

# Capturing the Visual Traits of a Mathematician – On Anders Johan Lexell’s Futile Studies in Physiognomy

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## Abstract

Physiognomy is the art of interpreting a person’s psyche from his outward appearance. Today physiognomy is dismissed as unscientific, but in the 18<sup>th</sup> century, the Finnish-Swedish mathematician A. J. Lexell put the method to a serious test. On his European journey in 1780–1781, he met with the famous mathematicians and philosophers of his time and used his skill to interpret their spiritual condition. The results were not convincing, but Lexell’s vivid descriptions of his contemporaries remain an important eye-witness to the Enlightenment.

## Introduction

Anders Johan Lexell (1740–1784) was a Swedish-Finnish mathematician and astronomer who in the years 1768–1783 worked with Leonhard Euler at the Petersburg Academy of Sciences in Russia [3]. Besides being a remarkable mathematician, Lexell also had a penchant for visual arts. He was particularly fond of the facial expressions captured in the portraits and sculptures by the great masters of the Renaissance and Baroque. In the Enlightenment, every aspect of the world was open for scientific inquiry, including human life in all its complexity. Lexell was known as a keen and patient observer of his environment and curious about the people he met. Would it be possible, he wondered, to interpret their outward appearance and facial traits in order to understand their inner, spiritual qualities? The learned collegium where he worked, with Leonhard Euler as his most notable associate, had plenty of material for the study of the outward signs of genius. As a guidebook and a source of inspiration to the subject, he employed the massive four volume treatise on physiognomy, *Physiognomischen Fragmente zur Beförderung der Menschenkenntnis und Menschenliebe* (1775–1778), which the Petersburg Academy had acquired in 1778. The author of this popular treatise was Johann Caspar Lavater (1741–1801), a Swiss reformed pastor in Zürich.

In 1780, Lexell embarked on a European journey of one and a half years to the most important centres of learning of his time. He visited observatories, libraries and botanical gardens, participated in the meetings of scientific societies and interacted with scientists and philosophers. Now he had an opportunity to train his ability in physiognomy. He communicated his observations to his colleagues in St. Petersburg and Stockholm in numerous letters (to be published shortly by the present author). However, as we will see, he was not very impressed by the results and doubted the reliability of the whole method. In our presentation, we will compare his conclusions about the persons he analysed with extant portraits.

### Lavater’s *Physiognomischen Fragmente*

Lavater regarded every human being as a unique whole and thought that a person’s bodily features should in some way reflect the qualities of his or her soul. Borrowing ideas from the ancient Greek philosophers [1], Lavater’s Physiognomy was a peculiar blend of aesthetics, psychology, and theology, in combination with the Enlightenment ideal of systematisation and geometrical exactness [2] – a feature that may have initially appealed to Lexell as a geometer.

Lavater’s holism can be comprised in three mutually related tenets: 1) that all created things are unique and distinct from each other (against the universal), 2) that every part has the nature and character of the

whole, just as every created thing is a mirror of its Creator, and 3) that certain features are adapted to a particular whole and cannot fit into another whole. Moreover, Lavater distinguishes the “animal”, the moral, and the intellectual life of a being as parts of the whole. Principally, these features are seated below the belly, in the breast and in the head, respectively. In the countenance, the forehead mirrors intellectual life, the nose and the cheek moral life, and the mouth and the chin animal life. The eyes are particularly important for Lavater as the centre of the whole individual. A specific feature of Platonic (or Neo-Platonic) origin in Lavater’s Physiognomy is his appeal to harmony between physical and moral beauty, especially when observed in a person’s countenance.

Much like phrenology and graphology, physiognomy is nowadays classified as a pseudo-science. No infallible and empirically testable connection has so far been discovered between the physical and the spiritual features of a human being. Lavater himself was conscious of the lack of hard evidence and emphasised that he has not provided a perfected system, but only fragments of physiognomic studies. He held mathematical knowledge in high regard and stressed the existence of principles as a feature of science (but not e.g. empirical verification, not to mention falsifiability of his theory). His challenge was thus to establish reliable principles which combine the unique physiognomic features of an individual with a universal structure. In this challenge he was unsuccessful, because in practice he was obliged to join countless exceptions to the rules, which in the end undermined the whole system.

However, Lavater maintains that when a physiognomist errs in his judgement of a countenance, it does not mean that the countenance lies about the character of the person, but it is the physiognomist that lacks the necessary discernment. This is probably what Blaise Pascal had in mind with his notion of the discerning spirit, *esprit de finesse*, a mind that can perceive the essential from a complex whole. Lavater’s account of physiognomical judgment can be illuminated by a comparison with his correspondent Immanuel Kant’s distinction between *determinant* judgment, where the particular is subsumed under a pre-given universal rule, principle, or law, and *reflective* judgement, where in Kant’s words « only the particular is given, for which the universal is to be found » (Ak 5:179) [2]. Physiognomical judgments are reflective, and in this respect, they resemble aesthetic judgements rather than rule-following mathematical judgments. In the words of Lavater himself, physiognomy, in so far as it is a science, measures and draws according to rule, like Dürer, and in so far as it is an art mastered by geniuses, depicts the truth following the imagination, like Raphael. Lavater clearly believed that there is an accord between physiognomy *qua* science and physiognomy *qua* art, but it is another matter to prove it.

When we are judging physiognomy today, it must be remembered that ancient humoral pathology or humoralism was still a part of standard medicine of the 18th century. Humoralism posited that an excess or deficiency of any of four distinct bodily fluids (blood, yellow and black bile, as well as phlegm) influences the temperament and health. The excess of each fluid of a person was manifested in different types, called by Galen sanguine, choleric, melancholic and phlegmatic. The typical features of these types were of course recognised by Lavater, but for him physiognomy went much further. He made extensive comparisons between animal and men and claimed that for instance horse-like outward appearance corresponds to a horse-like personality (whatever that can be), and so on.

By studying portraits of known artists and scientists, Lavater tried to identify their distinctive marks of genius. As a striking example of well-known scientists, Lavater analysed images of René Descartes and Isaac Newton. Figure 1 shows four drawings of Newton made from different paintings. Lavater studied them and commented in detail how well each one captures Newton’s genius. He writes in his spiritual manner (translated verbatim from the German):

The eyes, full of inner strength to take hold of an object; to grasp it, not merely to illuminate it; not to enfold it in the memory; but to devour it and to let it flow into the great All [...] The eyes full

of creativity – and the eyebrows full of the brightest, the most solid fertility [...] A marked nose – sweetly satisfied, not a smug lip; firm, honest chin etc.

In fact, Lavater only mentions those qualities which conform to his pre-existing mental image of Newton as a supreme geometer, attributing the lack of certain features to the inferior quality of the drawing itself.



**Figure 1.** Drawings of Isaac Newton (made after portraits) and studied by Lavater.

### Lexell's physiognomic studies

Lavater's physiognomic fragments encouraged Lexell to apply the method to his own observations from live persons. Below are excerpts of his unpolished notes of some famous scientists he met on his journey in 1780–1781, which he addressed to Leonhard Euler's son, Johann Albrecht:

- In Berlin Lexell met Joseph Louis Lagrange and writes seemingly impressed: « *Il a une physionomie très fine et très spirituelle en sorte qu'elle s'accorde très bien avec ses grands talents.* ».
- Abraham Gotthelf Kästner was Professor of Geometry in Göttingen and the future teacher of C. F. Gauss. His unusual physiognomy Lexell described as follows: « *La physionomie de Mr Kaestner ne cadre pas mal avec ses dispositions pour la satyre, et je ne pouvois pas m'empêcher en la regardant de me souvenir de John Wilkes, quoique le visage de Mr Kaestner n'est pas à beaucoup près si satirique, que celui de Wilkes. C'est principalement lorsque Kaestner rit, qu'on peut remarquer qu'il est enclin à la satyre. Cependant plusieurs personnes à Göttingue m'ont assuré, qu'il est d'un caractere excellent et le plus honnête homme, qu'on puisse trouver.* » John Wilkes, to whom Lexell compares Kästner, was a contemporary British radical journalist, known for his verbal wit and snappy responses. Similarly, Kästner was known for criticising his colleagues. This is probably what Lexell had in mind with the words « *satyre* » and « *satirique* ».
- Jean d'Alembert was one of the first scientists Lexell met when he arrived in Paris in November 1780. He made an immediate impression on Lexell by his hospitality and unusual social skills,

but his physiognomy did not conform to what he expected from a great mathematician : « ... sa figure n'a rien qui marque un grand génie et je suis assuré, que toutes les règles de Lavater se trouveront en défaut, avec Mr d'Alembert. » ; « ... son extérieur ou sa figure ne marquoit pas le grand mathématicien. En ayant examiné plus soigneusement, je vois que son front, étant bien voué, doit marquer des talents speculatifs. D'après un tableau peint il y a vingt ans, il doit avoir beaucoup changé de Physionomie, dans ce temps là il a eu les cheveux et la barbe noires, dont à présent on ne s'aperçoit pas, d'autant plus qu'il a les yeux cendrés. Il a beaucoup de vivacité dans les yeux et même un regard un peu malin. Il est petit et foible de corps. Il tremble beaucoup avec la tête, quoique il n'a plus que soixante trois ans. »

- Gaspard Monge (mathematician) : « Sa figure n'est pas prévenante, il est très noir, les sourcils froncés et la lèvre supérieure recourbée. »
- Adrien-Marie Legendre (mathematician) : « Sa figure ressemble beaucoup à celle de Mr Monge. On les croiroit tous deux originaires de la Tartarie. »
- Alexandre-Théophile Vandermonde (mathematician) : « ... passe pour être un homme de talent, quoiqu'il n'en a pas la mine. Sa manière de s'exprimer n'est pas trop claire. Il est petit et son front ne passeroit jamais pour le front d'un mathématicien. »
- Alexandre Guy Pingré (astronome) : « ... de juger après sa physionomie, il paroît très obstiné à défendre ses sentiments, ce qui est aussi conforme au caractère, qu'il a développé dans ses écrits. Il a l'organe de la parole très difficile. »
- Charles Messier (astronome) : « ... est d'une taille médiocre, un peu maigre et desséché, ce qui fait que sa santé pourroit être d'autant plus durable et forte, pour essuyer toutes ces fatigues, qu'il se donne. »
- Jean Sylvain Bailly (astronome) : « ... une grande figure maigre avec une physionomie aussi très oblongue. L'extérieur ne marque pas, qu'il a autant d'esprit, comme on en trouve dans son livre. D'ailleurs il est très complaisant, sage et modéré. »
- Marquis de Condorcet (mathematician), Charles Bossut (mathematician) : « Le Marquis de Condorcet est grand et bien fait, c'est lui et l'Abbé Bossut qui ont l'extérieur le plus avantageux, mais celui de l'Abbé Bossut me plaît encore mieux ; c'est que son extérieur marque un caractère de bonhomme. »
- Jacques Antoine Joseph Cousin (mathematician) : « Mr Cousin est grand et même trop grand, pour avoir la mine d'être bon mathématicien ; c'est à dire il a trop d'embonpoint. »
- Pierre Simon Laplace (mathematician) : « Mr de la Place a des cheveux rougâtres, est un peu maigre et n'a rien dans sa physionomie, qui exprimeroit le génie d'un mathématicien. »

### Summary and Conclusions

In studying the outward appearance of numerous learned men which occupy themselves with the same science, Lexell had discovered the most striking differences. Mainly for this reason, he concluded it to be doubtful « ... if one could ever push physiognomic knowledge to the point of being able to say, to what science his genius is the most applicable. » Yet, he could not abandon physiognomy entirely as groundless, as it always seemed possible to improve and refine one's skill in the art.

### References

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