

# Prepared Minds Darwin – Wallace and Mendel Precedents

from  
Natural Philosophy  
to  
Natural Sciences  
Biology  
Scientific Horticulture  
Demography – Political Economics  
“Back crosses” – “Dominance” – “Selection”  
Struggle for Existence (Survival of the “fittest”)  
Origin of Species – Natural Selection  
“Allele” – Mendel’s Laws of Inheritance  
Genetics

# Discoveries - Ideas - Principles – Theories - Verification - Revolutions

During the late 18<sup>th</sup> and early 19<sup>th</sup> century, cardinal observations triggered new ideas about the essence of life and the nature of man. Concurrently, those who harbored hopes for greater liberty and human dignity, inspired new ideologies. With the French Revolution, the most powerful monarchy failed and it was followed by an unrelenting ongoing collapse of authoritarian regimes regardless if sustained by traditional religious or newly coined social ideologies. The recent collapse of communism and the implosion of the U.S.S.R. underscore how ideologies discrepant with prevailing perceptions of human dignity fall. As **advances in genetics** continue to open **new vistas**, current “**humanistic**” and “**bioethics**” judgments point out ambiguities that are distressing to societies.



Charles Robert Darwin

Charles Robin Darwin (1809-1882) with Russel Albert Wallace (1823-1913) and Gregor Mendel (1822-1884) became central figures that revolutionized the whole sphere of biology, then studied by “Naturalists”. Their prepared minds synthesized a plethora of previous observations, as well as their own, into “Principles” and a testable “Theory”.  
(continued )



Russel Wallace

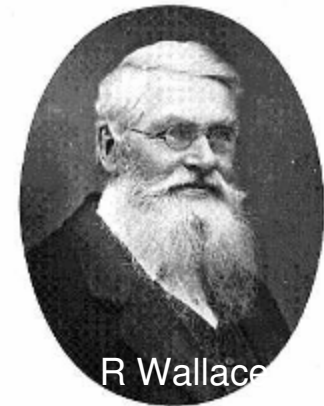
# Discoveries – Ideas – Principles – Theories – Verification - Revolutions (continued)



Dogmatic views about the “creation of life” were challenged by observations of extinct and **“transmutation of species”**.

The report by Darwin on “The **Origin of Species** by means of **Natural Selection** or The Preservation of Favoured Races in the Struggle for Life” and by Wallace as “On the **Tendency of Varieties to Depart Indefinitely from the Original Type**”, currently referred to as “**Evolution of Species**” is a “theory” that withstood the test of investigations that followed and retains its central position in modern Biology.

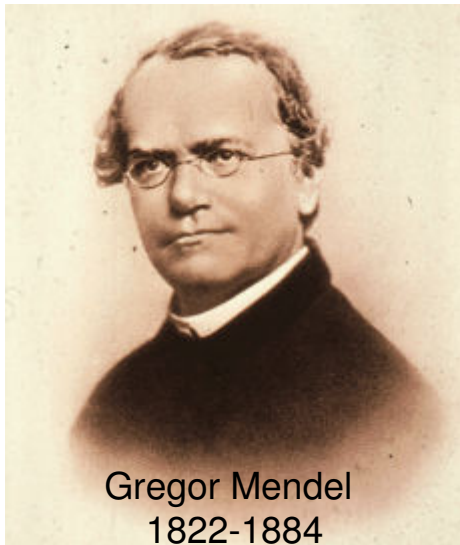
Notably, neither Darwin nor Wallace, having no knowledge of Mendel’s studies, challenged the “**Pangenesis**” theory that was prevalent at the time. (continued)



R Wallace

A handwritten signature of Alfred Russel Wallace, written in cursive script.

## Discoveries – Ideas – Principles – Theories – Revolutions – Verification (continued)



Gregor Mendel  
1822-1884

**“Pangenesis”** or the “blending” theory of inheritance became obsolete once **Mendel’s statistical studies** of inheritance became known. Mendel was the first to focus on **mathematical ratios** and to conclude that inheritance was “particulate” (genes). Mendel was an expert horticulturist – he confirmed previous observations of hybridization, back crosses, dominance and added 7 years of his own experiments. Being mathematically prepared, Mendel concluded that hereditary information flowed as **inheritance units (alleles, later called genes)** in accordance to simple statistical laws. In 1866, Mendel reported “laws of Inheritance” – **“law of segregation of characters”** and **“law of independent assortment”**. With the discovery of **chromosomes**, Mendel was “re-discovered” in 1905 and “Mendel’s Laws” laid the foundation of the new science of scientific inheritance or **Genetics**, so named in 1906.

## Darwin - Wallace - Mendel

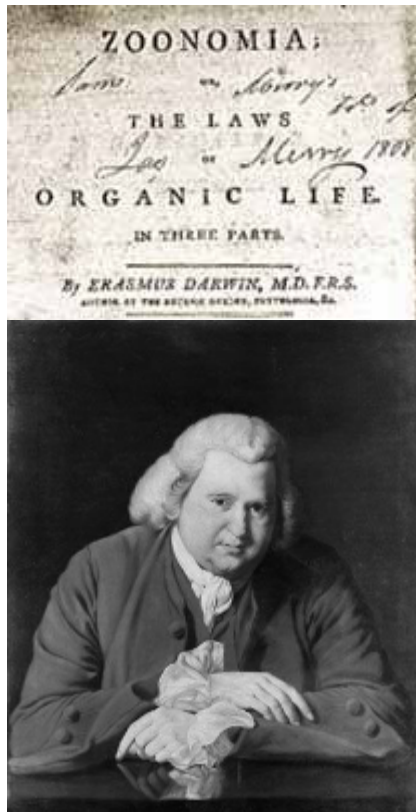
### Persisting Precedents

Many outstanding precedent discoveries prepared the minds of Darwin and Wallace to interpret their observations in an original manner. Only some examples follow and a few others are given in the Appendix.

Previously, reference was made to **Linnaeus** and the Linnean Taxonomy. Linnee systematized the discoveries of “Naturalists”, thus facilitated the data collection, organization, analysis and comparisons of findings and conclusions drawn by Darwin and Wallace.

“Natural Taxonomy” and Medical Taxonomy of **Nosology** (classification of “diseases”) evolved concurrently. An example is Daltonism or “color blindness” cited earlier. Nosology can be based on “symptoms or signs” (**Syndromology** as is “color blindness”, a heterogeneous group of disorders prevalent in males); **pathogenesis** (mechanism of translation of cause into effect – Dalton donated his eyes to clarify the pathogenesis of his “color blindness”); **etiology** (Daltonism is the result of an X-linked gene mutation – the clinical heterogeneity results for a variety of gene alleles mutated in various ways, from base substitutions to small deletions); and diseases can also be classified by cause of death which gave rise to the current **ICD medical billing code**.

Darwin - Wallace - Mendel  
Persisting Precedents (Continued)  
**Impact of Erasmus Darwin (1731-1802)**



**Erasmus Darwin** was known for his early **evolutionary ideas** which, among others, greatly impacted his grandson Charles Darwin.

*“ ... imagine that, in the great length of time since the earth began to exist ... imagine that all warm-blooded animals have arisen from one living filament ... with the power of acquiring new parts, attended with new propensities ... thus possessing the faculty of continuing to improve by its own inherent activity, and of delivering down these improvements by generation to its posterity ... ”*

Darwin - Wallace - Mendel  
Persisting Precedents (continued)  
Impact of Jean-Babtist Lamarck (1774-1829)



***“Use it or loose it”**  
persists as a refrain*

**Lamarck** introduced the notion that **traits can be inherited**. He is unjustly vilified for believing in the heritability of “useful traits” acquired through “use” or lost from “disuse”.

T. Lysenko, a favored USSR geneticist, is accused of **“Lamarckism”** as well as crimes against humanity.



T. Lysenko engaged in **“Lysenkoism”** – a political campaign against geneticists during the Stalinist era. (see Appendix)

Darwin - Wallace - Mendel  
Persisting Precedents  
Impact of Thomas Robert Malthus (1766-1834)



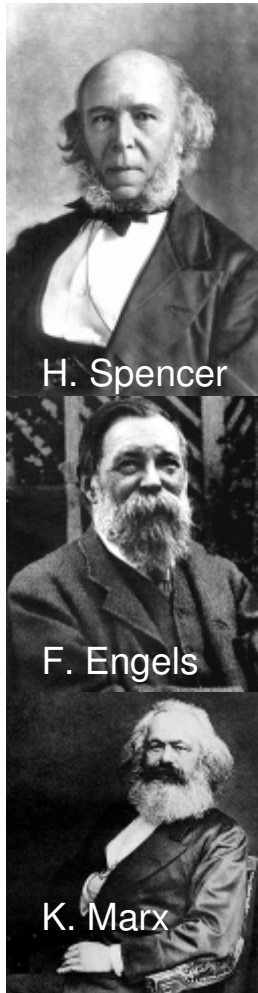
Malthus had a **surgically corrected cleft lip and palate.**

Malthus, a humanist, published **“An Essay on the Principle of Population”** which established **Political Economics** and **Scientific Demography**.

***“The power of population (growth) is so superior to the power of the earth (to sustain subsistence) for man that premature death must in some shape or other visit the human race ... “*** now Political Economics is called “the dismal science”.

The impact of the Essay was transcendental and led H. Spencer to coin the phrase **“survival of the fittest”** which was reluctantly adopted by C. Darwin to replace his preference for **“struggle for survival”**. The implications in “fittest” reflected the social views of H. Spencer whose influence impacted ethics and politics.  
(continued)

Darwin - Wallace - Mendel  
Persisting Precedents (continued)  
Impact of Thomas Robert Malthus (1766-1834) (continued)



**“An Essay on the Principle of Population” ...**  
***“the most important book I read ...” (R. Wallace)***

Darwin and Wallace recognized the significance of **intra-species** and **inter-species “struggle for survival”** referred to by H. Spencer as **“the survival of the fittest”**. Arguably, called an “ultra-conservative”, Spencer published quite original “Principles of Ethics” and inspired **“Social Darwinism”** and the **Eugenics** movement (some refer to Spencer as a coarse social Darwinist). The idea of the “survival of the fittest” inspired others, including disastrous political actions ... Charles Dickens offers Ebenezer Scrooge in “A Christmas Carol” who refuses charity to the poor and declares that “the poor... better die and decrease the **surplus population**” ... Friedrich Engels and Karl Marx to develop the theory of **communism** ... inspired A. Hitler to justify criminal euthanasia ... Julian Huxley to write “The Crowded World” and establish UNESCO ... Aldous Huxley to write “Brave New Word” and Paul R. Ehrlich, **“The Population Bomb”** ... (Appendix)