


Costanzo Varolio (1543–1575), who named the “pons”

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His life

Costanzo Varolio (sometimes spelled Constanzo Varolio) (latinised as Constantinus Varolius) (Fig. 1), son of Sebastiano Varolio, is a Renaissance neuroanatomist who lived in the sixteenth century. Varolio was an Italian citizen, born in 1543 in Bologna and died in Rome in 1575 [1–5]. Varolio studied philosophy at a local university and then graduated in 1567 with medical education at the University of Bologna (MD and PhD) [2, 6]. During his medical education, he took lessons from Julio Caesar Aranzio (1530–1589), who was a student of Andreas Vesalius (1514–1564) [3]. In 1569, he undertook the responsibility of teaching anatomy at the University of Bologna [6, 7]. In 1572, he went to Rome and it is thought that he lectured at Sapienza University. However, there is no record of this [4]. At the same time, he was the doctor of Pope Gregory XIII during this period. He died in Rome in 1575 [3, 4, 7].

His books

In 1573, Varolio published a book, which was entitled *De Nervis Opticis nonnullisque aliis praeter communem opinionem in Humano capite observatis* (On the optic nerves observed in the human brain and a few other particulars adverse to the common opinion) in Padua (Fig. 2) [8]. There are three illustrations in this book (Fig. 3 and cover image, 4). The inferior view of the brain was drawn in the first two illustrations (Fig. 3 and cover image). The formations were numbered in these illustrations and the names of these numbers were given in the book. A piece of cerebrum was drawn in the third illustration (Fig. 4). After his death in 1591, another book of him, which was entitled *Anatomiae sive de resolutione corporis humani ad Caesarem Mediovillanum libri IV* (Fig. 5) with only one illustration (Fig. 6), was published [9]. In this illustration,

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Fig. 1 Costanzo Varolio (1543–1575), which can be found at http://www.wikiwand.com/it/Costanzo_Varolio. Accessed 1 May 2017 [5]

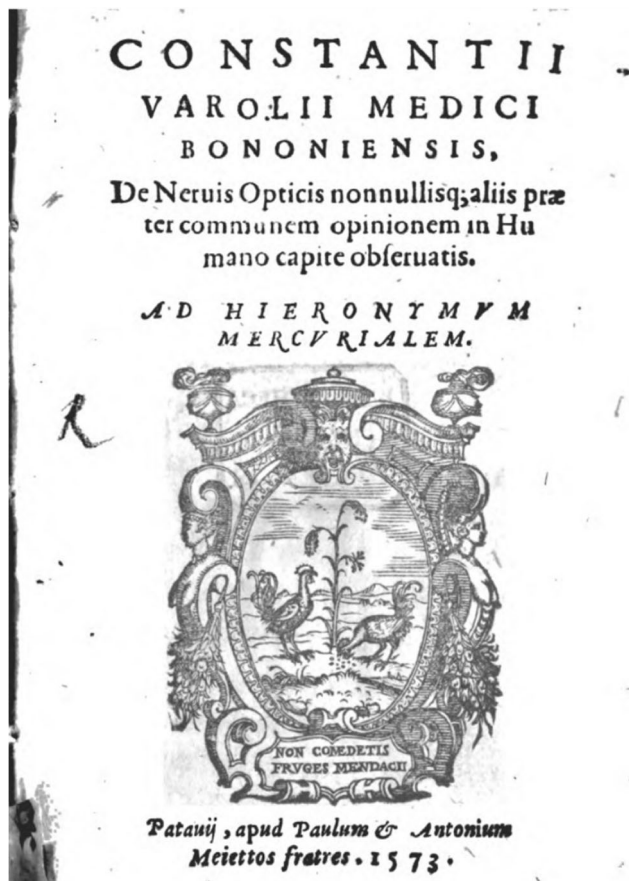
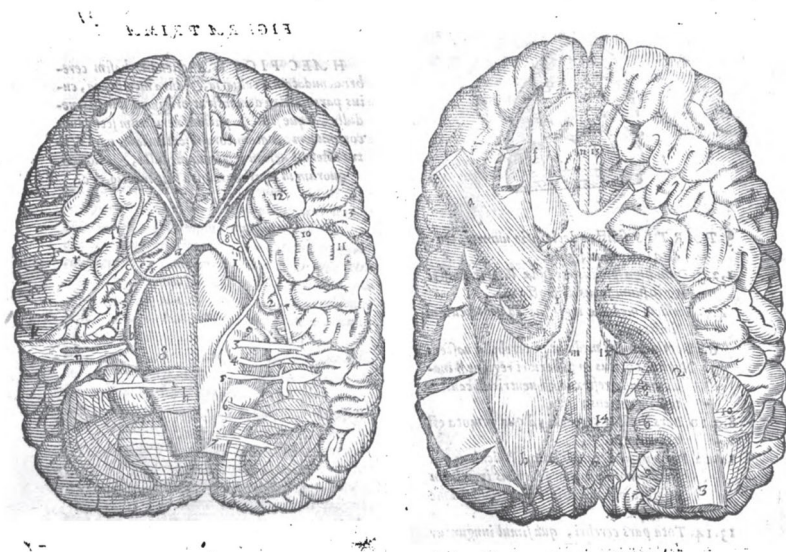


Fig. 2 Title page of *De Nervis Opticis nonnullisque aliis praeter communem opinionem in Humano capite observatis* written by Costanzo Varolio [8]

an eye globe was depicted and the formations including pupilla and cornea were shown. Also, it was thought that the book entitled *De Cerebro* (The Brain), which was published at Frankfurt in 1591, might have been written by Varolio [7].

Fig. 3 and cover image The first two illustrations in *De Nervis Opticis nonnullisque aliis praeter communem opinionem in Humano capite observatis* [8]



- § PARTIS sinistrae declaratio numeris tradita in secunda figura.**
1. 2. 3. Dimidium spinalis medulla lateris sinistri & in suum latus distractum.
 4. 5. Eiusdem medulla ingressus ad ventriculum sinistrum.
 6. Portio spinalis medulla ex cerebello nascens
 7. Nervus opticus in posteriori regione spinalis medulla reflexus, & ventriculi cavitatem ingrediens.
 8. 9. 10 Pars sinistra cerebelli, à qua remota est pars dextra.
 11. 12. Rima ingrediens sinistrum ventriculum partim formata a corpore fornicis imaginem referente, partim ab intimiore spinalis medulla parte.
 13. 14. Tota pars cerebri, quae simul iunguntur dextrum cum sinistro, cuius pars opposita

Fig. 4 The third illustration in *De Nervis Opticis nonnullisque aliis praeter communem opinionem in Humano capite observatis* [8]

In his books, Varolio has given various information about cranial nerves, cerebellum, brain hemispheres, ileocecal valve, pons and the connection of optic nerve with occipital lobe. He stated that there are four tracts in the spinal cord. He pointed out that the two tracts in front were related to the senses and

**CONSTANTII
VAROLII, PHILO-
SOPHI AC MEDICI
BONONIENSIS,
ANATOMIÆ,
Sive
DE RESOLVTIONE
CORPORIS HVMANI
Ad Cæsarem Mediouillanum**

LIBRI IIII:

A IOAN. BAPTISTA CORTESIO,
In Bonon. Gymnasio Chirurgiam atque Anatomem
publice profiteente, nunc primum editi;

AC V. C. HIERONYMO MERCVRIALI,
Medicinam theoreticam supraordinariam in eodem Gy-
mnasio docenti, ab eodem nuncupati.

Eiusdem VAROLII & HIER. MERCVRIALIS De
neruis Opticis, nonnullisque aliis, præter communem
opinionem in humano capite obseruatis, EPISTOLAR.

Cum INDICE copiosissimo.



FRANCOFVRTI

Apud Ioannem Wechelum & Petrum
Fischerum conforres,

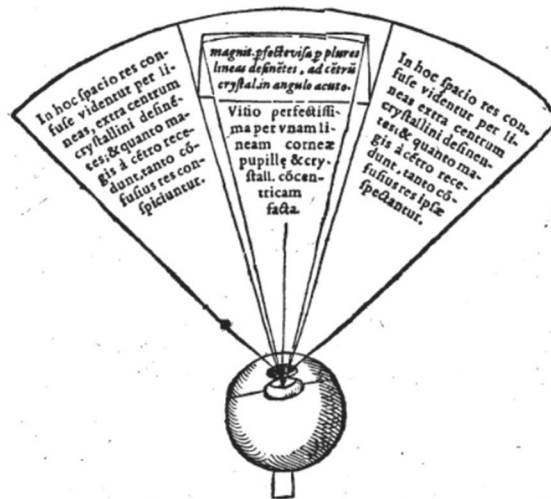
MD. LXI.

Fig. 5 Title page of *Anatomiae sive de resolutione corporis humani ad Caesarem Mediouillanum libri IV* written by Costanzo Varolio [9]

other two tracts at the back carried fibers from the cerebellum. It is also noted that Galen, Hippocrates and Aristotle were mentioned in his works [3, 8, 9].

The naming of pons

Since the Galen period, brain has been dissected from superior to inferior as in the horizontal sections [7]. Varolio, who described this method as *unusual* and *difficult*, is considered to be the first anatomist to dissect human brain from the inferior to superior [3, 7, 10]. He removed the brain from cranium and then went on to dissection starting from the inferior. Thanks to this method; he had observed cranial nerves in a good way and first identified the pons. Italian anatomist Varolio thought that pons was a part of the cerebellum and was located between the hemispheres of the cerebellum, so he described this formation as *pons cerebelli* (which means bridge of cerebellum). Varolio named this formation as pons, because the word “pons”



CAP. V; De Olfactu.

Cur secundo loco de olfactu agatur. **Q**UAMVIS ordo nobilitatis sensuum requireret, vt post visibilia ad sonos deuenirem; tamen quia (vt intelliges) organum olfactus maiorem habet affinitatem in corpore nostro cum visu, decreui prius de odoratu, quam de auditu tecum verba facere. Cum igitur odores in quadam exhalatione consistant; eousque enim corpora odorē spirant, quousque exhalant; hincque (ceteris paribus) longe magis estare, quam in hieme vnumquemque percipimus odorem, cum exhalatio suapte natura sicca sit; oportuit sensorium olfactus à principio humido ortum duxisse; vt ratione contrarietatis, actionibus necessario requisita, posset ab exhalatione pati, ac moueri. Idcirco nascitur odoratus à cerebro, à quo etiam visum oriri dicebamus; cui longe

Fig. 6 A single illustration in *Anatomiae sive de resolutione corporis humani ad Caesarem Mediouillanum libri IV* [9]

means bridge in Latin, and he resembled the pons to a bridge on the Venice Canal because of its shape. For this reason, this formation was later called pons Varolii (bridge of Varolius) [7, 8, 10].

The pons was resembled to a bridge connecting the hemispheres of the cerebellum because of its macroscopic shape by Varolio. It is a very interesting coincidence in terms of naming the pons that according to current knowledge has a function as a bridge between the cerebral cortex and the cerebellum via the corticopontocerebellar pathway. Because of this coincidence, the naming of pons which originally means a bridge still maintains its validity today.

Conclusion

Even though we do not have much information about his life, Costanzo Varolio, who died at the age of 32, has a quite high contribution in neuroanatomy.

Compliance with ethical standards

Conflict of interest The authors declare that there is no conflict of interest.

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