

= Augustin Pyramus de Candolle =

Augustin Pyramus de Candolle also spelled Augustin Pyrame de Candolle (4 February 1778 ? 9 September 1841) was a Swiss botanist . René Louiche Desfontaines launched de Candolle 's botanical career by recommending him at an herbarium . Within a couple of years de Candolle had established a new genus , and he went on to document hundreds of plant families and create a new natural plant classification system . Although de Candolle 's main focus was botany , he also contributed to related fields such as phytogeography , agronomy , paleontology , medical botany , and economic botany .

Candolle originated the idea of " Nature 's war " , which influenced Charles Darwin and the principle of natural selection. de Candolle recognized that multiple species may develop similar characteristics that did not appear in a common evolutionary ancestor ; this was later termed analogy . During his work with plants , de Candolle noticed that plant leaf movements follow a near @-@ 24 @-@ hour cycle in constant light , suggesting that an internal biological clock exists . Though many scientists doubted de Candolle 's findings , experiments over a century later demonstrated that ? the internal biological clock ? indeed exists .

Candolle 's descendants continued his work on plant classification . Alphonse de Candolle and Casimir Pyrame de Candolle contributed to the *Prodromus Systematis Naturalis Regni Vegetabilis* , a catalog of plants begun by Augustin Pyramus de Candolle .

= = Early life = =

Augustin Pyramus de Candolle was born on 4 February 1778 in Geneva , Switzerland , to Augustin de Candolle , a former official , and his wife , Louise Eléonore Brière . His family descended from one of the ancient families of Provence in France , but relocated to Geneva at the end of the 16th century to escape religious persecution .

At age seven de Candolle contracted of a severe case of hydrocephalus , which significantly affected his childhood . Nevertheless , he is said to have had great aptitude for learning , distinguishing himself in school with his rapid acquisition of knowledge in classical and general literature and his ability to write fine poetry . In 1794 , he began his scientific studies at the Collège Calvin , where he studied under Jean Pierre Étienne Vaucher , who later inspired de Candolle to make botanical science the chief pursuit of his life .

= = Career in botany = =

Candolle 's initiation to botany happened in 1794 thanks to Pierre Etienne Vaucher in Geneva . He spent then four years at the Geneva Academy , studying science and law according to his father 's wishes . In 1798 , he moved to Paris after Geneva had been annexed to the French Republic . His botanical career began with the help of René Louiche Desfontaines , who recommended de Candolle for work in the herbarium of Charles Louis L 'Héritier de Brutelle during the summer of 1798 . The position elevated de Candolle 's reputation and also led to valuable instruction from Desfontaines himself. de Candolle established his first genus , *Senebiera* , in 1799 .

de Candolle 's first books , *Plantarum historia succulentarum* (4 vols . , 1799) and *Astragalogia* (1802) , brought him to the notice of Georges Cuvier and Jean @-@ Baptiste Lamarck. de Candolle , with Cuvier 's approval , acted as deputy at the Collège de France in 1802 . Lamarck entrusted him with the publication of the third edition of the *Flore française* (1803 ? 1815) , and in the introduction entitled *Principes élémentaires de botanique* , de Candolle proposed a natural method of plant classification as opposed to the artificial Linnaean method . The premise of de Candolle 's method is that taxa do not fall along a linear scale ; they are discrete , not continuous .

In 1804 , de Candolle published his *Essai sur les propriétés médicales des plantes* and was granted a doctor of medicine degree by the medical faculty of Paris . Two years later , he published *Synopsis plantarum in flora Gallica descriptarum*. de Candolle then spent the next six summers making a botanical and agricultural survey of France at the request of the French government ,

which was published in 1813 . In 1807 he was appointed professor of botany in the medical faculty of the University of Montpellier , where he would later become the first chair of botany in 1810 . While in Montpellier , de Candolle published his *Théorie élémentaire de la botanique* (Elementary Theory of Botany , 1813) , which introduced a new classification system and the word taxonomy . Candolle moved back to Geneva in 1816 and in the following year was invited by the government of the Canton of Geneva to fill the newly created chair of natural history .

de Candolle spent the rest of his life in an attempt to elaborate and complete his natural system of botanical classification. de Candolle published initial work in his *Regni vegetabilis systema naturale* , but after two volumes he realized he could not complete the project on such a large scale . Consequently , he began his less extensive *Prodromus Systematis Naturalis Regni Vegetabilis* in 1824 . However , he was able to finish only seven volumes , or two @-@ thirds of the whole . Even so , he was able to characterize over one hundred families of plants , helping to lay the empirical basis of general botany . Although de Candolle 's main focus was botany , throughout his career he also dabbled in fields related to botany , such as phytogeography , agronomy , paleontology , medical botany , and economic botany .

= = Later life = =

Augustin de Candolle was the first of four generations of botanists in the de Candolle dynasty . His son , Alphonse de Candolle , whom he fathered with his wife , Mademoiselle Torras , eventually succeeded to his father 's chair in botany and continued the *Prodromus* . Casimir Pyrame de Candolle , Augustin de Candolle 's grandson , also contributed to the *Prodromus* through his detailed , extensive research and characterization of the *Piperaceae* family of plants . Augustin de Candolle 's great @-@ grandson , Richard Émile Augustin de Candolle , was also a botanist . Augustin de Candolle died on 9 September 1841 in Geneva , after being sick for many years .

= = Legacy = =

He is remembered in the plant genera *Candollea* and *Candolleodendron* , and the mushroom *Psathyrella candolleana* . *Candollea* , a scientific journal that publishes papers on systematic botany and phylotaxonomy , was named after de Candolle and his descendants in honor of their contribution to the field of botany . He was a mentor to the French @-@ Mexican botanist Jean @-@ Louis Berlandier .

= = = Classification system = = =

de Candolle was the first to put forward the idea of " Nature 's war " , writing of plants being " at war one with another " with the meaning of different species fighting each other for space and resources . Charles Darwin studied de Candolle 's " natural system " of classification in 1826 when at the University of Edinburgh , and in the inception of Darwin 's theory in 1838 he considered " the warring of the species " , adding that it was even more strongly conveyed by Thomas Malthus , producing the pressures that Darwin later called natural selection . In 1839 de Candolle visited Britain and Darwin invited him to dinner , allowing the two scientists the opportunity to discuss the idea .

de Candolle was also among the first to recognize the difference between the morphological and physiological characteristics of organs . He ascribed plant morphology as being related to the number of organs and their positions relative to each other rather than to their various physiological properties . Consequently , this made him the first to attempt to attribute specific reasons for structural and numerical relationships amongst organs , and thus to distinguish between major and minor aspects of plant symmetry . To account for modifications of symmetry in parts of different plants , an occurrence that could hinder the discovery of an evolutionary relationship , de Candolle introduced the concept of homology .

= = = Chronobiology = = =

de Candolle also made contributions to the field of chronobiology . Building upon earlier work on plant circadian leaf movements contributed by such scientists as Jean @-@ Jacques d 'Ortous de Mairan and Henri @-@ Louis Duhamel du Monceau , de Candolle observed in 1832 that the plant *Mimosa pudica* had a free @-@ running period of leaf opening and closing of approximately 22 ? 23 hours in constant light , significantly less than the approximate 24 @-@ hour period of the Earth 's light @-@ dark cycles . Since the period was shorter than 24 hours , he hypothesized that a different clock had to be responsible for the rhythm ; the shortened period was not entrained ? coordinated ? by environmental cues , thus the clock appeared to be endogenous . Despite these findings , a number of scientists continued to search for " factor X " , an unknown exogenous factor associated with the earth 's rotation that was driving circadian oscillations in the absence of a light dark schedule , until the mid @-@ twentieth century . In the mid @-@ 1920s , Erwin Bunning repeated Candolle 's findings and came to similar conclusions , and studies that showed the persistence of circadian rhythm in the South Pole and in a space lab further confirmed the existence of oscillations in the absence of environmental cues .

= = Published works = =

Reticularia rosea (1798)

Historia Plantarum Succulentarum (4 vols . , 1799)

Astragalogia (1802)

Flore française (1805 ? 1815) editor , 3rd ed . (Introduction : Principes élémentaires de botanique page 61)

vol . I 1815

vol . II 1805

vol . III 1815

vol . IV 1815 Latin Index page 931

vol . V 1815 Supplementary volume , volume index page 650

Les liliacées vols . 1 @-@ 4 , (1805 @-@ 1808) of 8

Essai sur les propriétés médicales des plantes comparées avec leurs formes extérieures et leur classification naturelle (1804)

Synopsis plantarum in flora Gallica descriptarum (1806)

Mémoire sur la Géographie des Plantes de France , Considérée dans Ses Rapports avec la Hauteur Absolue (1817)

Théorie élémentaire de la botanique (1813) , 2nd ed . 1819

Flore du Mexique (1819) transcribed in Hervé M. Burdet , " Le récit par Augustin Pyramus de Candolle de l 'élaboration de la Flore du Mexique , dite aussi Flore des dames de Genève , " *Anales del Jardín Botánico de Madrid* , 54 (1996) 575 @-@ 88 .

Regni vegetabilis systema naturale (2 vol . , 1818 ? 21)

Essai Élémentaire de Géographie Botanique (1820)

Prodromus Systematis Naturalis Regni Vegetabilis (17 vols . , 1824 @-@ 1873)

First seven volumes 1824 @-@ 1839 , continued by Alphonse de Candolle

= = Collections of works = =

View digitized titles by and a short biography of de Candolle in Botanicus.org

de Candolle 's works in Gallica

de Candolle at Biodiversity Heritage Library