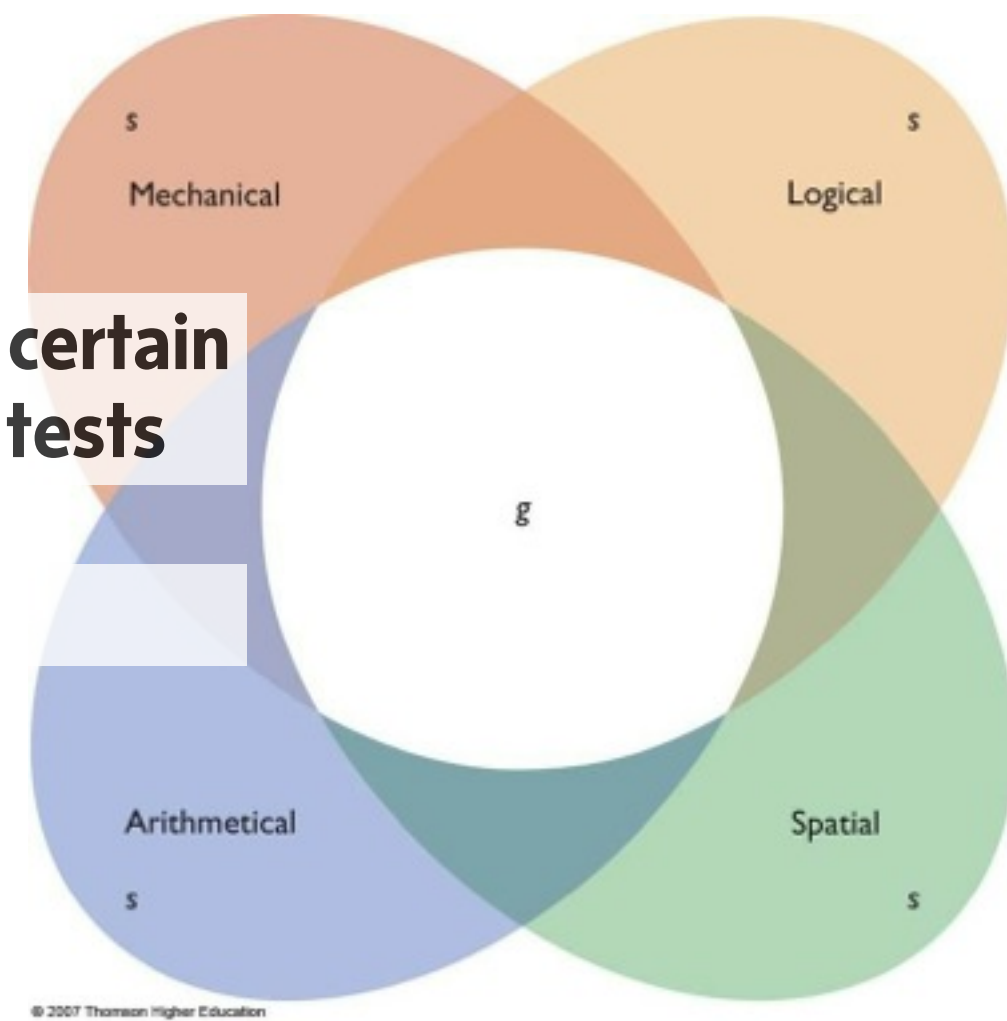


**Spearman**

**s-factor: specific abilities unique to certain tests or shared only by a subset of tests**

**g-factor: general intelligence**

**major contribution in statistical methods (factor analysis)**



**"g" is largely inherited (65% - 70%)**

**model of intelligence influential in the U.S.**

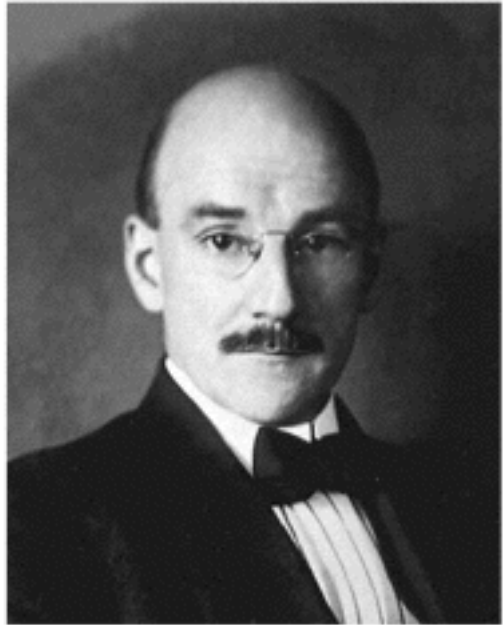
published papers showing a difference in intelligence between **whites and blacks**



**Burt**

# **intelligence tests in the U.S.**

**Galton - Spearman tradition**



© Psychology Archives-The University of Akron

**Goddard**

**intelligence tests of the "feeble minded"  
coined the term moron**

**Further promotes the ideas of eugenics in the US**

**In 1927 the Supreme Court ruled that states have  
the right to sterilize those they thought unfit**

**1907-1963 over 64,000 individuals were forcibly  
sterilized under eugenics legislation in the U.S.**

**Nazi war criminals cited the U.S. as the inspiration  
(sterilized over 450,000 in less than a decade)**

# Stanford-Binet



**Terman**

# Stanford-Binet



**Terman**

**modified Binet-Simon to fit US children**

**found that the tests were not consistent  
across ages**

**adjusts measures until average score is 100  
(intelligence quotient)**

**validated results by correlating to academic performance**



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## ***Genetic Studies of Genius***

**children identified as exceptionally bright had high academic and professional success later in life**

# **educational applications**



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**Leta Setter  
Hollingworth**

**important work in discrediting “women’s  
genetic inferiority**

**later work with “defective” individuals**

**work with “gifted”:**

**no effective way of educating children in public schools**

**children often suffer from a lack of stimulation and parental nurturing**

**discoveries of exceptional children’s special needs and proneness to  
adjustment issues led to reform in the education system and flexible  
curriculums that can be varied to better suit the children’s needs.**

# debates on intelligence



**Yerkes**

**comparative psychology**

**Military applications**

**your (great) grandfather's intelligence test**

**influenced by Galton (eugenics)**

**sets up the Army Testing Program**

**alpha test and beta test**

**influenced national debate on deterioration of national intelligence**

*Been around the world and found  
That only stupid people are breeding  
The cretins cloning and feeding  
And I don't even own a tv*

**social applications**

**in the follow decades evidence mounts  
against strongly nativist viewpoints**



# **your grandfathers intelligence test**



**David Wechsler (1937)**

**Attempted to minimize biases in intelligence tests  
Focused on measuring adult intellectual abilities  
IQ as an individual's position relative to peers of the  
same age on a frequency distribution**

**Wechsler Adult Intelligence Scale (WAIS-III; 1997)**

**Wechsler Intelligence Scale for Children (WISC-III; 1997)**

**Abandoned the concept of mental age**

**IQ derived from a number of subtests**



# intelligence is what tests measure





# **unifying problem**

**studies in intelligence lead to the development of new methods and metrics on handling individual differences (questionnaires, surveys, systematic longitudinal investigations, correlational data, factor analysis)**

**psychology moves toward “higher problems” and finds it practical fit in science**