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RENAISSANCE ANATOMIST JACOPO BERENGARIO DA CARPI – AN INSIGHT INTO HIS LIFE AND WORK. AN EMPHASIS ON HIS CONTRIBUTION TO ANATOMICAL TERMINOLOGY

RENESANSNI ANATOM JACOPO BERENGARIO DA CARPI – UVID U ŽIVOT I RAD, S NAGLASKOM NA NJEGOV DOPRINOS ANATOMSKOJ TERMINOLOGIJI

Nora Malinovská[*], Mária Bujalková[**], Yvetta Mellová[***]

Summary

In general, Vesalius (1514–1564) is considered a pioneer in the study of anatomy. However, he had several important predecessors whose contributions are considered fundamental to the history of anatomy. Amongst these pre-Vesalian anatomists, Jacopo Berengario da Carpi (c. 1460–1530) is widely acknowledged as the most important one, and by some scholars even as the first ever anatomist. Berengario was the first anatomist who recognized the value and importance of anatomical illustrations for text comprehension. Our analysis is based on his works "Carpi Commentaria super anatomia Mundini" (1521) and "Isagogae breves" (1522). In contrast to Vesalius, who attempted to put into practice only Latin nomenclature, Berengario da Carpi had no ambition to reform anatomical terminology or

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purge it from "barbaric" terms. He just adopted the most widely used terms of his time, no matter their Latin, Greek, or Arabic origin. His work titled Isagogae contains an important list of all relevant terms used in the text, which serves as a historical record of the anatomical nomenclature used in his period. All this establishes the historical legacy of his work, which contributed to the development of anatomical terminology. This is why, from the current perspective of a medical school anatomy teacher, Berengario's conviction about the need not only to read a textbook but also to see anatomical structures with one's own eyes is relevant even in the third millennium.

Keywords: *Renaissance medicine, Jacopo Berengario da Carpi, pre-Vesalian anatomy, anatomical terminology, anatomical illustrations*

Introduction

The primary sources of anatomical knowledge in the early 16th century were the works of Galen (129–216 AD), which, for a long period of time, dominated the field of medicine. These writings were used in universities all over Europe, and their authority was not long questioned (Lindemann, 2010, pp. 84–90). According to the English medical historian R. French, anatomy played only a minor role in medieval medical education, e.g., in the 12th-century medical compendium of the Salerno School, "The Little Art of Medicine" (lat. *Articella*, or *Ars medicinae*), anatomy had no place (French, 1993, p. 81). In the late Middle Ages and early Renaissance, the study of human anatomy was revived as northern Italy took advantage of the gradual rehabilitation of human bodies' dissections. These had long been forbidden since the time of the Alexandrian school in the 3rd century BC.

During the Renaissance, anatomy also underwent such a transformation; that is, it was reformed according to ancient Greek principles. This marked a major turning point in the history of anatomy, beginning a recognizably modern understanding of the functioning and anatomy of the human body. We may call this the "anatomical renaissance" (Cunningham, 1997, p. 3).

Systematic dissection of the human body began at the University of Bologna in the Colleges of Arts and Medicine, where surgery was taught alongside internal medicine. Possible precursors of medical dissection can be found in legal studies, where it was often necessary to ascertain the causes of death when assessing the lethality of injuries, poisonings, stillbirths, and related cases. By adopting the practice of teaching anatomy through the dissection of dead human bodies, Bolognese physicians were doing something very unusual (French, 1993, pp. 81–82). The first known systematic dissector was Mondino dei Liuzzi (c. 1275–1326).

Among his most important followers was Jacopo Berengario da Carpi (c. 1460–1530), a predecessor of Vesalius who is often regarded as the first modern

anatomist. From his biography, we briefly note that he was born around 1460 in the town of Carpi in northern Italy. At the beginning of the 16th century, Berengario moved to Bologna–the city he called *mea altrice* (meaning "the nurturer of my studies")–where he received his doctorate in medicine in 1489. He practiced as a physician and surgeon, but he also studied and taught anatomy. This was exceptional in his time because those who taught anatomy were usually trained as physicians, meaning they had taken an academic course in medicine at the university. Between 1502 and 1527, he lectured on surgery and anatomy at the University of Bologna.

It is noteworthy that Berengario published his three major works within eight years, although he worked hard as a physician and surgeon. In 1514, he published a medieval dissection manual entitled *Anatomia Mundini noviter impressa ac per Carpum castigata* ("Mondino's Anatomy Rewritten and Corrected by Carpi"). His second book (1518) was an important treatise on skull fractures, *Tractatus de fractura calvae sive cranei* ("Treatise on Fractures of the Calvaria or Cranium"). This work is considered a landmark in the field of skull surgery. It is the first book devoted entirely to head injuries and their surgical treatment (Parent, 2019, p. 3). In 1521, his most influential work, illustrated with woodcuts, *Carpi Commentaria super anatomia Mundini* ("Commentary on Mondino's Anatomy"), was published in print. One of his most important pre-Vesalian anatomical studies was the 1522 compendium *Isagogae breves in anatomiam humani corporis* ("A Short Introduction to Anatomy"), with an added account of the anatomical nomenclature of his time. Berengario died in Ferrara around 1530.

Berengario's "transition" to anatomist

Renaissance medicine thus revived the ancient interest in the anatomy of the human body. However, a description of the "real state" of medieval anatomy can be found in F. H. Garrison (1927, p. 609):

Up to the time of Leonardo's wonderful drawings, it was mainly porcine, simian, bovine, pseudo-Galenic, and, as far as the dry texts are concerned, more a contribution to general morphology than actual human anatomy. Thus, medieval surgeons did very well with operations on the external parts. When they opened the abdomen, they were really fishing in the dark, performing autopsies *in vivo*.

The accusation of human vivisection was leveled against Berengario when the Italian anatomist Gabriele Falloppio videlicet accused him of this practice in his work *De morbo Gallico* (*On the French Disease, Syphilis*):

> *"Hic (Iacopus illae Carpensis) ita erat infensus Hispani, ut (cum esset Bononiae) geminos ex eis laborantes morbo Gallico ceperit, et vivos anatomicis administrationibus destinaverit; qua de re profligatus Ferrariae obiit,"* (Fallopio, 1574, cap. 76, pag. 126).
>
> "This (the famous Jacopo de Carpi) so hated the Spaniards that (when he was in Bologna) he took from among them twins suffering from syphilis and decided to perform a vivisection on them; being therefore devastated, he left for Ferrara." (Translated by the authors)

Falloppio was probably exaggerating because there is no direct evidence to support this accusation. André Parent (2019, p. 2) supports the thesis of misunderstanding and clarifies that "what Berengario called *Anatomia vivorum* is nothing other than the so-called *Anatomia fortuita* (accidental, natural), i.e., what doctors can see during various surgical operations". Berengario was clear about this in his commentary:

> *"Tempore enim nostro non fit anatomia in vivis, nisi forte a medicis, ut mihi contingit interdum in incidendo apostemata etc., ubi cognoscunt colligantias membrorum, positiones et operationes et omnia requisita in anatomia."* (*Commentaria*, 1921, fol. 4b.)
>
> "For in our time, anatomy is not practiced on the living, unless, perhaps, by physicians as sometimes falls to my lot in cutting an abscess, etc., when they acquaint themselves with the anatomic relations of the organs, positions and operations and all the things that are requisite in anatomy." (Translated by Choulant, 1920, p. 137)

In the dedication of his work, *Commentaria,* Berengario emphasized his long study of texts and bodies, "... what I have seen by long experience in dissecting the bodies both of the living and the dead, and what I have sought in long reading" (*Commentaria*, fol. 4v). He found anatomy most useful in the study of disease, and stressed, as he himself did, that a good anatomist should dissect many different subjects in order to learn it (*Commentaria*, fol. 5v).

Berengario thus devoted much of his time to anatomy, to which he seemed to have had a special inclination, and boasted of having dissected several hundred bodies (Choulant, 1920, p. 136). It is not known when Berengario's interest in anatomy became dominant, although his 1514 edition of Mondino's *Anatomy* may indicate this.

Berengario and Mondino dei Liuzzi

Berengario's role model in matters of anatomy was Mondino dei Liuzzi, also known as Mundinus (c.1270–1326), a Bolognese surgeon and professor of medicine. His treatise *Anatome omnium humani corporis interiorum membrorum*, abbreviated *Anatomia Mundini*, dated 1316, was first printed in Padua between 1475 and 1478. The treatise can be considered the standard work on anatomy used in Italian universities of the late Middle Ages and early modern period. This medieval treatise was based on the traditional medieval teaching of anatomy, which took place over a dissected body. Public dissections were part of the medical curriculum, during which the body was dissected, and the audience was shown one organ after another. Mondino's text was read aloud to explain what the students were observing. Dissections, according to the model of Mondino, were based on the "three venters" of the body *(abdomen, thorax, cranium)*. The three venters were dissected in a sequence that avoided the worst effects of putrefaction.

Berengario studied Mondino's work in such detail that he became its (cautious) critic, and in 1514, he published the medieval dissection manual under the title *Anatomia Mundini noviter impressa ac per Carpum castigata* (Mondino's Anatomy reprinted and corrected by Carpi). The work was probably prepared as an aid for his students.

Its publication indicates that Berengario, at that time, began to place more emphasis on anatomical research, which had initially been only an auxiliary discipline for him as a surgeon at the University of Bologna. Mondino, however, in a blind trust in Galen and the Arab physicians, had repeated all the misconceptions based on observation of dissected animals (e.g., liver with five lobes, heart with three cavities, seven-chambered uterus). Although Berengario criticized Mondino, he also corrected Galen but merely stated that he did not see it that way, leaving Galen's original claim and his own findings side by side (Čihák, 2014, pp. 4–5). Similarly, Garrison is of the opinion that although *Anatomia* is full of Galenical errors and preserves the old fictitious anatomy of the Arabists with the Arabic terms, "this work was for over a hundred years the only textbook of anatomy in all the medieval schools" (Garrison, 1917, p. 144).

Thus, *Anatomia Mundini* represented a crucial work in the development of pre-Vesalian anatomy and was was an inspiration for Renaissance anatomists (Achillini, Zerbi, and Berengario). The problems were related to its form, as the text was written in impoverished Latin with many convoluted terms taken from Arabic, Hebrew, Greek, and Latin, causing terminological confusion, as one anatomical structure could have several names or one term could refer to several different

structures. Therefore, pre-Vesalian anatomists attempted to replace Arabic and Hebrew terms with Greek ones in the hope of creating a more coherent anatomical nomenclature. As Parent notes, these efforts to create a coherent anatomical nomenclature should not be seen as the result of a rejection of Arabic works; quite the contrary. Arabic/Islamic scholars have fruitfully filled the gap between Galen and the pre-Vesalian anatomists. In doing so, the pre-Vesalian anatomists paved the way for a fundamental reform of anatomical nomenclature, in which Vesalius attempted to introduce exclusively Latin nomenclature (Parent, 2019, p. 12–13).

Anatomia sensibilis

Since the beginning of the 16th century, knowledge through the senses, such as sight and touch, became a central requirement in medical knowledge. A fundamental prerequisite for this approach was dissection: the anatomist had not only to dissect with his own hands but also to see with his own eyes and no longer be content with book knowledge drawn from the writings of authorities. The truth was to be sought not in texts but in bodies, of which only direct observation could provide reliable knowledge (French, 1985, pp. 42–43). This is confirmed by an excerpt from Berengario's *Commentaria*:

> *"Et non credat aliquis per solam vivam vocem aut per scripturam posse habere hanc disciplinam: quia hic requiritur visus et tactus."* (*Commentaria*, 1521, fol. 6v)
>
> Let no one think that he can acquire this discipline only by word of mouth or by the written word: for here sight and touch are indispensable." (Translated by the authors)

Berengario's conclusions were based on the method of systematic dissection. According to him, real evidence in the anatomical study could only come from the testimony of the senses, and this is what he called *anatomia sensibilis*, a procedure he used for both research and teaching purposes. It is a concept that emphasizes sensory versions of truth over textual ones. As quoted by Lind (1975, p. 10), Berengario insists upon the precedence of sense perception over authority in the following passages:

> *"Et cum isto textu [of Galen] concordat sensus: sic ergo sint cauti componentes libros de anatomia et non credant auctoritatibus sed sensui sicut nos facimus et faciemus."* (*Commentaria*, fol. 153v)
>
> "And let sense perception agree with this text [of Galen]: and thus let those who write books on anatomy also not trust in the authorities but in their sense perception as I do and shall do."

"Galenos cum suis sequacibus cuius opinionem semper tenemus nisi ubi discordat ab ipso sensus." (*Commentaria*, fol. 412v)

"Galen with his followers whose opinion I always maintain except when sense-perception disagrees with him."

"Multi tamen aliter sentiunt, sed sensus in hoc est iudex." (*Commentaria*, fol. 443r)

"Many, however, believe otherwise, but sense perception is the judge in this matter."

(Translated by Lind, 1975, p. 10)

Commentaria super Anatomia Mundini

In 1521, Berengario da Carpi wrote an extensive commentary on the *Anatomy* under the title: *Carpi Commentaria cum amplissimis additionibus super Anatomia Mundini una cum textu eiusdem in pristinum et verum nitorem redacto* ("Carpi's Commentaries on the Anatomy of Mondino, with very copious additions, together with his text restored to its former and true splendour"). Cunningham (1975, p. 75) emphasizes the main idea of this work: re-establishing the text as Mundinus intended it—free from the errors and accretions introduced by generations of manuscript copyists. On the opening page of this work, Berengario claims that his intentions in doing this are to produce peace and concord among anatomists:

"Visis tot et tantis altercationibus inter scribentes de Anatomia placavit mihi, quod longa experientia vidi secando et vivorum et mortuorum corpora, et quod longa lectione quaesivi per viam Commenti in unum breviori quodam summario perstringere. Et dux meus erit optimus Mundinus Bononiensis… In qua exposition aliqua notatu digna iunioribus non inutilia addam. Duce semper sensu et divini Galeni auctoritatibus et rationibus quibusdam." *(Commentaria, 1521, fol. 4v)*

"When I saw so many and so great altercations between those writing on Anatomy, I resolved through means of a Commentary to draw together, by some quite brief summary, what I have seen by long experience in dissecting the bodies both of the living and the dead, and what I have sought in long reading. And my guide will be the excellent Mundinus of Bologna... In this exposition, I will add some noteworthy things, not without their usefulness, from more recent writers, always with the senses and some authorities and reasonings of the divine Galen as my guide..." (Translated by Cunningham, 1997, p. 75)

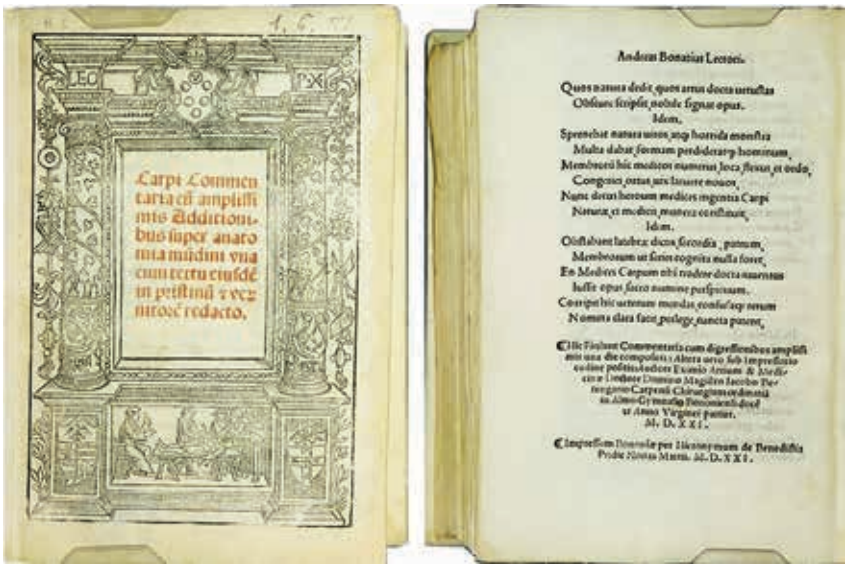

Figure 1. The title and last page of the work *Commentaria super Anatomia Mundini* (1521).

The only and very rare edition of this work is the printing Bononiae, 1521, per Hieronymus de Benedictis. Although modestly titled, his *Commentaria* is, in fact, an original contribution of considerable value and the first illustrated textbook of anatomy ever printed (De Santo et al., 1999, pp. 199–212; Prioreschi, 2007, p. 4; Singer, 1925, p. 97).

The book has 528 pages and is illustrated with 21 full-page anatomical wood engravings depicting the muscles and bones of the human body. Following Mondino's text, Berengario systematically described the general characteristics of the main structures and regions of the body, together with the properties of fat, membranes, flesh, fibers, ligaments, tendons, nerves, and muscles. Following Mondino's arrangement, the abdominal organs, which are most susceptible to putrefaction, were discussed first. This follows the custom of medieval works, in which the contents were arranged according to the relative rate of decay of tissues and organs.

Terminology examples

Berengario da Carpi bore no ambition to reform anatomical terminology or purge it of "barbaric" terms; he simply adopted the terms most widely used in his time, whether Latin, Greek, or Arabic. To illustrate the mentioned, here are a few anatomical terms of historical as well as linguistic interest found in the text of the

Commentaria (fol. 174i–175r). For completeness, we list their occurrence in current anatomical terminology.

A. *lacertus – musculus*; according to Berengario, these terms were synonymous: "*Musculus et musculus pisciculus et lacertus dictus est ad formam parvi muris et parvi piscis et lacerti animalis*" (*Commentaria*, fol. 71b). The muscle is named after the shape of a small mouse, a small fish, and a lizard. However, there are also muscles that do not have the above names: the long muscles, the transverse abdominal muscles, and the diaphragm (*Commentaria*, fol. 71b). Some authors attribute *lacertus* to a muscle that has a more sensory function (*spiritus sensitivus*) and *musculus* to a muscle that has a more motor function (*spiritus motivus*). In 1864, Hyrtl introduced the synonymous term *lacertus fibrosus*. Eventually, this name was also included in the BNA (1895), and the PNA of 1955 added the term aponeurosis *m. bicipitis brachii* as a synonym. These two terms have remained in the official anatomical nomenclature to this day (Šimon et al., 2016, p. 317). The *Terminologia Anatomica* (TA) of 1998 includes these terms.

B. *mirach/myrach* (Arab.) – abdomen, abdominal wall (also according to Berengario). Du Cange's Dictionary of Medieval and Modern Latin (1883–1887, vol. 5, col. 563c, online: http://ducange.enc.sorbonne.fr/MYRACH), states: *"…vox Arabica, quam Medici usurpant pro partibus continentibus stomachi. Vide Mundinum in Anatomia pag. 43"*, or in English: "… an Arabic word that doctors use for the parts surrounding the stomach. See Mundinus in the Anatomia, page 43". Hyrtl mentioned these meanings of *mirach*: abdomen, regio abdominalis, abdominal musculature, and, rarely, umbilicus and peritoneum (1879, pp. 177–179). The last anatomists to mention this term were Casparus and Thomas Bartholinus (1641, lib. I, page 9): *"pars anterior infimi ventris myrach dicitur"*, meaning: "the front of the abdomen, which is called myrach." This term is now obsolete, so it is not found in the current anatomical nomenclature.

C. *matrix;* according to Oxford Latin Dictionary [mater; term. perhaps from nutrix] – female animal kept for breeding, dam; also applied to human beings (OLD, 1968, p. 1084). In the translation literature of late antiquity, *matrix* often renders *μήτρα* (Greek word for 'womb'), and it is possible that the phonetic similarity between the two words was one of the factors behind the semantic change in the Latin term. In addition, there is a close relationship between the meanings "mother, breeder" and "womb"(Adams, 1982, p. 106). After its meaning as "womb" became established, we find it in late Latin medical literature–e. g., in the work *Gynaecia* of T. Priscian from the 4th century–exclusively in this meaning throughout the work (Priscianus, lib. III). Medieval authors

used the synonyms *μήτρα, ὑστέρα, matrix, vulva,* and *uterus* for the womb. In Mondino, the chapter on the uterus is called *De anatomia matricis*, and in Berengario *De matrice non pregnante*. Current anatomical terminology (TA, 1998; 2019) uses the term *uterus* for the womb and also recognizes the term *matrix*, but in the sense of *bed*: *matrix unguis* – nail matrix.

Isagogae breves

One of the most significant pre-Vesalian anatomical studies was the compendium *Isagogae breves perlucidae ac uberrimae in anatomiam humani corporis a communi medicorum academia usitatam* ("Short introduction on the anatomy of the human body used with great profit and clarity in medical colleges") written by Berengario in 1522. It is a shorter version (80 folios) of the *Commentaria*, which includes a concise and detailed description of the human anatomy, as well as a guide for dissection. The second edition of the book (1523) is the only version that contains Berengario's illustration of the brain (Parent, 2019, p. 4).

Figure 2. The title and last page of the work *Isagogae Breves* (1523).

Terminology examples

To illustrate the then anatomical terminology, we will discuss the following terms from historical-linguistic aspect, including the occurrence in the current anatomical terminology.

A. *nucha/nuca* (Arab.) – nape, neck. Du Cange's Dictionary (vol. 5, col. 619b, online: http://ducange.enc.sorbonne.fr/NUCHA) quotes Silvaticus: *"Locus, ubi collum craneo jungitur (vox Arabica)*", meaning: 'the place where the neck joins the skull' (Arabic word). Joseph Hyrtl derived the word's origin from the Arabic *nuqrah*, meaning 'a dimple in the neck' (Hyrtl, 1880, pp. 356–357). During the period from Avicenna to Vesalius, the term was used to refer to the spinal cord, e.g., *nucha, medulla spinae est* ('nucha, that is, the spinal cord') (Mondino) and *nucha sicut et cerebrum velatur a dura et a pia matre* ('the nucha, like the brain, is covered with hard and soft linen') (Berengario, *Isagogae*, 57h). Nevertheless, Onomatologia Anatomica Nova (Barcia Goyanes, 1986, vol. VI, p. 135) states: "Although, we can infer from what da Carpi says that in his time the name *nucha* was already commonly used to refer to the back of the neck, we have not found this word in any 16th-century anatomy, although we have searched for it in texts." In the currently used anatomical nomenclature (TA, 1998), the term *nucha* appears in the following terms: *ligamentum nuchae; m. transversus nuchae; fascia nuchae; linea nuchalis superior, inferior, suprema; planum nuchale.* However, the latest anatomical nomenclature version (TA, 2019) shows only the term *fascia nuchae*.

B. *embotum* – funnel. According to Du Cange's Dictionary, the meaning of *embotum* is a funnel (vol. 3,col.254a.http://ducange.enc.sorbonne.fr/EMBOTUM). In Berengario, its description is found in the figure of the brain ventricles (*Isagogae breves*, fol. 54v and 56):

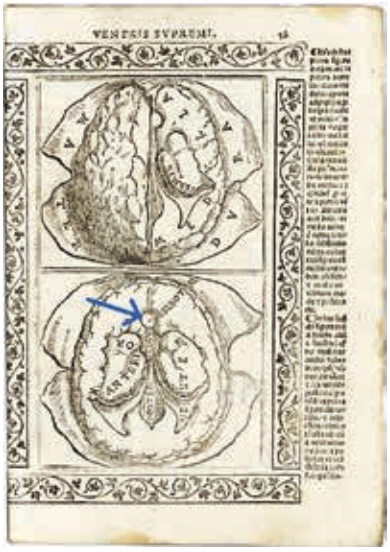

Figure 3. View of the brain ventricles (fol. 54v and 56) from *Isagogae,*1523.

Berengario describes the term *embotum* and its function in the text in these words:

> *"…unum foramen, per quod spiritus ad alios ventres tendunt et etiam aliquae humiditates in ipsis contentae descendendo exeunt ad certam vacuitatem tendentem versus os basilare. Haec vacuitas vocatur a Mundino lacuna, ab Avicenna caput rosae et ab aliis embotum, quia est lata superius, stricta inferius. Per istud embotum evacuantur ut plurimum humiditates superfluae cerebri"* (*Isagogae,* fol. 54v)
>
> "...a foramen through which the spirit and some humidities contained in them descend and pass out to a certain vacuity stretching toward the basilar bone. This vacuity is called *lacuna* by Mondinus, head of the rose by Avicenna, and *embotum* by others because it is broad above, narrow below. Through this embotum to the aforesaid bone are evacuated for the most part the superfluous humidities of the brain." (Translated by Lind, 1959, p. 143)

The *embotum* is currently an obsolete term; in today's anatomical terminology, it is called *infundibulum hypophysis* (TA, 1998) and *truncus infundibularis* (TA, 2019) – pituitary stalk.

C. *pecten* – Berengario mentioned the term *pecten* as follows: *"Quinta est pars pecten dicta; intra quam est os pubis seu pectinis,"* (*Isagogae*, fol. 4a), meaning: "The fifth part is called the rest; inside it is the *os pubis* or *os pectinis*." As stated by Hyrtl (1880, p. 387), Roman physicians called the pubic region *pecten* and the pubic bone *os pectinis*. The meaning of this term was clearly defined by Celsus*: "A quibus [coxis] oritur os, quod pectinem vocant; rectius in viris, recurvatum magis in exteriora in feminis,"* (lib. VIII, cap.1, p. 328), meaning: "Out of them [the hips] comes a bone called the *pecten*, which is straighter in males and more curved on the outside in females." Hyrtl offered an explanation for why the term *pecten* came to be used in the sense of 'ridge': "…because there is hair in the pubic area, which, as in the combing of wool or flax, is wont to hang on a comb…" (1880, p. 387). There is also the term *pecten manus*, which consists of the parts: *procarpus*, *antecarpus,* and *metacarpus* (*Isagogae*, fol. 67i). Current anatomical terminology (TA, 1998) includes the terms *pectin ossis pubis, pecten analis*, and the derived terms *linea pectinata, m. pectineus, mm. pectinati, lig. pectineum*, and *lig. pectinatum*. TA 2019 lists only *pecten ossis pubis, lig. pectineum, pecten analis*, and *linea pectinata*.

"Anatomical dictionary"

Berengario apparently lacked a list of the anatomical vocabulary of the time, so at the end of the *Isagogae* editions of 1522 and 1523 (fol. 75k3–79), he attached *Index rerum dignarum cura, quae hoc volumine continentur* ("The index of the results worthy of attention that are contained in this treatise"). He included all relevant terms from the text, providing a comprehensive historical record of the anatomical nomenclature of his time. He explored and reviewed several anatomical terminologies, as well as the contributions of translations of classical texts available to him. This work by Berengario can be considered the first attempt at an "anatomical dictionary".

In the example below, we see that each term is assigned a folio (*folium*) and a page (*pagina*) where the term is found in the text, e.g., *vena ischiadica & saphena* folio XVI, pag. l.

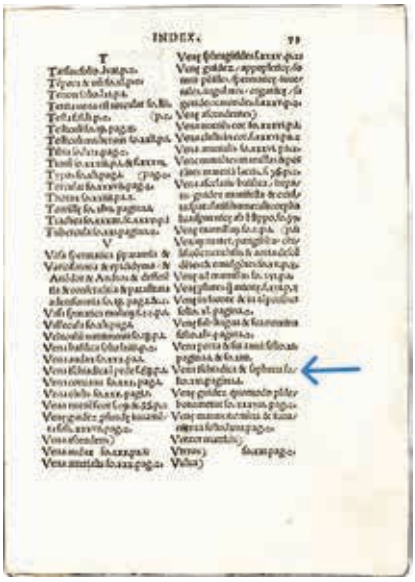

Figure 4. An example from *Index rerum dignarum cura, quae hoc volumine continentur* (*Isagogae*, 1523, (fol. 75k3–79).

Conclusion

Berengario was the first to teach and emphatically argue that anatomy must be studied on the human body and not in books. His deeds and work illustrate the transition from the uncritical repetition of ancient notions to reliance on empirical observation. As we have already stated, he claimed that he always accepted Ga-

len's views–except when they contradicted his own observations (*Commentaria*, fol. 240r, 398r, 412r). In contrast to Vesalius, who attempted to put into practice only Latin nomenclature, Berengario da Carpi had no ambition to reform anatomical terminology nor purge it of "barbaric" terms. He simply adopted the most widely used terms of his time, no matter if they were of Latin, Greek, or Arabic origin. His work titled *Isagogae* contains an important list of all relevant terms used in the text. This writing represents a historical record of the anatomical nomenclature used in his era. The contribution of Berengarius to anatomy was most eloquently appreciated by Fallopius when he stated: *"Iacobus Carpensis primus procul omni dubio anatomicae artis, quam Vesalius postea perfecit, restaurator"*, which translates as: "Jacobus Carpensis was, without any doubt, the first restorer of the anatomical art, which was later perfected/completed by Vesalius." (Fallopius, 1561, fol. 25d). The view of a contemporary anatomist confirms that Berengario's conviction about the necessity not only to read a textbook but also to see the studied anatomical structures with one's own eyes is relevant even in the 21st century. However, this does not negate the fact that offering high-quality, life-size anatomical models serves as a valuable adjunct to anatomical dissection.

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SAŽETAK

Općenito, Vesalius (1514. – 1564.) smatra se pionirom u proučavanju anatomije. Međutim, imao je nekoliko važnih prethodnika čiji se doprinosi smatraju temeljnima za povijest anatomije. Među tim predvesalijevskim anatomičarima, Jacopo Berengario da Carpi (oko 1460. – 1530.) široko je priznat kao najvažniji, a neki ga znanstvenici čak smatraju prvim pravim anatomom. Berengario je bio prvi anatom koji je prepoznao vrijednost i važnost anatomskih ilustracija za razumijevanje teksta. Naša analiza temelji se na njegovim djelima "Carpi Commentaria super anatomia Mundini" (1521.) i "Isagogae breves" (1522.). Za razliku od Vesaliusa, koji je nastojao uvesti isključivo latinsku nomenklaturu, Berengario da Carpi nije imao ambiciju reformirati anatomsku terminologiju niti je „očistiti" od „barbarskih" izraza. Jednostavno je usvojio najčešće rabljene izraze svoga vremena, neovisno o njihovu latinskom, grčkom ili arapskom podrijetlu. Njegovo djelo "Isagogae" sadrži važan popis svih relevantnih izraza korištenih u tekstu, što služi kao povijesni zapis anatomske nomenklature njegova razdoblja. Sve to potvrđuje povijesnu vrijednost njegova rada, kojim je pridonio razvoju moderne anatomske terminologije. Zbog toga je, iz današnje perspektive profesora anatomije na Medicinskom fakultetu, Berengarijevo uvjerenje o potrebi ne samo čitanja udžbenika već i neposrednog promatranja anatomskih struktura vlastitim očima, relevantno čak i u trećem tisućljeću.

***Ključne riječi**: renesansna medicina, Jacopo Berengario da Carpi, predvesalijevska anatomija, anatomska terminologija, anatomske ilustracije*

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SLOVENIAN INFLUENCE IN EARLY 18th CENTURY INOCULATIONS

SLOVENSKI UTJECAJ NA CIJEPLJENJA POČETKOM 18. STOLJEĆA

Karel Černý*

SUMMARY

In 1715, two Slovenian physicians, Johann Baptist Werloschnig de Perenberg and Antonius Loigk, published an extensive volume on the last plague epidemic in Central Europe. Hidden within its pages is a description of smallpox inoculation, which predates any record of this procedure in Europe by several years. The procedure was personally witnessed by Loigk in Vienna in or before 1714. Very little is currently known about the context of this event. We do not know how many inoculators there were, how many patients were treated and, crucially, how the procedure was received by the medical establishment in Austria. All these pieces of information would be necessary to understand the impact of this discovery on early 18th-century Austrian (and, by extension, Eastern European) society. In order to sketch out the possible connections, we will focus on a reconstruction of the intellectual network of both Slovenians as it appears in the academic literature of the time. We hope that these links may reveal something about a group of physicians who may have had early knowledge about this important anti-epidemic measure.

***Keywords**: smallpox, inoculation, variolation, Slovenia, early modern period*

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Introduction

At the beginning of the 18th century, smallpox was a substantial epidemiological burden to the European population, causing an estimated 400,000 deaths per year with a case-fatality rate, which is believed to range anywhere between 7–45% (Fenner et al., 1988, pp. 245–276; Glynn & Glynn, 2004, p. 4, 63, 68. Hauerkamp, 1985; Mackenbach, 2020, pp. 103–104, 140–142). Although contracting the virus provided lifelong immunity, thus attacking each victim only once, surviving the encounter was often not without consequences. Some individuals were affected only cosmetically, with facial scarification or loss of hair, while others suffered from debilitating disabilities, including limited mobility or blindness. The number of these unlucky survivors is now impossible to assess.

For centuries, medical practitioners, both lay and learned, provided very little recourse to the sick, who were forced to patiently suffer through the ordeal (Williams, 2010, pp. 20–24). Attempts to mitigate the accompanying symptoms likely had little effect, and some may have even exacerbated them. For a disease with such great morbidity, likely approaching 100%, there was practically no prevention available. However, records from various regions across Europe show that, particularly among the lower classes, people tried to reduce the risk of severe cases or death by pre-emptively infecting children at a relatively young age in rituals often called "buying the pustules". During the second half of the 17th century, a similar crude method of regulated exposure was also recommended by some physicians (Černý, 2022).

The situation began to improve in the second decade of the 18th century when Europeans learned about inoculation, a preventative measure already in use among certain ethnic groups in the Ottoman Empire (Eriksen, 2020; Grant, 2018). This method, also known as variolation, engrafting, insertion, translation, etc., predated the better-known vaccination by several decades. Although both procedures had the identical objective of protecting the individual against the severe form of smallpox, their *modus operandi* was actually quite different. Vaccination was based on the cross-immunity caused by two closely related species of the virus, cowpox and smallpox, where the former led to only mild symptoms and also provided long-term immunity against the latter. For a recent discussion on the history of vaccination in Central Europe, see a dedicated volume compiled by Dietrich-Daum, Hilber, Lobenwein, and Watzka in 2021. Variolation, on the other hand, used the same deadly smallpox virus, which was, however, administered through shallow skin cuts, thus resulting in a less dangerous form of the disease.

Early inoculation was nevertheless a perilous endeavour that could still turn into the dreaded confluent form with fatal consequences. On top of this, there was a practical problem given by the fact that the virus could be stored only for a very limited period of time. Therefore, patients could be variolated only when an ongoing epidemic already existed in the area. This turned each variolation into a race against time as to whether the first contact with the virus would be mediated through the inoculator or in a natural way (smallpox was primarily an airborne disease).

In this sense, variolation was an intermediate step between deliberate infections in the 17th century and the substantially safer vaccination discovered at the end of the 18th century. Despite all the shortcomings associated with the procedure, it had the potential to significantly reduce the number of deaths caused each year by smallpox, and, as such, it did attract a considerable amount of interest. There has been a great deal of literature published on the process of the transfer of knowledge related to variolation from the East to the European academic circles, starting with a classical monograph of Genevieve Miller, which is still worth reading (Miller, 1957) and her paper on the role of lady Mary Wortley Montagu (Miller, 1981). Among modern publications, a monograph by Alicia Grant and a paper by Anne Eriksen are particularly important additions to the subject, and these works also provide a thorough summary of the pertinent literature (Barker & Chalus, 2005, pp. 19, 92; Eriksen, 2020; Grant, 2018). We will, therefore, not revisit this topic in detail but provide only a brief summary.

It has been speculated that the variolation might have been initially used around the turn of the century among the Greek minority in the Ottoman Empire. In subsequent years, visitors from the West, such as merchants, medical staff, and diplomats, started to take notice. Between 1714 and 1716, the discovery began to propagate in writing, primarily through the summaries compiled by two physicians of Greek origin Emmanuel Timonis (1669–1720) and Jacob Pylarini (1659–1718) published in Britain, Venice, and Germany (Poulakou-Rebelakou & Lascaratos, 2003; Pylarini, 1715, 1716–1717; Timonis, 1714-1716).[1] The procedure was also referenced in 1715 by the surgeon Peter Kennedy (dates of life unknown), who did not witness it personally but was informed by Timonis (Kennedy, 1715; Wilson, 1999, p. 68).

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[1] Pylarini's paper in the Philosophical Transactions was published in Issue no. 347, printed in 1716 or 1717. Most issues had a short note on the publication date and place at the end of the last paper. This note is missing in numbers 347 and 348, but the previous issue (346) was published in 1716 (see page 388) and the following issue (349) in 1717 (see page 504).

At that time, some members of the Western diplomatic staff had their children inoculated, including Lady Mary Wortley Montagu (1689–1762), wife of the British ambassador to the Ottomans, who wrote her now famous description of variolation in a letter to her friend Sarah Chiswell (Wortley Montagu, 1970). Although this particular source probably had no effect on the reception of variolation in Europe because it was made public only three decades later, Lady Mary stated that it would be her patriotic duty to introduce this beneficial custom to her homeland, which she did in quite spectacular fashion in the spring of 1721, when she had her daughter inoculated in London. The procedure, performed by surgeon Charles Maitland (who died in 1748) and supervised by four distinguished physicians, took place under the close scrutiny of the British public, bringing variolation to the centre stage of contemporary medical debates.

Until recently, this was considered the earliest documented variolation outside the Ottoman Empire. Only a few months later, during the Summer of 1721, Jan Adam Reiman (1690–1770), a graduate from Leiden University and a city physician in Prešov, Upper Hungary (now in Slovakia), also had his daughter variolated. This is, therefore, an established history of the first European variolations—a procedure brought from the East to the West by members of the educated, well-travelled elites, who came across a medical discovery, realised its potential, and took the bold step of putting it to use for the benefit of their compatriots. The recent discovery of the description of an even earlier inoculation performed in Vienna in or before 1714, however, sheds a rather different light on the process of transferring knowledge about the procedure.

The Viennese case

We have already discussed the Viennese variolation in detail elsewhere.Therefore, we will only briefly state the relevant facts (Černý, 2020, 2023b). It is recorded in print titled *Historia pestis* (History of Plague), which was compiled in the aftermath of the last major Central European plague epidemic (roughly 1707–1715) by two Austrian physicians of Slovenian origin Johann Baptist Werloschnig de Perenberg (1670?–1750) and Antonius Loigk (also spelt Lojk, *1679) (Pintar, 2023a, 2023c). The book saw the light of day for the first time in 1715 and was re-issued a year later under a slightly modified title (Werloschnig & Loigk 1715, 1716).[2] It is

[2] The second edition has an extra Greek word (Loimographia) at the beginning of the title and two brief additions: an unpaginated list of physicians who died during the last plague epidemic and the errata for the first edition. Apart from that, both editions are identical, including the passage about inoculation.

a remarkable collection of papers written partially by the two editors but also by other physicians from cities affected by the epidemic, who sent their reports on the current situation, considerations of epidemic diseases, or recommended remedies. In total, there are ten parts dealing with the epidemics in the Austrian cities of Wells and Vienna, Regensburg in Germany, Prague in Bohemia, and Wrocław in Poland.

Although it deals nearly exclusively with the topic of plague, there is a passage written by Loigk that discusses the effects of an infectious disease on the human body. The passage is part of Loigk's "Epistolary Discourse", an extended treatise on epidemic diseases in four parts spanning over 150 pages (Werloschnig & Loigk, 1715, pp. 341–497). The last letter, dedicated to the prevention and cure of the plague, proposes that there are two forms of cure – expelling the plague from the victim's body and destroying the plague itself. While explaining the former, Loigk drew an analogy with smallpox, claiming that the skin afflictions during the bout of the disease represent a process of cleansing when the noxious matter is expelled from the body. The Slovenian physician understood ulceration during smallpox as an example of "healing by nature, the greatest artisan, which cures through the most perfect purification of diseases" (Werloschnig & Loigk, 1715, p. 456).

This passage suggests that the natural course of the disease is also its best cure. Antonius Loigk then supported his theory by comparing the cure recommended by academic medicine with that of peasants, who let smallpox usually develop without providing any specific drugs or, if they did prescribe anything, they did not follow other tenets of scholarly medicine: bed rest and a strict diet. Thus, they would "happily achieve health while eating cabbage" (Werloschnig & Loigk, 1715, p. 457). The rich and the noble, in contrast, who presumably followed all the appropriate scholarly advice, frequently did not survive. In cases of smallpox, Loigk concluded, taking no medicine was often the best strategy (Werloschnig & Loigk, 1715, p. 457).

His therapeutic nihilism allowed for only one exception – inoculation, which he referred to as the cure through the smallpox ferment. Loigk noted that he himself observed an Arabic healer who employed shallow skin cuts on the forehead and hands into which he introduced a small amount of pus taken from the ulcers of someone with a benign case of the disease. The procedure led to mild inflammation called "Blatter-Peltzen" by Loigk, which "cured" the smallpox (Werloschnig & Loigk, 1715, p. 458).

The report does not provide the time and place of the inoculation, but a date is given at the end of Loigk's *Epistolary Discourse*–February 1714. The Arabic healer

had reportedly arrived several years earlier, and inoculations had, therefore, been taking place in Austria for some time. Furthermore, inoculations likely took place in Vienna, where Loigk was located in the later stage of his career. This is supported by a remark that he had observed "a young noble" being given the treatment, which is more likely to have happened in the Imperial capital.

The earliest depiction of inoculation recorded by the Slovenian physician in 1714 is quite important for our understanding of the history of early modern medicine as it brings up two relevant points. Firstly, it shifts the earliest use of variolation from Western Europe, which is traditionally understood at that time as being at the forefront of scientific development. The concept of the "scientific revolution" of the 17th century, associated particularly with the English milieu, casts a long shadow over the conventional concepts of the European history of medicine.

Secondly, the depiction of the procedure makes it clear that the inoculator was not a physician but rather an "Arabic" migrant from Constantinople who was "mimicking" the Greek method of smallpox prevention. Loigk, therefore, framed the whole enterprise as functional but outside the scope of ordinary academic medicine. This also subverts the traditional narrative of the history of epidemiology because it takes away the agency from educated, well-travelled, upper-class individuals, who were historically thought to have been the active element for spreading the progressive methods of disease prevention among the population.

However, a key element for understanding this new narrative is the question of impact: How important was this on the greater scale of things? Apart from the individuals directly involved in the story, the inoculator, the young noble, probably his parents, and the observing physician, who else in Austria and surrounding countries at the beginning of the 18th century could have known about this preventative measure recently brought from abroad? The healer and his contacts will likely remain forever obscure, as these individuals rarely left written records, but we can try to gauge what was or could have been the uptake among members of Central European Academia. In order to do this, we need to reconstruct Loigk's contacts within the contemporary Republic of Letters.

The slovenian connections

So far, we have been able to find only a single work that cited the inoculation report itself. It is a paper written a couple of years later by Jan Adam Reiman and published in the Wrocławian journal with the rather long title *Sammlung von Natur- und Medicin- wie auch hierzu gehörigen Kunst- und Literatur-Geschicht-*

en (Reiman, 1718). Reiman and the readership of the Sammlung were, therefore, the first group of individuals who either knew or had an opportunity to familiarise themselves with the procedure. Indeed, as noted above, when Reiman had a chance to act on this newly acquired knowledge, he inoculated his daughter in the Summer of 1721.

Who were the readers of the *Sammlung*? Unfortunately, we have very little information here.The journal is occasionally used as a source of information, particularly about early weather observations, but historians do not seem to tackle the question of its significance and readership in either a local or international context (Brázdil et al., 2008; Brzezowski, 2009; Przybylak & Pospieszyńska, 2010).

Leaving the only citation of the inoculation report aside, we can also broaden our search and take a closer look at the individuals who were connected with the publication of Werloschnig's and Loigk's *Historia Pestis*. It contains ten parts; three were written by the editors, and the rest were sent by various Central European physicians, who presumably might then have read the publication, including the passage on inoculation. We will skip the editors for now and focus on the other contributors.

The first among them was Johann Gereon Schimperich (life data unknown), a physician serving in a temporary plague lazaretto established by the government of Upper Austria for the Traun district (*Traun-Viertel*). There is very little we can glean from the sources about his life or career. He probably survived the dangerous duty of plague physician because he is not listed among those physicians who died during the epidemic and were added to the second edition of *Historia Pestis* (Werloschnig & Loigk, 1716).[3] He is not mentioned in the Acts of Medical Faculty of the University of Vienna. Therefore, it is likely that he graduated from a different institution (Senfelder, 1912).

The second corresponding physician was Sebastian Christian Fuchs of Löwenwalt (d. 1725), a professor at the Prague Medical Faculty, who wrote a report about the plague in Bohemia while on the run from the epidemic-stricken capital (Černý, 2018, pp. 101–102; Hlaváčková & Svobodný, 1988, pp. 66–67; Werloschnig & Loigk, 1715, pp. 61–71). With Fuchs, the potential readership of news about inoculation expanded into the medical milieu of Prague with its ancient faculty of medicine, which at that time was undergoing something of a renaissance. It was moving away from traditional Galenic medicine and searching for new ide-

[3] An unpaginated list of physicians who perished in the epidemic is inserted in the 1716 edition before the errata and after a salutation written by the dean of the Viennese Medical Faculty, Pius Nicolaus Garelli.

as, particularly Cartesian physiology, with its concept of the human body as a "*machina pneumatico-hydraulica*" (Černý, 2023a). In terms of medical theories, Fuchs' alma mater drew inspiration from other medical faculties in the Habsburg dominion – Vienna and Innsbruck. However, a surviving reading list for students, written at the end of the 17th century by Prague professor Johann Franz Löw von Erlsfeld (1648–1725), contains over 350 authorities—most of them early modern writers—suggesting that the faculty cast its nets much farther than that (Černý, 2023a; Löw, 1693).

Two names of contributors to *Historia pestis* are connected with the city of Regensburg in Bavaria. Johann Adam Göritz (1681–1734) added some personal information at the end of his report, noting that he became personally acquainted with Werloschnig while both had studied together in Jena several years earlier (Werloschnig & Loigk, 1715, pp. 72–75). Later, he graduated from there under Georg Wolfgang Wedel (1645–1721) with a dissertation on testicular tumours. Shortly after his contribution to *Historia Pestis*, Göritz became a member of Leopoldina, the German Academic Society founded in 1651. Göritz's link to Wedel is important because the Jena professor was quite an influential figure in Central European Baroque medicine; his writings were among the most frequently recommended by the Prague reading list (Černý & Divišová, 2023).

The second physician writing about the epidemic in Regensburg was Georg Eric Thill (Werloschnig & Loigk, 1715, pp. 76–80). Similarly to Schimperich's case, we do not have any additional information with the exception of the fact that he was a "*physicus ordinarius and senior*", suggesting that among the city physicians he had, at that time, the longest professional career. Despite the lack of information, Göritz and Thill represent an important connection to the Bavarian medical community and also a link to the Jena Medical Faculty.

The fifth foreign contributor points towards another Central European centre of learning. Johann Kanold (1679–1729) was born in Wrocław (Breslau) and studied medicine in Halle under Georg Ernst Stahl (1659–1734), where he also graduated with a dissertation on abortion and dead foetuses (Hirsch, 1882). Kanold spent his life in Wrocław as a respected physician and scholar due to his role as the editor of the Wrocławian *Sammlung*. In accordance with contemporary medical theories, Kanold was interested in the relationship between local climate and epidemic diseases, and the journal partially served as a publication platform for regular weather reports from various regions.

For *Historia Pestis*, Kanold wrote a brief report about the anti-plague remedies used in his home town during the epidemic (Werloschnig & Loigk, 1715, pp.

81–93). More importantly, though, he also later cited Werloschnig and Loigk's book in his own text on plague published in *Sammlung* (volume dated to Autumn 1718 but published in 1720) (Kanold, 1720). While Kanold was not interested in variolation per se, he had clearly read the passage in question because he cited a piece of information from a page immediately after the reference to smallpox (Werloschnig & Loigk, 1715, p. 459; Kanold, 1720, p. 1829).[4] After Göritz, Kanold is also the second person connecting this intellectual network to the Leopoldina society, which underscores the importance of the German Academy for sharing medical knowledge across early modern Europe. Regrettably, as with several other links mentioned in this paper, the influence of Kanold contacts remains rather obscure. For example, we do not know how much the members of academic communities at the Habsburg medical faculties (Innsbruck, Prague, Vienna) engaged with Kanold's publication project. There is only a single reference to Kanold in the Acts of the Vienna Medical Faculty, which suggests that Kanold wrote to the faculty members about the anti-plague measures in 1710 (Senfelder, 1912, p. 307). Later in the century, Kanold's text on the plague, including the citation of Loigk, was re-published by another Wrocławian physician, Johann Christian Kundmann (1684–1751). However, it remains unclear what impact this edition had, and the text was clearly provided in the context of a discussion about the plague, not smallpox (Kundmann, 1737, col. 1198).[5]

The last contributor was Johann Christoph Ausfeld (life data unknown), who provided an extensive review of the plague in Vienna, comparing it with the previous epidemic in Hungary, which he had personally witnessed. This text is unusual because it is written in German, while the rest of the book is in Latin. His German, however, is sprinkled with copious Latin words and phrases, so he did not choose the language because he was unfamiliar with the academic *lingua franca*. The Viennese *Acta* recorded in 1712 a "*formula of curing the plague, which someone called Ausfeld used to use, and who also later presented this method to the faculty*."

It seems that in May 1712, Johann Christoph Ausfeld sent his notes on the Viennese plague to the government, which forwarded the text to the faculty. In this text, Ausfeld claimed that the current wave of infections in Vienna was identical to the plague raging a few years ago in Hungary. He also argued against the speculations that the Viennese cases might be caused by Venereal diseases, as some had reportedly suggested (Senfelder, 1912, p. 232). The *Acta* records the first few paragraphs of Ausfeld's memorandum to the government, and it seems that it is

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4 Note that *Sammlung* has continuous pagination, hence the high page number.

5 Note that this book does not have pagination. Instead, it counts columns (with two columns per page).

a Latin translation of the passage later published by Werloschnig and Loigk in *Historia Pestis* (Senfelder, 1912, p. 290).

Initially, the medical faculty wrote a rather indignant reply where they acknowledged the contagious nature of the epidemic but refused to accept that it was the same plague as the Hungarian one, arguing that Ausfeld had not seen Viennese patients personally (Senfelder, 1912, pp. 291–297). This turned out to be quite a short-sighted position as the 1713 plague epidemic was right around the corner (Senfelder, 1912, pp. 320–321). Unfortunately, apart from this correspondence with the medical faculty in Vienna, the figure of Johann Christoph Ausfeld remains rather obscure; we have found only a single mention in a recent Hungarian study (Kerekes, 2017–2021, p. 393). The only piece of information we have is again included in his own text, where Ausfeld noted that, when writing this report, he had already been a physician for four decades. He also signed the letter as a "doctor of medicine", so presumably, he was an academically educated physician from Hungary (Werloschnig & Loigk, 1715, p. 95).

Let us now focus on the editors of *Historia Pestis*—the fact that they were both Slovenian is likely not a coincidence. As far as we know, Slovenian historians of medicine have not yet reported on the role of Johann Baptist Werloschnig de Perenberg and Antonius Loigk in relation to inoculation. A general history of Slovenian medicine by prominent historian Zvonka Zupanič Slavec mentions Werloschnig's participation in the *Historia Pestis*, noting that this text provided an "*epidemiological, clinical, and patho-anatomical description of the plague with rich casuistics*" but no additional details were given (Zupanič Slavec, 2017, pp. 69, 97, 100).[6] Recently, Katarina Keber contributed with a great discussion about early variolations in the region, but she was also unaware of the fact that Werloschnig and Loigk played such an important role in the introduction of the procedure (Keber, 2023).

Biographic information on both has already been summarised by Ivan Pintar. Johann Baptist Werloschnig de Perenberg (Ivan Krstnik Brložnik in Slovenian) was born in the town of Mozirje in the northern part of the country. He studied in Graz, although Pintar also tentatively mentions the Viennese faculty. However, if Werloschnig had indeed been there, he did not take any exams, because he was not mentioned in the Acts of the Vienna Medical Faculty (Senfelder, 1912). Werloschnig worked as a physician in Graz, Linz, Freistadt, and later Ried. During his stay in Linz, he was elevated to a knighthood with the predicate "de Perenberg", which might have happened in relation to his appointment as physician to the Estates of Upper Austria. He also referred to himself as a "professor", although it is

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6 Translated from Slovenian text to English by the author.

not clear at which medical faculty he lectured. He was a member of two scientific societies: the German Leopoldina and also the Slovenian *Academia Operosorum*.

Apart from *Historia Pestis*, Johann Baptist Werloschnig wrote a very interesting book arguing against the abuse of a widespread custom of so-called "Spring and Autumn purifications" (Werloschnig, 1713a). These procedures, which usually involved bloodletting, diet, and the ingestion of purgatives and vomitives, were quite popular among the lay public, as they were considered a powerful preventative measure. Other works included a dissertation on plague and a German description of the newly discovered healing waters in the Bohemian estate Omlenice (Werloschnig, 1713b; Werloschnig, 1706; Mareš, 2001–2023).[7]

Another pertinent detail for our topic is the fact that since childhood, Werloschnig was friends with Slovenian physician and scientist Marko Gerbec (1658–1718) (Pintar, 2023b). Gerbec was born in Šentvid pri Stični in Carniola (now in Slovenia), graduated with a degree in philosophy from the University of Ljubljana, and studied medicine in Vienna, Padua, and Bologna. He wrote several books on his own medical observations and contributed with papers published in the journal of the German Leopoldina, of which he was also a member. Importantly, Gerbec founded a scientific society in Ljubljana (*Academia Operosorum*) as well as the earliest medical society in Slovenian lands, the Confraternity of St Cosmas and Damian (Zupanič Slavec & Neudauer, 2015, p. 856). He was also a member of the Carniolan *Societas Unitorum* (Piry, 2023, p. 24). This connection to Gerbec, therefore, brings us back to Werloschnig's homeland.

At the beginning of the 18th century, when the Ljubljana Academy published its rules and catalogue of members, there were 23 individuals who were mostly theologians and jurists, but four–Georg Sigismund Pogatschnig, J. B. Werloschnig, Johann Caspar Corusi, and M. Gerbec–were physicians (Author unknown, 1701). The Carniolan Society published a list of members in 1706, with at least two physicians among them (Johann Baptist Pettermann, Johann Caspar Corusi) (Fereri Klun, 1852, pp. 25–29). The connection with Gerbec and the local societies, therefore, provides a link to the Slovenian academic community.

Biographic data on Antonius Loigk (Anton Lojk, born in1679) is much more sparse (Pintar, 2023c). The primary source here is the Acts of the Vienna Medical Faculty, where Loigk appeared for the first time in 1700 as a student of medicine. The steps necessary to achieve a doctoral degree in Vienna were rather complicated, and Loigk, therefore, first asked for permission to hold a public disputation

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[7] Omlenice in South Bohemia is only about 30 km away from Austrian Freistadt, where Werloschnig was located at that time.

necessary for passing a bachelor's degree in medicine, which took place on 30 July 1700 (Senfelder, 1912, p. 161). In October of the same year, Loigk received financial support (S*tipendium Emericanum*), and later, he passed the exam and graduated on 6 December 1700, with a baccalaureate in medicine (Senfelder, 1912, pp. 162–163). The following year, Loigk asked for another disputation and, in September, for the so-called "rigorosum" exam (Senfelder, 1912, pp. 167–168). During the exam in October, Loigk reportedly exceeded all the fellow students and was, therefore, assigned first place. After the exam, students graduated with a doctorate in medicine (Senfelder, 1912, p. 169).

Following graduation, Loigk disappeared from our sources for several years, presumably serving as a military physician in Hungary, but he later returned to Vienna. In 1715, during the term in office of Dean Pius Nicolaus Garelli (1675–1739), the faculty began working on a new version of statutes. The old version was medieval and was no longer sufficient for an early modern institution of medical learning. The faculty, therefore, created a commission which supervised work on the modernised statutes with six members, including Loigk (Senfelder, 1912, p. 368). The following year, we were briefly informed that Loigk became ill, recovered, and participated in activities of the Viennese College of Physicians (Senfelder, 1912, pp. 379–380). Finally, in 1719, he became a member of the commission overseeing the infirmary in the local poor house (Senfelder, 1912, p. 418).

There is a large gap in Loigk's biography between 1700 and 1715. It would be interesting to learn more about the period when he served in Hungary. He styled himself in the *Historia Pestis* as a physician in the army of the "three Emperors", which provides us with a clue because he must have started his service before the ascension of Joseph I (1705) and remained in the service until 1711, when Joseph I died, thus spanning the reigns of Leopold I, Joseph I, and Charles VI. However, in the later stages of his career, he moved to Vienna and became a member of the Viennese medical circles. Considering his membership in various committees, it is likely that he had achieved a certain level of prestige. The Viennese Collegium Medicum would, therefore, be the last connection that should be considered in research on the possible impact of early variolation.

Conclusions

The inoculation began to spread from the Greek minorities in the Ottoman empire shortly after it was discovered through to the Habsburg-Ottoman frontier in 1714 or earlier. Rather than mediated through the Western medical staff, merchants, or diplomats, it now seems clear that the earliest procedures were per-

formed by an immigrant who brought this medical practice from the East to Central Europe. While we are unable to tell whether this particular instance was an exception or part of a regular occurrence, it seems obvious that the communities living along the ever-shifting border between the Habsburg and Ottomans were not entirely isolated.

Several groups, like the Jewish or Armenian merchants, had stakes in the Muslim as well as the Christian part of the Balkans; they might, therefore, have served not only as the brokers of goods but also of ideas and concepts transmitted through the restless frontier. One of these ideas was the "Greek custom" of inoculation introduced to Vienna. While it is probably impossible to track this cross-border communication in detail, we may attempt to figure out what happened after the procedure was noticed by Viennese scholars. An examination of the sources related to these individuals shows several possible avenues for further research.

The most promising of these would probably be the Wrocławian lead related to the community of contributors and readers around Kanold's journal. We know that one of them – Jan Adam Reiman – applied the knowledge from Vienna to inoculate his own daughter. Johann Kanold himself very likely read the passage about inoculation as he referenced an adjacent passage. A thorough reading of the rest of the journal may help us to better understand this network of individuals. Authors who contributed to *Historia Pestis* might also have become aware of the procedure. This link points towards physicians in Regensburg (Bavaria), Austria, Bohemia, and Silesia.

The biographies of the editors of *Historia Pestis* reveal additional possibilities, including a link to the academic milieux in Jena and Vienna. The Slovenian connection is also worth consideration—Werloschnig and Loigk likely cooperated because they were both successful compatriots building careers outside their motherland. Finally, the importance of scientific societies should also be examined. Several individuals were connected through the German Leopoldina, but there was also the Slovenian *Academia Operosorum* and Carniolan *Societas Unitorum*. All these links reveal the complex nature of the network of scholars living and working in the Central and East European region during the early vaccination period.

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SAŽETAK

Godine 1715. dva su slovenska liječnika, Johann Baptist Werlosching de Perenberg i Antonius Loigk, objavila opsežan svezak o posljednjoj epidemiji kuge u srednjoj Europi. U svesku je, bez isticanja, pronađen opis cijepljenja protiv malih boginja koji je nekoliko godina stariji od svih zapisa o tom postupku u Europi. Loigk je osobno svjedočio postupku u Beču 1714. ili prije. O kontekstu ovog događaja trenutačno se malo zna. Ne znamo koliko je bilo inokulatora, koliko je pacijenata liječeno i, što je ključno, kako su medicinski krugovi u Austriji prihvatili postupak. Svi su ti podatci potrebni za razumijevanje utjecaja ovog otkrića na austrijsko (i, šire, istočnoeuropsko) društvo s početka 18. stoljeća. Da bismo razmotrili moguće poveznice, usredotočit ćemo se na rekonstrukciju intelektualne mreže obaju Slovenaca kako se pojavljuje u tadašnjoj akademskoj literaturi. Nadamo se da te poveznice mogu otkriti nešto o skupini liječnika koji su možda prije nego ostali bili upoznati s ovom važnom protuepidemijskom mjerom.

***Ključne riječi**: male boginje (ospice), inokulacija, variolacija, Slovenija, rani novi vijek*

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GIUSEPPE CERVETTO. HISTORY AND PHILOSOPHY OF AN ALMOST FORGOTTEN PHYSICIAN

GIUSEPPE CERVETTO. POVIJEST I FILOZOFIJA GOTOVO ZABORAVLJENOGA LIJEČNIKA

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SUMMARY

Giuseppe Cervetto (1807–1865) was a physician, lecturer, and medical historian from a Jewish family born in Verona, Italy. In addition to his clinical practice, he delved into historical studies, making notable contributions to the works of Italian anatomists from the 15th century, as well as to the physicians and their College in Verona, particularly G.B. Da Monte from the 16th century. In 1860, he was called to teach History of Medical Sciences at the University of Bologna. After two years, he became a lecturer in Hygiene and Forensic Medicine at Messina, but he sadly passed away at the relatively young age of 57 due to his delicate health. He strongly believed in the importance of medical knowledge «enriched by history», actively advocating the use of the biographical method in reconstructing the historical development of medicine and its inseparable connection with philosophy.

Keywords: *medical biography, history of medicine, medical history, medical philosophy*

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Education and professional career

Giuseppe Cervetto was born on July 16, 1807, into a family of Jewish origins. According to the records found in the Archive of the Municipality of Verona, he was the son of Mezulan and Stella Bassani (Ferrari et al., 2019). His medical education started in his hometown of Verona, after which he pursued further studies at the University of Padua, where he obtained his degree in Medicine in 1830 with a thesis dedicated to spinal caries. More precisely, the academic degree conferred by the University of Padua was in "medicine and philosophy" until the reform implemented during the Third Austrian Domination (1813–1866). The reform, dated 1816/17, occurred only a few years before Cervetto's graduation and brought an end to a centuries-old tradition.

After achieving the academic title, Cervetto's professional endeavors encompassed two prominent roles: that of «Physician of the Pious Israelite Society» in Verona and «Primary Physician at the Civil Hospital» of the same city (Massalongo, 1918). Additional fragments of his autobiography emerge from his works, particularly in the frontispiece of his first written work with a historical-medical focus, "Cenni per una storia dei medici veronesi e del loro antico collegio" ("Insights into the History of Veronese Physicians and Their Ancient College", 1834), where Cervetto identifies himself as "Doctor of Medicine and Surgery / Master in Obstetrics and Ophthalmology / and Physician at the Civic Hospital" (Cervetto, 1834).

The strong involvement of Cervetto in the Italian cultural and also political climate during the Risorgimento is well confirmed by his repeated participation in the Meetings (Congresses) of Italian Scientists, which took place annually in various cities of the peninsula from 1839 to 1847. These gatherings represented an important and stimulating opportunity for scientists of the time, showcasing the existence of a unified Italian culture in the spirit of national identity. The first meeting, held in Pisa in 1839 under the auspices of Grand Duke Leopold II of Habsburg-Lorraine (1797–1870), was followed by a second one in Turin in 1840. During this meeting, the physician from Verona presented his work entitled "Cenni per una nuova storia delle scienze mediche" ("Remarks for a New History of Medical Sciences"), outlining the principles of his historiographic proposal. Later, an "Appendix" was added to this work, which Cervetto did not have the opportunity to present in Florence in 1841, but its contents were nonetheless published in Verona in 1842. In addition to his published printed works, this active participation in conferences and the formulation of innovative and original proposals certainly contributed to giving visibility to Cervetto in the diverse scientific pano-

rama of the time, likely laying the groundwork for his appointment at the University of Bologna (Ferrari, 2019; Cervetto, Le Riunioni 1861).

Interest in the history of medicine

In parallel with his medical profession, Giuseppe Cervetto nurtures a personal interest in the history of medicine, a passion he has cultivated since his university education at Padua. During this period, he had the opportunity to attend lectures on the History and Literature of Medicine taught by Giuseppe Montesanto, the director of the city hospital (Ferrari, 2019). Motivated by the desire to «reclaim for the homeland the glories that foreign historians forgot or mistreated» (Massalongo, 1918), Cervetto decides to materialize this predilection for historical-medical studies. In 1839, he published a work with a distinctly biographical approach dedicated to the physician and humanist Giovanni Battista Da Monte ("Montano", 1498–1551), accompanied by an extensive documentary apparatus (Cervetto, 1839).

Also, Giovanni Battista da Monte (1489–1551) was born into a noble lineage in Verona. At the University of Padua, he pursued studies in literature, philosophy, and medicine. After obtaining his medical degree, he traveled to several cities on the Italian peninsula, including Palermo, Naples, and Rome, before returning to Padua, where he assumed the chairmanship of medicine at the University. Montano is recognized as a precursor to the clinical method, teaching medicine not only from the lectern but also at the patient's bedside.

As early as 1834, in the aforementioned work dedicated to physicians of Verona, Cervetto delineates with precision some of the guiding principles of his methodological approach to the history of medicine. He asserts that "we must, therefore, be inspired by the memories of our predecessors [physicians] who, in such great number, illuminated their respective centuries" (Cervetto, 1834). In other words, the objective was to shed light on the prominent Italian medical figures, thus rescuing them from the oblivion to which, according to Cervetto, they had been confined (Ferrari, 2019). Remaining congruent with the views expressed in 1834, Cervetto provides an additional practical example of his historical-medical method by publishing, in 1842, a second biographical work titled "Di alcuni illustri anatomici italiani del decimoquinto secolo" ("On Some Illustrious Italian Anatomists of the Fifteenth Century"). This publication, through the study of unpublished documents, is dedicated to reconstructing the lives and scientific contributions of Renaissance physicians and anatomists Marco Antonio Dalla Torre, Gabriele Zerbi, and Alessandro Benedetti (Cervetto,1842).

In 1854, Giuseppe Cervetto relocated from Verona to Brescia (Ferrari& De Salvo, 2019), a city in which he became notably active, especially on the front of professional activities and, above all, in the field of historical-medical research. Notably, in the same year of his move, he published an expanded edition of his work from 1842, dedicated to the Italian medical Renaissance (Cervetto, 1854). Starting from 1859, he was duly registered among the physicians of the province of Brescia. He subsequently received the appointment as the «director of the balneo-sanitary establishment» of the city, as mentioned in one of his publications titled "Stabilimento idroiatrico di Trento" ("Hydrotherapeutic Establishment of Trento"), which was released in 1857 (Cervetto, 1857). Moreover, he was recognized as a corresponding member «of the Academy of the Department of Mella, later known as "Ateneo di Brescia"» (Ferrari, 2019).

Teaching activity

Over the course of several decades of research, Cervetto's scientific output gained considerable renown in medical circles, allowing him to attain the position of Professor of the History of Medical Sciences at the University of Bologna in 1860. This appointment marked one of the pioneering courses dedicated to this subject(Massalongo, 1918). Regarding this call, Cervetto wrote, "His Excellency Count Terenzio Mamiani della Rovere, with a gracious letter dated July 13, 1860, consulted me in Brescia about this honorable appointment which, following my affirmative response, was conferred upon me by a decree on the 18th of the same month" (Cervetto, 1861).

The university appointment followed the new provisions introduced on March 8, 1860, by the legislative decree of Luigi Carlo Farini (1812–1866), who was the Governor in Emilia (Italy) after it separation from the Papal States (Simeoni, 1947). These provisions envisaged the establishment of a chair for the compulsory teaching of the History of Medical Sciences. This course was to be held during the sixth year of the medical students' curriculum, as well as for those pursuing veterinary studies.

Despite being occupied with his medical practice for many years in Verona and subsequently in Brescia between 1854 and 1860, where he received a letter from the Minister of Public Education, Terenzio Mamiani (1799–1885), Cervetto had earned visibility and recognition within the scientific community. He achieved this through his writings, active participation in meetings of Italian scientists, and repeated proposals for a "New History of Medical Sciences".

In the preliminary lecture of his course, delivered in Bologna on November 27, 1860, while praising "Felsina [Bologna], illustrious mistress of knowledge" for welcoming him to its university, Cervetto's extensive reflection on the necessity of incorporating the History of Medicine into the educational path of future physicians begins by focusing on the Italian context: "History should thus confirm that our country boasts the greatest representation in the annals and triumphs of medical sciences, and that the tapestry of their events must be an integral part of national historical studies". He then expanded his discourse to encompass the diverse European scenario: "Enlightened by such a potent and beneficial truth, numerous European governments, for nearly half a century, have grafted this historical branch onto the organic structure of medical education, either as a connected chair within the university career or as a free school in a College or as part of advanced Institutes".

Contemporary to Cervetto, the only others having the same teaching role in universities across the Italian peninsula during the unification process were Francesco Puccinotti (1794–1872) in Pisa and Florence and Salvatore De Renzi (1799–1872) in Naples. As noted by M.D. Grmek (1924–2000), "both of them closely aligned with the German Romantics [...] they attribute a profound significance to the historical development of medicine" (Grmek, 1993).

Puccinotti was a determined advocate of the need to reclaim the Hippocratic method in medicine. In this regard, he found himself in open contrast with the views espoused by the physician with Jacobin sentiments, Giovanni Rasori (1766–1837), who, following the path of Brownism, upheld the doctrine of "Controstimolo", which was destined for inevitable decline. Rasori was also a polemical proponent of the "Analisi del preteso genio di Ippocrate" ("Analysis of the Alleged Genius of Hippocrates") (Rasori, 1799). Before assuming the chair of the History of Medicine, Puccinotti held positions in Theoretical Medicine, Hygiene, and Forensic Medicine in Pisa. He further distinguished himself as the founder of the "New Italian Hippocratic School", which he also termed "iatro-philosophical". We shall delve deeper into the significance of this term later in the article, noting its strong idealistic inspiration (Cosmacini, 1987; Fortuna, 2016).

As for Salvatore De Renzi, the author of the monumental "History of Italian Medicine" in 5 volumes (Naples 1845–1848), his historiographic approach was explicitly inspired by the thinking of Giambattista Vico (1668–1744), "enlightened mind who, foreshadowing his century, pointed to the history of sciences as the true source of the progress of knowledge and the improvement of the human species" (Cappelletti, 1991). De Renzi considered the History of Science not only

as a "narrator of events in their chronological sequence; but as a rigorous evaluator of the causes of social developments".

The imprint left by Cervetto on his own teaching is also attributable to the romantic vein of historical-medical studies (Bernabeo, 1988), in substantial harmony with the perspective of his contemporaries. Moreover, the entirely cordial relationship between Cervetto and De Renzi is confirmed by the latter's writings in III volume of his aforementioned History of Medicine, where he commends Cervetto's work on the clinical activity of Giovanni Battista Da Monte: "This is not a mere opinion, but it is based on monuments, documents and authorities that my esteemed friend Giuseppe Cervetto, with great diligence and ingenuity, gathered in his history of Da Monte, published in Verona in 1839" (De Renzi, 1845–48).

Cervetto, in "Preliminary Lecture to the Course" (1860), does not hesitate to reciprocate his colleague's praise, emphasizing the «copious and substantial volumes» authored by his friend De Renzi solely for the "History of Medicine in Italy" (1845).

According to the proposal put forth by the newly appointed professor, «the new historical course for Bologna, naturally completed in two or three years», was succinctly structured as follows:

A. The life and works of the most celebrated or meritorious figures in medical or surgical science and related fields ("Bio-Biblio-graphy").

B. Deductions from these works, especially national ones, of authentic claims of actual discoveries in various branches of the health science ("Biography of Science").

C. Historical philosophy of systems and physio-patho-logical theories that caused the most commotion and were fruitful in effects in relation to the civil, philosophical, political, and religious state.

D. Historical Pathology and Epidemiology.

E. Health and Educational Institutes and establishments whose organization and development were connected, as they are today, to the state of medical knowledge and civil life (Cervetto, Prelezione 1861).

As can be observed, the starting point of the historical analysis proposed by Cervetto is the biographical-bibliographical method, with a significant philosophical component that indeed permeates his entire work. The celebratory undertones associated with the Risorgimento, culminating largely in the unification of the country, resonate prominently throughout the entire Preliminary Lecture, highlighting the role played in that historical event by the Kingdom of Sardin-

ia, specifically the House of Savoy under the reign of King Vittorio Emanuele II (1820–1878), with Camillo Benso, Count of Cavour (1810–1861), serving as Prime Minister. Looking to the future of this discipline, Cervetto, in his Preliminary Lecture for the new course on the history of medicine (1860), urged young students to choose as the topic of their thesis not a «theoretical-practical point», but rather a «deceased fellow citizen [physician], ancient or modern, among the many awaiting justice». In this way, according to the Author, «these theses would be worthy of preservation instead of being destined for a fleeting existence» (Cervetto, 1861).

The style of the memory that Cervetto reads at the Academy of Sciences of the Institute of Bologna just a month later (December 20) is similar to the mentioned Preliminary Lecture, as the chronological course of the meetings of Italian scientists intertwines with broader historical considerations, always with a strong celebratory connotation of patriotism and Risorgimento ideals (Cervetto, 1861).

As a consequence of the fall of the third government led by Camillo Cavour on March 23, 1861—the last cabinet of the Kingdom of Sardinia before the proclamation of the Unification of Italy on March 17, 1861—Terenzio Mamiani's tenure as Minister of Public Education also came to an end. In the newly formed Kingdom of Italy, the fourth Cavour Government assigned the same ministry to Francesco de Sanctis (1817–1883). He had, on several occasions, expressed hostility towards Cervetto (Ferrari, 2019) and would replace him in the chair with Angelo Camillo De Meis (1817–1891), a physician of abruzzese (Italian) origin with a strong interest in philosophical studies, with whom he had previously maintained close collaborative relations. De Meis held the chair in Bologna until he died in 1891, unlike other Italian university seats where the teaching of the History of Medicine was abolished after the 1870 reforms.

In 1863, Cervetto was called to the University of Messina. According to G. Ferrari, the teaching position held by Cervetto at the Sicilian university was in Hygiene and Forensic Medicine, while R. Massalongo, later echoed by R.A. Bernabeo, claimed it was in the History of Sciences. Accepting this appointment, which undoubtedly took Cervetto far from his familiar surroundings, was influenced by precarious health conditions and his search for a climatically more favorable residence (Massalongo, 1918; Taccari, 1980), considering the presence of a morbid condition that, as stated by biographers, seemed to follow a plausible chronic and progressive course (tuberculosis?). However, the swift conclusion of his relationship with the University of Bologna also played a significant role in his decision.

However, the stay in Messina, for which little information is available, did not benefit Cervetto's health. After leaving Sicily, he passed away in Padua on September 10, 1865, while returning to his city of origin.

Historical method

In his writings, Giuseppe Cervetto expresses gratitude toward traditional historical reconstructions of medical sciences, at the same time maintaining a critical approach. According to his assessment, those accounts are imperfect, narrow-minded, and uncertain. Their errors and inherent incompleteness make it necessary to compile a new history of medicine, which he himself advocates for. However, he did not leave behind any published results despite the elaborated program, which we shall now report.

Such an ambitious work, which in his intentions will join monumental, civil, and ecclesiastical historical works, must be conducted with an original drafting method compared to previous works. Cervetto is well aware of the "immensity" of such a «gigantic undertaking» and the related risk of being overwhelmed by it, as has happened to the daring pioneers in the past (Cervetto, 1843). For this reason, he foresees an «indispensable» extensive collaboration among scholars who draw from both municipal and national analytical journals. The goal is to create a network that includes, on the one hand, local civic commissions (secondary entities) to collect the medical-surgical history of a particular municipality and, on the other hand, national committees (primary entities) to ensure a coherent overall perspective. Once the materials are gathered, Cervetto's program envisions that historical research should be conducted «without tenderness»: while acknowledging the merits of illustrious past physicians, the historian of medicine must be objective, impartial, and stringent in their assessment. As for the structure of the work, it should follow a geographical-topographical division, while the presentation order should be chronological, as it is "the most suitable for showing the regular path of our art and science, like any other".

Cervetto's chosen form is the biographical one, which is considered by the author to be the most useful in providing excellent materials for the history of medicine. The sources of medical knowledge, namely the lives and works of the "most prominent and illustrious departed", thus become the very sources of historical knowledge of medicine. In other words, writing a new history of medical sciences means crafting a "biographical history for medical sciences». According to Cervetto's intentions, it will rest upon the names (including the most "admired" figures) of those "renowned and great masters, professors deserving of all praise,

splendid artists" who actively contributed with their intellect and heart to scientific progress and social well-being. Cervetto emphasizes that in clarifying their personal information and facts, i.e., their studies and endeavors ("sublime discoveries or works of genius"), one will make "biography a grade of history" (Cervetto, 1841).

In summary, the combination of the chosen structure and form will ensure the gathering and illustration of the lives, works, and portraits of the worthy individuals who preceded us "to coordinate them in many impressive collections throughout the most prominent cities of the [Italian] peninsula" (Cervetto, 1843).

Philosophical insight

The history of medicine,as conceived by Cervetto, is closely connected to philosophy – a connection likely influenced by his academic degree, which, as previously mentioned, was in "medicine and philosophy". The profound link between these two disciplinesis recognized and explicitly stated by the physician from Verona, who cites specific authors, including Tommasini G. (1815), Mangiovini A. (1821), Conti C. (1832), Bouillaud J. (1836), Bernardi (1839), Geromini F.G. (1840), and Giusto F.C.H. (1852).

The philosophy, in its social aspects, is found both in the origin and the purpose of medicine. Philosophy, "the offspring of heaven", is the mother of all sciences, including medicine, through which "Homines ad Deos accedunt" ("men approach the Gods"), as stated by "the old man of Cos who likened that physician who is a philosopher to the Gods" (Cervetto, 1834). Thus, while the philosopher is not necessarily a physician, the physician is undoubtedly a philosopher. Consequently, the history of medicine, referred to as "the path of healing art", reveals the history of the philosophy of medicine, encompassing the "essential various theories and systems" (Cervetto, 1842), to the extent that it is appropriate to speak not only of the history of medicine but predominantly of the "history of medical philosophy", the "philosophy of medical history", or "jatro-philosophy"—a term combining the concept of "who heals" or "the doctor" with the wisdom of philosophy. Cervetto further explains the idea of a «national philosophical history of the art [...] where Italian medical history serves as the nucleus to the general one» (Cervetto, 1843). In fact, it is precisely through the "sublime study" of the history of medicine that "the interdependence and connection of our art with other sciences, and most notably with philosophy and civilization are revealed" (Cervetto, 1842). Therefore, the history of medicine is, above all, the history of a "pre-eminently social" science. Its most accomplished realization, of which Cervetto aspires to be the

author, is distinguished not only by "historical faith, wise criticism, accuracy and length" but also by "instructive philosophy" (Cervetto, 1841).

What is particularly interesting in Cervetto's perspective is this "assimilation" (not reduction) of medicine into philosophy, rooted in a classical hermeneutics that does not distinguish between the humanistic and scientific domains, despite being situated in the positivist period, occurring at least two centuries after the scientific revolution and the introduction of the experimental method. Cervetto (1842) himself places medicine and philosophy in the same historical category—that of the sciences–describing it as "attaining to criticism, erudition, philosophy, the spirit of observation and studying the immutable laws of creation [through] experimental sciences, including medical and surgical ones, based on observations, experiments, cases, inductions and facts", distinct from the civil field ("attaining to speculations of the moral world, "poetic wisdom" and studying human passions").

Noteworthy is also Cervetto's observation regarding the emergence, while retracing the history of medicine, of a maturation of a relational philosophy among physicians, united by the same "philanthropic and highly useful ardor". If, as Cervetto records, they were isolated "until yesterday", competing and fighting among themselves for personal interests, now they are finally aware of the importance of being united "by their love for truth and utility within the scientific community as a powerful association of enlightened brotherhood". The history of medical sciences thus demonstrates the overcoming of that "fatal dissension among them that has torn apart medicine for a long time", in favor of an "amnesty" for a higher good: to unite in association as a "medical family" for the benefit of society. A virtuous example is the scientific association "Società Italiana dei 40" ("Italian Society of the 40"), founded in 1782 in Verona (and during Cervetto's time, headquartered in Modena) by Anton Mario Lorgna Veronese. This academy included not only physicians but also other Italian scientists, consisting of the 40 greatest scientists of that era.

In summary, the physicians who populate Cervetto's history of medicine are not merely wise individuals who, through their studies, dedicated themselves to clinical work. They are, rather, philanthropists who, through their "toils, hardships and martyrdoms", sacrificed for the progress of civilization and science, the improvement of humanity, and the enhancement of its happiness, battling against ignorance, prejudices, malice, and abuse of power. Consequently, the purpose of the history of medicine is not merely intellectual. It is primarily to encourage readers to follow the example of past physicians and be inspired in order to enrich and improve «social coexistence», as Cervetto (1842) writes: "Historia extinctos, Medicina resuscitat aegros. Qui Medicis vitam reddit, utrumque facit" ("History extinct, medicine revives the sicks. Who gives life to physicians accomplishes both things").

Conclusion

Giuseppe Cervetto played a significant clinical role, contributing also to the educational dimension of medicine. However, he deserves to be primarily remembered for his studies in the history of medicine, a discipline that undoubtedly constituted the central core of his intellectual efforts. In this field of study, the 19th-century Veronese physician demonstrated dedication and rigor, focusing particularly on the methodological aspect, which he selected in the biographical form. Cervetto firmly believed in the possibility of reconstructing the historical trajectory by detailing the lives and works of the "most illustrious deceased physicians". At times, he might have displayed an overly laudatory tone, but this does not negate the scientific and methodological value of this Veronese physician's work. Specifically, his own method became the key to understanding and bringing to light his own thinking, constantly directed with passion toward a "new" history of medicine capable of recognizing the philosophical and social spirit of medicine.

The intertwining of philosophy and medicine, united by a sense of medical brotherhood both toward the public and at the intra-collegial level (which matured precisely during Cervetto's historical period), expresses and highlights the intrinsically humanistic dimension of medicine – a science where human life is simultaneously the author, means, and purpose; technique and creation; evidence and art; action and relationship.

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SAŽETAK

Giuseppe Cervetto (1807. – 1865.), liječnik, predavač i povjesničar medicine iz židovske obitelji, rođen je u Veroni u Italiji. Uza svoju kliničku praksu, bavio se povijesnim studijama, pružajući značajan doprinos djelima talijanskih anatoma iz 15. stoljeća, kao i liječnicima i njihovoj visokoškolskoj ustanovi u Veroni, a posebno G. B. da Monteu iz 16. stoljeća. Godine 1860. pozvan je da predaje povijest medicinskih znanosti na Sveučilištu u Bologni. Nakon dvije godine postaje predavač kolegija Higijena i forenzična medicina u Messini, ali je zbog narušenog zdravlja preminuo u razmjerno mladoj dobi od 57 godina. Čvrsto je vjerovao u važnost medicinskog znanja „obogaćenoga poviješću", aktivno se zalažući za upotrebu biografske metode pri rekonstrukciji povijesnoga razvoja medicine i njezine neraskidive veze s filozofijom.

Ključne riječi: *medicinska biografija, povijest medicine, povijest bolesti, medicinska filozofija*

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MOMENTS FROM THE LIFE OF IULIU BARASCH (1815–1863): DOCTOR, PROFESSOR AND PROTECTOR OF HIS PEOPLE

TRENUCI IZ ŽIVOTA IULIUA BARASCHA (1815. – 1863.), LIJEČNIKA, PROFESORA I ZAŠTITNIKA SVOJIH LJUDI

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SUMMARY

In 1842, at a time when Romanian society was taking its first steps towards modernization, a Jewish man from Galicia chose to settle in Wallachia. This man was a physician with a medical degree in "medicine and surgery" obtained at the University of Berlin, spoke two widely spoken European languages (French and German), and was concerned with diverse areas of knowledge, such as philosophy, natural sciences, law, and more. As an ethnic Jew, he made a remarkable career in Wallachia. He was a physician in the country's medical service, professor, hospital director, journalist, and philanthropist. He founded the first children's hospital in the country and two influential newspapers. He campaigned for the political rights of Wallachian Jews and the modernization of the synagogue cult. He gave public conferences in the country and abroad and translated and wrote several books. The physician's name was Iuliu Barasch, and this study tries to reconstruct his life and medical activity between 1842 and 1863 in Wallachia, a period marked by social unrest, revolution, war, and cholera epidemics, but also unionist actions, political and social reforms. For this reconstruction, I researched documentary material in archives, the press of the time, journals, memoirs, and specialized literature.

***Keywords**: Iuliu Barasch, Wallachia, biography, diseases, children's hospital, quarantine*

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Introduction: who was Iuliu Barasch? Family, school, and college years

Iuliu Barasch was born in 1815 in Brody, a town in Habsburg Galicia (present-day Ukraine). The name received at birth was not Iuliu, but Yehuda. His mother's name was Hana Landau, and she came from a Hasidic Jewish family in Poland, a family that produced several generations of prominent rabbis, businessmen, diplomats, and intellectuals (Schwarzfeld, 1919, p. 9). His father, Mordechai Barasch, was a well-known member of the Jewish bourgeoisie from Brody, whose profession as a bank clerk did not bring him enough income to support his family as he wished, so he was forced to reorient himself to the fur and exotic goods trade. The new job proved to be beneficial for the family, especially for the education of the two children, Eisic and Yehuda.

Yehuda was the youngest child of the Barasch family. Until he went to school, he had received a solid education at home from a teacher of Hebrew studies, a "famous scholar at the time, Mise Meir, who instructed only a small number of gifted students" (Schwarzfeld, 1919, p. 19). At an adequate age, little Yehuda was enrolled in the "Commercial Israelite School" in Brody (Barasch, 1894, p. 45). At school, Yehuda proved to be a diligent and promising student, so his parents began to make plans for his future. From Brody, he went to Tysmienice in Poland, then to Leipzig in Saxony, intending to thoroughly study the *Talmud* and *Torah* and become a rabbi, as his parents wished (Cernovodeanu, 1999, p. 128). In the schools of these two cities, he studied more than just holy books. In Tysmienice, he joined a group of intellectuals who followed the Haskalah (an Enlightenment-inspired movement of reformist Jews from the Habsburg Empire). In Leipzig, he discovered the works of the philosophers of classical antiquity and became passionate about German philosophy (Herşcovici, 1999, pp. 241–242). In 1839, he went from Leipzig to the University of Berlin to complete his studies in philosophy (Siupiur, 2019, p. 216). However, in addition to philosophy, the young Barasch was now attracted to the natural sciences. Not daring to tell his parents that he had changed his mind about the profession, he enrolled in the Faculty of Medicine at the same University, then wrote to Eisic, his older brother, to inform him: "You know, brother, that I chose medicine as a career long ago and this is where my mind is now exclusively directed, although - God willing - I will also take the doctoral exam in philosophy in the future, for I remain forever attached with my heart to philosophy and the social sciences, apart from the specialty of medicine" (Schwarzfeld, 1919, p. 23).

At the University of Berlin, most of the professors were renowned scholars (for example, Johann Lukas Schönlein (1793–1864), the professor who supervised his

doctoral thesis), so the student Barasch wondered if he would have the time and strength to accumulate the necessary knowledge in order to practice his chosen profession as well as possible (Buda, 2022, pp. 121–122; Izsak,1956, p. 18). In the end, he passed all the exams, and in 1841, he defended his doctoral thesis with the title *Synopsis impetiginum seu Conspectus omnium morborum cutis chronicorum.* The thesis, which is a dermatology-related topic, was signed with his Latinized first name, Julius Barasch (Figure 1).

Barasch's decision to latinize his first name should be viewed from the historical context of his cultural and professional development. In the first half of the 19th century, it was still fashionable for the "late" humanists of Europe to latinize their names. Barasch's passion for medicine, natural science, and philosophy marked him as a genuine humanist. Also, the Latinization of the first name proves that he adhered to Haskalah from conviction and not just out of a desire to reject an outdated religious authority. His belief was that Jews must integrate into the land where they settled and culturally adapt to the new times. In this sense, after settling in Wallachia, Barasch advocated for the modernization of customs, language, fashion, and mentalities within the Jewish community. Nevertheless, he also supported the preservation of the specific identity, representative values, and traditions of the "Israelite confession" (that should be based on the religion of Yahweh, but also modernize some ritualic elements, i.e., the prayer should be done solemnly and be "accompanied by beautiful songs") (Bihl, 2021, pp. 23–24; Herșcovici, 1999, p. 241).

With a medical degree in hand, Iuliu Barasch considered practicing medicine in the Netherlands—a liberal and prosperous country, separated from Belgium in 1830—but after a discussion with his family, he gave up the idea and headed for Jassy, the capital of Moldavia (Barasch, 1894, p. 107). In 1840, Moldova was ruled by Mihail Sturdza (1834–1849), who, in the context of the country's modernization process, was looking for new taxpayers to increase the country's budget and was pursuing a policy favorable to the settlement of foreigners in the Principality. Many Jews from Habsburg Galicia and Russia took advantage of this policy. In the first half of the 19th century, amidst wars and territorial changes in the Habsburg Empire and the Russian Empire, the Jewish population was in a difficult situation characterized by ethnic discrimination, excessive taxation, and religious intolerance. In search of a better life, many Jews chose to emigrate to the Romanian Principalities (Moldavia and Wallachia), settling in cities and ports where they could have liberal occupations (mainly in the craft sector and commerce). In this regard, the city of Jassy was significant as the number of Jews increased from 5,765 in 1820 to 30,460 in 1859. According to the calculations of historian Dan Dumitru

Iacob, Jews constituted approximately 46% of the population of Jassy in 1859 (Iacob, 2015, p. 115). In the cities of Wallachia, the number of Jews was much smaller. Roughly 3,600 Jews were registered in Bucharest, representing 2.9% of the capital's total population in 1860 (Rotman, 2015, p. 39). Among the Jews who preferred to emigrate to the Romanian Principalities were many physicians who were attracted by the large offer of jobs in the country's health system and also in the private sector (Livadă-Cadeschi, 2013, pp. 86–91; Trăușan-Matu, 2022, p. 360).

Iuliu Barasch hoped for a medical career and a dignified life in Moldavia, but was unfortunate (Schwarzfeld, 1919, p. 29, pp. 333–334). In the fall of 1841, after a failed attempt to obtain the certificate of free practice in Jassy[1], he arrived in Bucharest, the capital of the Wallachia. At this time, Wallachia (similarly to Moldova) had a complicated legal status. It was under the suzerainty of the Ottoman Empire and the protectorate of the Russian Empire. This situation was imposed on the two countries by the Treaty of Adrianople in 1829, which ended the Russo-Ottoman War (1828–1829) and considerably strengthened Russian influence in the Balkans to the detriment of the Ottoman Empire. Between 1829 and 1834, the Romanian Principalities were occupied militarily by Russia and ruled by its representative, the Russian general Pavel Kiseleff (1788–1872). Under the supervision of Governor Kiseleff, the first concrete measures to modernize the principalities were taken, including the introduction of the Organic Regulations (Regulamentele Organice, 1831–1832), the first constitutions for the two countries, and the implementation of a quarantine system on the Danube, as a barrier against the coming plague and cholera epidemics from Asia. Kiseleff's rule ended in 1834, but Russia, with the agreement of the Ottoman Empire, appointed trusted persons as rulers: Alexandru Dimitrie Ghica (1834–1842) in Wallachia and Mihail Sturdza on the throne of Moldavia. By these means, Russia retained control in the Principalities until 1853, when the Crimean War outbreak (1853–1856) ended Russian influence in the Principalities. Defeated in the war, Russia lost the status of protector over the Principalities, which passed under the collective guarantee of the Great European Powers. The Paris Peace Treaty (1856) enshrined the new status of the two countries and opened the way for their union (1859) and the creation of Romania (Ardeleanu, 2008, p. 57; Boia, 2007, pp. 74–75).

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[1] In Moldavia, the right to free practice was obtained following a competition organized by the Health Commission. However, sometimes, for different reasons (personal or professional), the examining committee made rejection decisions, even if the candidate had prepared honorably for the exam. In 1846, English physician John Mason was in a similar situation to Barasch when he took the exam for a license to practice medicine in Jassy, in Moldavia (Mason, 1860, pp. 12–14).

Doctor Barasch arrived in Bucharest in the midst of the country's modernization process when there was a great demand for specialists in the medical field. As soon as he appeared before the Health Commission for the verification of his doctorate diploma, he obtained the right to free practice (Buletin Oficial al Prinţipatului Ţării Româneşti 58/1851, p. 229; Gyémánt & Benjamin, 1999, p. 260). The joy of success was immeasurable. It was the beginning of a new life in a new country for him. He just had to bring his whole family. At the time he arrived in Wallachia, Iuliu Barasch was married to Leia Gritz, the daughter of a merchant from Tysmienice. The marriage took place in 1832. At that time, Iuliu was seventeen years old, and Leia was twenty-two. Leia Barasch came to Wallachia in 1843, after Iuliu Barasch established himself in Călăraşi, but she could not integrate into Wallachian society (Schwarzfeld, 1919, p. 19). After a while, they decided to separate. Their child, Friedrich, studied law at the University of Vienna, where he also settled and practiced law (Schwarzfeld, 1919, p. 333).

Free again, Iuliu Barasch married Sophia Landau in 1855 in Budapest. This time, he had better luck. Sophia came from a family of rabbis and influential businessmen (Petrescu, 2022, p. 196)[2] from Pest and was a gentle, modest, and jovial woman. She remained by Barasch's side until the end, and after his death, left alone and unable to manage the pension given by the Romanian state, she went to her relatives in Vienna (Schwarzfeld, 1919, p. 19). Three children were born from the marriage with Sophia: Oscar, Marcel, and Melania. Against expectations, none were attracted to medicine. Oscar (the eldest son) became an engineer, and Marcel dealt with commerce. They both chose to live in Paris. Melania married a lawyer and settled in Vienna (Schwarzfeld, 1919, pp. 333–336).

Before entering the state medical service, Iuliu Barasch practiced for two years as an "ophthalmologist" and generalist in Bucharest. In 1843, he was offered the position of "quarantine physician" in Călăraşi (Almanah al Statului, 1844, p. 60; Trăuşan-Matu & Buda, 2022, p. 27). Back then, being a quarantine physician was very dangerous as plague and cholera were very contagious diseases for which no cure existed at the time. Barasch immediately accepted the job and left Bucharest. He saw the appointment decision as a social promotion and hurried to inform his family (Schwarzfeld, 1919, p. 23).

Iuliu Barasch remained in Călăraşi for three years, from 1843 to 1845. During this time, although contagious diseases managed to bypass the barriers placed in

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[2] Sophia's brother, Horace Landau (1824–1903), was a banker and, temporarily, the representative of the Viennese Rothschild Bank in Constantinople, Turkey (See Petrescu, 2022, p. 199).

their way, he managed to prevent the spread of plague and cholera epidemics from the south of the Danube through the use of quarantine. He spoke little of this success. In a letter sent for publication to the Viennese journal "Wiener Medizinische Wochenschrift", he just briefly mentioned that "when the plague was haunting beyond the fortress of Silistra, located on the right bank of the Danube", the city of Călărași (located on the left side) "remained untouched all the time" (Barasch, 2023, p. 274; Wiener Medizinische Wochenschrift, 26/1854, p. 412). After that, his reputation as a physician grew and spread throughout the "Ialomița County" so that in April 1845, the governors of Wallachia promoted him to the position of "county physician", entrusting him with the medical administration of Dolj County (Buletin Gazetă Oficială a Prințipatului Țării Românești, 42/1845, p. 167).

From Călărași to Craiova. Iuliu Barasch, doctor of the Dolj county

Taking charge of the Dolj county's state of health, Barasch established his office in Craiova and, with the enthusiasm specific to the age of thirty, began his work. Responsibilities were on par with the position and involved: "monitoring the health of the inhabitants and cattle", managing epidemics and epizootics, speeding up the process of vaccination against smallpox, medicalizing venereal disease cases, providing "medical-forensic and sanitary police" services, and implementing the orders of the Quarantine Committee. For these services, he received a salary of "5,000 lei per year" (Almanah al Statului, 1850, p. 79), approximately half the salary that quarantine inspector Nicolae Mavros received annually (Petrescu, 2020, pp. 139–165)[3].

Barasch had to provide such a long and diverse list of medical services due to an acute shortage of doctors and qualified medical personnel in Wallachia. The first Faculty of Medicine in Romania was established in 1869, in Bucharest. Until the society could benefit from the services of physicians trained at the Romanian faculty, it had to rely on the services of foreign doctors. To attract them to Wallachia, the governors offered generous salaries and privileges. In the middle of the 19th century, according to a list of physicians published by the government official publication, there were 78 physicians and two veterinarians working in Wallachia's medical service (Buletin Oficial al Prințipatului Țării Românești, 58/1851, p. 229). They had to supervise a population of 2.5 million inhabitants and their animals. Although these figures should be taken more as orders of magnitude than precise

[3] Nicolae Mavros (1786–1868) was the General Inspector of the Danube quarantines of Moldavia and Wallachia from 1830 to 1854, when the office was abolished.

data, I estimate that in 1851, a physician in Wallachia was responsible for an average of about 32,000 patients. The list reveals something further: with a few notable exceptions (Ștefan Piscupescu, Nicolae Kretzulescu, Gheorghe Polizu, Ștefan Capșa, etc.), the doctors were foreigners, including some Jews: Ignaz Mayer, Constantin Laibu, Morit Slehter, Solomon Steger, Benedict Stainer, Morit Werthaimer, Iacob Felix, and others (Buletin Oficial al Prinţipatului Ţării Româneşti, 58/1851, p. 229). The last one on the list, Dr. Iacob Felix (1832–1905), had a successful career in Wallachia; he was a professor of hygiene at the Faculty of Medicine in Bucharest (1869–1902) and director of the Public Health Service between 1892 and 1899 (Brătescu, 2004, pp. 160–161).

In the middle of the 19th century, the people of Wallachia suffered from many diseases that we still have today, and Barasch had to find solutions to treat or alleviate them. It often happened that people suffered from several diseases at the same time[4], and the chance that the diagnosis would be correct was quite small, a fact that displeased him. Even the treatments did not help him much. Around 1850, the syringe for skin injections had just been invented. Aside from the smallpox vaccine, quinine (used to treat malaria), citrus fruits (recommended to treat scurvy), digitalis (a strong cardiac tonic, used in case of dropsy), laudanum (valued for its pain-relieving and calming properties, but also for stimulating creativity), and mercury (used to treat syphilis), there were no effective drugs or antibiotics, and no one could observe what was happening inside a living body affected by disease. As a rule, when someone got ill, Barasch would draw a little blood with a leech or lancet, recommend an appropriate change in diet, cupping, enemas, or refreshing baths, prescribe a remedy, which patients could prepare themselves, and if the treatment was more complicated, he could call on the services of a chemist (Barasch, 2023, pp. 283–287). In case of a surgical problem, the physician would treat wounds, lacerations, ulcerations, burns, and simple fractures. He could also straighten a sprain, treat a dislocated ankle under chloroform anesthesia, sew up a wound, or excise an infected area (Trăușan-Matu, 2011, pp. 269–282).

When he wanted to move his mind away from illness and suffering, Iuliu Barasch took refuge in reading and writing. After returning from the patients, evening after evening, he sat at the writing table and read and annotated papers on various subjects. While reading, Barasch got the idea to write a natural science book in Romanian. He had no pretense to make an original contribution to specialized

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[4] In addition to epidemics of plague, cholera, and smallpox, the most widespread diseases that Barasch encountered in Wallachia were: syphilis, malaria, scarlet fever, dysentery, measles, mumps, tuberculosis, croup, and exanthematic typhus (eruptive fever), angina pectoris, hemorrhoids, and different sickness of the stomach.

knowledge. He simply wanted to share the wonderful world of science with interested people and, thus, combat ignorance and prejudice. The project became a reality in 1850, when his work, *Minunile naturii* (The Wonders of Nature), was published. The book reveals the author's encyclopedic interests. It illustrates how a scientist (physician, in this case) can contribute to a discipline by taking ideas and knowledge from fields adjacent to his profession (physics, chemistry, botany, astronomy, etc.) and adapting them to his own field of expertise (Barasch, 1850).

As a reward for his hard work, *The Wonders of Nature* helped Barasch assert himself as a writer who addressed issues beyond his field of specialization. I suppose this book played a significant role in reigning Prince Barbu Ştirbei's (1849–1856) decision on 4 June 1851 to appoint Iuliu Barasch as a professor of natural history at the St. Sava College in Bucharest (Barasch, 1850, p. 1). He was also recommended for this appointment due to his doctorate from Berlin, good command of two widely spoken European languages (German and French, in addition to Hebrew, Latin, and Slavic), and his solid scientific and literary background. However, it must be emphasized that these titles and abilities would not have mattered if the laws of the country had been against him. From this point of view, Doctor Barasch was lucky as he practiced at a time when Wallachia's legislation did not specify any incompatibility between foreign citizenship or ethnicity and serving as a teacher or physician in the state health service (Iancu, 2006, p. 57).

Back to Bucharest. The best years of life

In the summer of 1851, after being assigned as a professor of natural history at the St. Sava College, Barasch returned to Bucharest. He charmed his students through the quality of his lectures and his dignified, teacherly demeanor. He enjoyed the company of young people, and he tirelessly reminded them that science is not limited to information gathering and debates, but must also aim at developing applications. Through his conscientious way of teaching, his reputation grew and requests for professorships multiplied. Doctor Barasch taught botany at the Agricultural School (1857), forest botany at the Forestry School (1857), natural sciences at the Military School (1859), and held two courses at the National Medical School (1856): one on natural history and another on comparative physiology (Monitorul Medical al României, 10/1862, p. 75). Lastly, he taught "German, Hebrew, and Yiddish" at the Israelite School (Cernovodeanu, 1999, p. 135).

The teacher occupation was honorable and enjoyable, leaving plenty of time for other pursuits, such as scientific research and writing. As Barasch loved to research and annotate, the works accumulated. In addition to *The Wonders of Nature*,

Barasch is the author of numerous other works, including three school textbooks (two being his own contributions[5] and one being a translation[6]), a philosophical encyclopedia[7], a "folk hygiene" course[8], a travel diary[9], a study on the types of European philanthropic establishments[10], another one on the medical situation in Wallachia[11], and two brochures meant to popularize medical practices.[12] Finally, his interests also included dramaturgy, being the translator of a play authored by S. Mosenthal (1858).

Although reconciled with his work as a teacher, the young physician did not give up the dream that one day he would be able to practice medicine again in the country's health service. After four years of waiting, on 12 July 1855, Iuliu Barasch was hired as a physician at the "blue district" of Bucharest (Buletinul Official al Ţării Româneşti, 56/1855, p. 22).[13] It was a dream come true. Thus, in addition to teaching and writing, he had to reserve time for medical practice, which was no easy task. The job involved providing daily healthcare services at the medical office of the district: vaccinating children and adults, giving free consultations, and writing prescriptions. The medical office work had to be supplemented with fieldwork. At least once a week, the physician had to survey the markets and streets of his district for types of products that "could harm the health of the community, such as meat, bread, fish, fruits, and others", as well as disease generating centers, "as were the streets", garbage pits, and puddles "with stagnant water" (Vîrtosu & Oprescu, 1936, pp. 45–46). For the services he provided, the physician received "eight hundred lei per month" (Buletinul Oficial al Ţării Româneşti, 16/1853, pp. 61–62).

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5 Barasch, I. (1861–1862). *Manualul de Botanică Silvică, în uzul elevilor de la Şcoala de Silvicultură*. 2 Vol. Bucharest: Tipografia Statului Niphon; Cursul elementar de istorie naturală, pentru uzul claselor superioare gimnaziale în România. 3 Vol. Bucharest: Tipografia Statului.

6 Beleze, G. (1854 & 1855). Istoria naturală. Potrivită pe înţelegerea copiilor cu întrebări şi cu figure. Translation from French by Iuliu Barasch. Bucharest: Typografia Colegiului Naţional.

7 Barasch, I. (1856). *Liber thesaurus scientiarum in lingua hebraica, continens fundamenta omnium scientiarum*. Wien: J. Holzvarth.

8 Barasch, I. (1857). *Cursul de igienă populară, dat în lecţiuni publice de duminică în anii 1854 şi 1855 în Colegiul Naţional*.Bucharest: Tipografia Colegiului Sf. Sava.

9 Barasch, I. (1894). *Itinerar în Cracovia, Galiţia, Bucovina, Moldova şi Muntenia în 1841–1842* [Wanderung durch das Krakau'sche, Galizien, Bukowina, Moldau und Wallachei]. Translation by German by Elias Schwarzfeld. Bucharest: Redacţia ziarului "Egalitatea".

10 Barasch, I. (1853). *Despre unele din institutele filantropice în Europa.* Bucharest: Tipografia Colegiului Naţional.

11 Barasch, I. Beitrag zur Kenntnis der medizin-endemischen Verhältnisse der Walachei. *Wiener Medizinische Wochenschrift*, 26/1854, 412–414. The paper would appear in several issues of the magazine between 1854 and 1855.

12 Barasch, I. (1854). *Despre asfixie sau leşin la oameni*. Bucharest.

13 In Bucharest, the districts were designated by colors, not numbers.

Also, as a district physician, Barasch was part of the Medical Council of Wallachia and had to oversee (together with colleagues from the five districts of Bucharest) the country's medical service (Almanahul statului, 1858, p. 60). Until the health reform of 1874, the Medical Council was the institution that granted the right of free practice and controlled the market of medical services. This meant that no physician had the right to write a prescription, and no chemist could prepare medicines without a certificate of free practice from the Council.

While being a district physician (first in the blue district, then in the black district), Iuliu Barasch started visiting the workshops of artisans and craftsmen and had the idea to record his observations on the living and working conditions of the workers. He soon began to make connections between occupations and diseases. This is how he came to the conclusion that occupations influence the development of various diseases. He noted, for example, that "dyers, gardeners, and brewers suffer from rheumatism and arthritis," that "furriers are subject to tuberculosis," and "children who work in factories are thin, pale, scrofulous, and do not live long" (Barasch, 1850, pp. 150–153). Based on these observations, he held public conferences, drawing attention to the effects of working environments on health.

Another important contribution to the health of children came from Barasch, who was very sensitive to their sufferings. In 1858, in order to ease their pain, he established the first children's hospital in Wallachia, in Bucharest, at his house on Dudești Street, located in "Stone Cross District, 42" (Arhivele Naționale Istorice Centrale [hereafter ANIC], Fond Ministerul de Interne. Direcția Sanitară, dosar 577/1857, f. 3-5; Roman, 2019, pp. 139–140). He designed it as a charitable medical institution for "sick and poor children", with a capacity of "up to 40 beds", with rooms for mothers and nurseries separated from those of children and with a consulting room, where "generous physicians of the Capital" were going to give "free prescriptions and remedies to sick children" (ANIC, Fond Ministerul de Interne. Direcția Sanitară, dosar 577/1857, f. 4–6). Families with financial means from Wallachia could also call on the services of physicians at the hospital, but for a fee. The success of the children's hospital inspired Barasch to pursue other philanthropic projects. He had the idea of founding a nursery for workers' children who were forced to stay away from their homes and an asylum for the mentally sick (Barasch, 1853, pp. 9–10). He succeeded only with the hospital; the other two projects could have become a reality if he had lived longer.

Usually, success arouses envy, and Iuliu Barasch is a good example of this phenomenon. Several physicians who did not take kindly to Barasch's position and performance attacked him with accusations and complaints. A complaint that led

to his dismissal was signed by the French-born doctor Robert Macaire and was submitted to the Medical Council towards the end of 1858. The signer complained that Barasch held several posts in the service of the state and did not have enough time to do a good commissioner job (Buletin Oficial al Țării Românești, 4/1859, p. 41). On 12 January 1859, the members of the Medical Council voted to remove Barasch from the position of "black district commission physician" (Fraternitatea, 20/1883, p. 158).

Iuliu Barasch, newspaper founder and activist for the rights of Jews in Wallachia

Since his student years, Iuliu Barasch was attracted to journalism and published texts in "Allgemeine Zeitung des Judenthums" and "Jahrbuchfur Israeliter", where under the pseudonym Raphael Sincerus, he authored texts about the life and culture of Jews in the Balkans (Cernovodeanu, 1999, p. 128). After settling in Bucharest, he regularly published articles in journals like "Buletinul Oficial" (The Official Bulletin), "Revista Carpaților" (The Carpathian Magazine), "Românul" (The Romanian), "Wiener Medizinische Wochenschrift" etc. His articles in the Romanian press had a wide range of subjects. They referred to topics such as agricultural crops and current animal diseases (Buletinul Oficial [al Țării Românești], 27/1854, p. 107), the history of epidemics, hygiene, occupational diseases, and Romanian and European legislation. Without going into further details, I should also mention that most of the texts instructed peasants on how to raise their animals healthily or do modern agriculture. Lastly, he also wrote texts encouraging self-medication with homemade remedies (Barasch, 2023, p. 130).

However, Iuliu Barasch aspired to have his own magazine with a scientific orientation and professional collaborators. The project was not strictly within everyone's reach. Founding and managing a newspaper requires a large-scale operation and a unique talent different from that of an ordinary journalist. Nevertheless, Iuliu Barasch succeeded twice. The first journal, "Isis sau Natura" (Isis or Nature), was founded in 1856 in Bucharest (Figure 3). A journal named "Isis" existed in the German space since 1817, started in Jena by the naturalist Lorenz Oken (1779–1851), and it is very likely that the profile of this journal was the source of inspiration for Barasch's project (Brătescu, 1964, p. 130; Koszor-Codrea, 2022, pp. 47–51; Popescu, 2022, p. 318). Isis or Nature was the first magazine in Wallachia dedicated exclusively to the popularization of natural science. On its pages, one can find articles about the latest discoveries or theories related to the field of natural sciences. For example, Iuliu Barasch was the first to write in Wallachia about Darwin and Darwinism, about the theory of natural selection or about the

concept of "nature" (Isis sau Natura. Jurnalul pentru răspândirea ştiinţelor naturale şi exacte în toate clasele 3/1862, p. 20; Popescu, 2022, pp. 293).

Shortly after its publication, "Isis or Nature" became a popular, respected, and influential newspaper. The journal circulated through Romanian urban schools, being offered to students for free or as a prize. In January 1861, five years after its publication, the newspaper changed its name to "Natura" (The Nature). In 1866, three years after Barasch's death, the journal disappeared from the Romanian press.

Barasch's second publishing project took shape in 1857 and was named "Israelitul Român" (The Romanian Israelite). In addition to Doctor Barasch, Isaac Leib Weinberg, Aaron Ascher, and Armand Lévy also contributed to the paper. All of them were known as prominent representatives of the Haskalah and campaigned for the political rights of the Jews from Wallachia and Moldavia. The newspaper, launched as a reaction to the Paris Peace Treaty (1856) and in the context of the rising national unity movement of the Romanians, was the vanguard of the Jewish community in its effort to promote "tolerance and equality before the law, without distinction of religion" (Israelitul Român, 1/1857, p. 1; Trăușan-Matu, 2019–2020, pp. 169–170).

In 1857, although enjoying some civil rights, the Jews of Wallachia faced a ban on acquiring real estate in the countryside and difficulty in acquiring naturalization. Article 379 of the Organic Regulation emphasized that citizenship can be acquired by "any foreigner, of any Christian rank" (Negulescu and Alexianu, 1944, p. 131). In the article titled "On electoral rights" from the newspaper "Israelitul Român", Barasch pleaded for the correction of this situation using the following argument: "Every human being has natural rights, the most important of which are freedom and the right to possession" (Israelitul Român 6/1857, pp. 1–2). In the end, although some legislative initiatives attempted to favorably regulate the Jewish situation between 1866 and 1878, in the context of the affirmation of Romania's independence, some new legislation appeared that encouraged anti-Semitism. Despite this, the Israeli community did not abandon the cause; it continued to demand its rights firmly and with dignity (Petrescu, 2022, pp. 193–194). The fulfillment of these demands for full civil and political emancipation would only be brought about by the Constitution of 1923 (Ciupală, 2009, p. 127). As for the exercise of their profession, we can say that in the middle of the 19th century, the Jewish doctors in Wallachia had an honorable position and could make a career in the service of the state or the private sector, whether they converted to Christianity or refused to do so (Bărbulescu, 2018, p. 294).

However, "Israelitul Român" was not only a Jewish socio-political newspaper, but discussed everything, including educational, moral, legal, and factual issues. It started as a bilingual weekly publication (Romanian and French) and had hopes of both domestic and international circulation and audience. Unfortunately, after 23 issues, the finances thinned out, and on 20 September 1857, the 24th and last issue of the newspaper appeared.

Conclusion: Barasch's last three years

A photograph from the period depicts Iuliu Barasch as a gentleman with an elongated figure, having an intense and piercing gaze, who inspires intelligence and kindness (Figure 1). He looks tall, handsome, and distinguished, with his hair combed to one side, a thick mustache, and a short, neatly trimmed beard. He is dressed in the fashion of the time, with a frock coat, stiff collar, and bow tie. The physician seemed satisfied; he was respected, valued, and invited everywhere. Contemporary sources mention him as being present in numerous places. He participated in the banquets given in honor of 24 January 1859 (the day when Romania was created)[14], attended the Romanian Science Society, and was interested in painting, theater, and literature. He was kind not only to friends in need, but also to young scholars, giving them advice and promoting them in their careers. He also spent a lot of time collecting specimens related to natural history and man-made objects, which he exhibited in the "Cabinet of Curiosities" at the St. Sava College in Bucharest (Urechia, 1894, pp. 116–117). At some point, the extremely hectic life, the busy schedule, and the suffering caused by malaria weakened his body. Iuliu Barasch died on 31 March 1863 at the age of 48. He was buried in the Jewish Cemetery, located in Sevastopol Street, Bucharest (Figure 4).[15]

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14 Romania was founded in 1859 through the union of Wallachia and Moldavia. The unification process continued in 1878 with the addition of Dobrogea and culminated in 1918, when the Romanian state was completed by the addition of three historical provinces: Transylvania, Bucovina, and Bessarabia.

15 In 1942, the decision was made to demolish the Jewish Cemetery on Sevastopol Street. This is how Iuliu Barasch's grave is now located in the "Filantropia" Cemetery in Bucharest.

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Sažetak

Godine 1842., u vrijeme kada je rumunjsko društvo poduzimalo prve korake prema modernizaciji, jedan Židov iz Galicije odlučio se nastaniti u Vlaškoj. Taj je čovjek bio liječnik s medicinskom diplomom iz „medicine i kirurgije" Sveučilišta u Berlinu. Govorio je dva široko rasprostranjena europska jezika (francuski i njemački) i bavio se različitim područjima znanja (filozofija, prirodne znanosti, pravo i drugo). Kao etnički Židov ostvario je zavidnu karijeru u Vlaškoj. Bio je liječnik u medicinskoj službi zemlje, profesor, ravnatelj bolnice, novinar i filantrop. Osnovao je prvu dječju bolnicu u zemlji i pokrenuo dvoje utjecajne novine. Zalagao se za politička prava vlaških Židova i modernizaciju kulta sinagoge. Održao je javne skupove u zemlji i inozemstvu i preveo i napisao nekoliko knjiga. Liječnikovo ime je Iuliu Barasch, a ovo istraživanje pokušava rekonstruirati njegov život i medicinsku djelatnost u Vlaškoj između 1842. i 1863. godine. To je razdoblje popraćeno društvenim nemirima, revolucijom, ratom i epidemijama kolere, ali jednako tako i unionističkim djelovanjem te političkim i društvenim reformama. Za ovu rekonstrukciju pretraživani su arhivski dokumenti, tisak toga vremena, dnevnici, memoari i stručna literatura.

***Ključne riječi**: Iuliu Barasch, Vlaška, biografija, bolesti, dječja bolnica, karantena*

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HISTORICAL REVIEW OF SURGICAL TECHNIQUES FOR OPERATIVE TREATMENT OF INGUINAL HERNIA

POVIJESNI PREGLED KIRURŠKIH TEHNIKA OPERATIVNOG LIJEČENJA PREPONSKE KILE

Damir Grebić*, Karla Havidić**

SUMMARY

Hernia is characterized as the protrusion of the peritoneum with or without an organ or a portion of an organ through the defect of the abdominal wall. It is likely that inguinal hernias have been a problem since the beginning of human history. Many doctors have had challenges in the past when treating them. Although they are no longer recognized as a fatal illness, they are nevertheless very common in the general population and they can be clinically complicated. There have been advancements in hernia repair throughout history. The most significant advancement was in the late 1800s when Eduardo Bassini published his method of triple sewing fascia and muscle tissues to reinforce the posterior wall of the inguinal canal. The use of prosthetic materials in the repair of the inguinal canal marked the next major development. Irving Lichtenstein is credited with being a pioneer in the use of prolene mesh for tension-free repair. The last remarkable development was the introduction of laparoscopic techniques in surgery, which are nowadays very commonly used in laparoscopic procedures.

***Keywords**: history, inguinal hernia, surgical technique*

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Introduction

One of the most frequently performed operations by general surgeons worldwide is the repair of an abdominal wall hernia. Inguinal hernias constitute approximately 75% of abdominal wall hernias, with femoral hernias accounting for 5%. (Mulholland et al., 2017) An inguinal hernia is a result of protrusion of the contents of the abdomen through a weak spot in the lower abdominal wall. There are two places in the lower abdominal wall, one on either side of the groin, where inguinal hernias can develop. Nowadays, and looking throughout history, one can see a high level of incidence and the development of many surgical techniques that will lead to the best results with different approaches. Today's treatment methods are very advanced and do not present an exceptional problem, and they are usually elective procedures. Advances in anesthesia and operative techniques have led to the fact that this is an operation with a low number of recurrences and an extremely low mortality rate. Given this success, the quality of life and avoidance of chronic pain became paramount in deciding which technique to use for the hernia repair itself. The choice of technique itself still remains a decision of the operator, and most will decide on a technique they are familiar with and have learned well. However, it is extremely important to emphasize that regardless of the choice of technique, each operation is a serious procedure and carries a possible risk of complications.

Historical review

Ancient times

The history of inguinal hernia treatment is the history of surgery. Descriptive anatomy of the anterior abdominal wall dates more than 6000 years back, to the beginning of civilization, the Nile Valley, and the Ancient Egyptian papyrus. These books, many of which were written by unidentified authors, date back to a time when magic and religion were the mainstays of medicine. Ebers Papyrus, dating back to 1500 BC and most closely resembling a modern surgical textbook of that period, was found in the Theban tomb in 1862 by Professor George Ebers. It provides the first descriptions of the anterior abdominal wall (Sanders & Kingsnorth, 2012). Interestingly, the last section deals with abdominal swellings and tumors. Although there is no specific mention of inguinal hernia, we can clearly see the root of all future developments in methods over the years. The observation about hernias was stated: "When you judge a swelling on the surface of a belly.., what comes out.., caused by coughing" (Lau, 2002.). Egyptian specialists considered all hernias, besides the inguinal-scrotal assortment, to be treated nonsurgically. The Ebers Papyrus suggested eating less and making outside compression of the hernia with gauze and liniments (palm oil). The

surgical approach to the inguinal-scrotal hernia contained an extraction of the hernia together with an orchiectomy. An illustrated sculpture of an operator seemingly completing a circumcision and possibly reducing an inguinal hernia can be found in the Egyptian tomb of Ankh-ma-Hor at Saqqara, which dates back to approximately 2500 BC. The role of the Egyptian pharaoh's inner circle of doctors was to maintain the monarch's health. These medical professionals had a thorough understanding of the human anatomy and had created several cutting-edge surgical methods for treating hernias in addition to other ailments. The mummy of Pharaoh Merneptah (1215 BC) showed a large wound in the groin, and the scrotum was separated from the body, from which it was concluded that an inguinal-scrotal hernia operation was performed (Kingsorth & Sanders, 2018).

The Greco-Roman period

The currently used term "hernia" comes directly from ancient Greece (*kele*/*hernios* in Greek means bud or offshoot) (Kingsorth & Sanders, 2018). Although the natural course of the disease is relatively slow, it eventually reaches a size that severely impairs patients' ability to perform daily activities. Early Greek medical texts such as The Corpus Hippocraticum, which are closely linked to the physician Hippocrates and his teachings, also mention hernias (Sanders & Kingsnorth, 2012). However, there was no description or hint of any possible surgical treatment in the books of the Hippocratic School. However, the anatomical studies in the Hellenistic period appear to have highly contributed to our understanding of the etiology and improved surgical management of hernias when necrotomies were permitted. A few centuries later, a Roman named Aulus Cornelius Celsus first described the importance of surgical closure of the abdominal wall. Cornelius Celsus states that when groin hernias first appear in small children, bandaging and poultices should be applied before considering surgery. A strip of linen is used for the bandaging; one end of the strip is rolled into a ball and applied to the prolapse to push the intestines back. After that, the remaining linen strip is securely tied all around. In this manner, the intestines are pushed back inside, and the tunics quickly adhere. The author also advises against surgery in older patients with very large or strangulated hernias. Celsus also provided a thorough surgical method for sparing the testicles. A century later, Aelius Galenus, undoubtedly the most prominent physician of the Greco-Roman period, provides a detailed description of how a hernia is the result of a rupture of the peritoneum and stretching of the adjacent fascia and muscles. Galen classifies hernias as bubonocele (when located in the groin), enterocele (scrotal hernia), and omphalocele (umbilical hernia). He provides a precise definition of the hernia, stating that it is a tumor that contains the intestines, peritoneum, liquids, dilated vessels, omentum, and similar sub-

stances. He further divides them into categories according to their contents; for example, enterocele - if containing intestines (entera in Greek), hydrocele - if containing water (hydor in Greek), epiplocele - if containing omentum (epiploon in Greek). The treatment process included ligature of the hernial sac and spermatic cord and testicular resection. Galen's principle of treatment was used as the treatment of choice for centuries afterward. (Lascaratos, Tsiamis & Kostakis, 2003).

The Middle ages

During the fall of the Western Roman Empire in 476, the Greco-Roman medical tradition was taken over by Byzantine medicine, with an emphasis on Galen's treatment. The notable techniques of Greco-Roman surgery were largely lost. Then came the long, dark Middle Ages, a period described as one of medical decline in the civilized world, marked by stagnation, the eclipse of surgery, centuries of ignorance, and the widespread abandonment of the use of the knife. This was an age of faith and scholasticism. Abdominal wall hernias of different types were rarely distinguished during this time. On the other hand, French physician and surgeon Arnauld de Villeneuve described an epigastric hernia in the year 1285, and Guy de Chauliac, 1363 wrote *Chirurgia Magna,* where he described six surgical techniques for inguinal hernia surgery and classification of various hernia types. He developed taxis for incarceration, recommending the head-down, Trendelenburg position (Sanders & Kingsnorth, 2012). His six surgical techniques were:

1. After the skin incision, the hernia sac is transfixed, and the distal spermatic cord with the testicle is amputated a (method of Galen).
2. Cauterization of the external swelling with the red-hot iron (a method of Albucasis).
3. Scar formation by using a 'cauteriumpotentiale,' a plaster with escharotic capacity, for instance, arsenic (a method of Theodoric of Cervia).
4. Applying a transcutaneous suture around the spermatic cord and tying it on an external wooden slat until the cord becomes sectioned (a method of Roger of Salerno).
5. Incising the suprapubic area and introducing a hot iron cautery directly on the spermatic cord (a method of Lanfranchi of Milan).
6. After incision, applying a golden thread around the spermatic cord to tie it just enough to ensure closure of the hernia sac but without compromising the vascularization and function of the testis (method of Guy de Chauliac) (A. Marte, A. A. Caldamone and L. M. Aguiar, 2021.) At the time, he was the authoritative expert on hernia, and his methods were in use, with a progressive predominance for de Chauliac's technique with the so-called "Golden Thread."

The anatomical era

Surgical operation on a fully anatomical basis only began to be performed after 'modern anatomy' was established during the sixteenth century, as autopsy and anatomic dissection spread throughout Europe. The superior pubic ligament, transversalis fascia, and cremasteric fascia were first described by Sir Astley Paston Cooper, an English surgeon and anatomist. In 1804, Astley Cooper stated, "No disease of the human body, belonging to the province of the surgeon, requires in its treatment a greater combination of accurate anatomical knowledge with surgical skill than hernia in all its varieties" (Hori & Yasukawa, 2021). The earliest method used was to cause inflammation to strengthen the hernial opening, which was achieved by cauterization with a red-hot iron, which is the forerunner of today's electrocautery device. Another used method was injecting acidic chemicals. In this way, the formation of a solid scar was induced in the area of the front wall of the inguinal canal. After the hernia was repositioned, a purse-string ligation was tied around the hernial sack at the level of the external inguinal ring. The hernial sack and spermatic cord were often tied with a golden thread, the so-called golden stitch (Sachs, Damm & Encke, 1997). A major contribution was made in 1817 when Cloquet dissected and examined about 340 hernia cases for his thesis, *Recherches Anatomiques sur les Hernies de l'Abdomen*. These cases came from five thousand cadavers that he had dissected over the course of three years at the University of Paris, along with Pierre-Augustin Béclard, a colleague and friend. The revolutionary aspect of Cloquet's thesis was that it was an extensive anatomical study that included a thorough description, dissection, and drawing. The thesis described the locations where inguinal and crural hernias are more likely to occur in terms of the cremaster muscle, the peritoneum, and the spermatic vessels (Loukas et al., 2007). Marios Jules Cloquet provided a crucial anatomical structure used in numerous sutured inguinal hernia repairs. Even with these significant advancements in anatomy knowledge and the discovery of anesthesia in 1846, hernia surgery did not advance much in the first half of the 19th century because attempts to open the inguinal canal often led to severe sepsis and hernia recurrence.

New trends from the XIX century

The first operation to narrow the hernial opening of the inguinal canal was performed by Vinzenz von Czerny, a German surgeon (1877). He surgically strengthened the abdominal aponeurosis by fascial duplicature without opening the aponeurosis (Czerny suture), which led to the narrowing of the external inguinal ring. Unfortunately, this operative augmentation of the anterior wall led to a high recurrence rate (>30%), even when performed by skilled surgeons such as

Billroth. Therefore, the procedure was considered insufficient (Sachs, Damm & Encke, 1997; Hori & Yasukawa, 2021). The Parisian surgeon Just Lucas-Championniere was the first to indicate that a high ligature of the hernial sac on the internal inguinal ring is necessary after splitting the abdominal aponeurosis. Most significant inguinal hernia repair techniques, still in use today, were made possible by this reinforcement of the posterior wall of the inguinal canal (Sachs, Damm & Encke, 1997).

For most of the 19th century, groin hernia surgery was performed largely in accordance with the procedures that Celsus had performed nearly 2,000 years earlier in Rome. The primary indications remained pain, incarceration, and strangulation, unresponsive to taxis. The age of tension hernia repair (19th to mid-20th century) was recognized as the beginning of contemporary hernia surgery, highlighting of anesthetic and sterile methods. Three key guidelines for hernia repair were established: high ligation of the hernia sac, internal inguinal ring narrowing, and aseptic and antiseptic techniques. Even with this improvement, the treatment was not very effective because the postoperative mortality rate was 7%, and the recurrence rate was significant. Only with Bassini's help did the outcomes noticeably improve (Marte, Caldamone & Aguiar, 2021).

Bassini began his work on inguinal herniation in 1883. He gave up on the idea of making a scar under the external oblique aponeurosis and hoping it would close the internal abdominal ring inside out, leaving the inguinal canal open for the spermatic cord to pass through. He made the decision to reconstruct the canal physiologically, companioned with new inguinal rings, and restored the valvular obliquity of the canal. Bassini sutured the conjoint transversalis abdominis and obliquus internus to the inguinal ligament, and his "triple layer" included the fascia verticalis Cooperi (transversalis fascia) (Rad, 1999). He focused attention on the valve-like mechanism, which must be restored by closing the floor from below upward. Many unique elements of his procedure included the use of interrupted nonabsorbable (silk) sutures, bilateral repairs, the management of cryptorchidism, the restoration of obliquity, and the placement of transversalis fascia and the rectus sheath. Additionally, he was the first person to deliver such a big success with thorough aftercare. He stopped using postoperative trusses and seldom used drains (Lau, 2002). The Bassini techniques were unfairly criticized in the interwar period since the outcomes of the many changes did not live up to initial reports. It was also shown that the muscle would not repair to the aponeurosis. Repairs of the deep, transverse layer resulted from a renewed focus on transversalis fascia deterioration and an increased incidence of direct defects with aging and smoking (Read, 1987). However, although Bassini's procedure was adopted widely, modifications (corruptions) to his methods were rapidly introduced. At about the same

time when Bassini brought his changes, Williams S. Halsted developed an independent operation for the treatment of inguinal hernia (Halsted I procedure) that differed from Bassini's technique by transposition of the cord in a position above the aponeurosis of the external oblique muscle (Read, 1984). By 1891, Halsted had performed this operation twenty-one times. In his paper, he gave a historical review of the operations for inguinal hernia and then described his operation. "'Bassini's operation and mine are so nearly identical that I might quote his results in support of my operation. Instead of trying to repair the old canal and the internal abdominal ring, as McEwen had tried to do, I make a new canal and a new ring" (Summers, 1947). Both Bassini and Halsted established the fourth principle of inguinal herniorrhaphy: reconstruction of the posterior inguinal floor. Georg Lotheissen developed a significant modification to Bassini's procedure in 1898. He suggested that the internal oblique abdominal muscle and the transverse abdominal muscle for radical hernia surgery should be attached to Cooper's ligament, which is typically more developed than the inguinal ligament. The American surgeon Chester B. McVay re-described this technique in 1942, and it was later published in the literature under the name McVay repair (Sachs, Damm & Encke, 1997). The original Bassini method has also been revived as the Shouldice operation in modern times. The classic open repair culminated in the 1940s with a new approach based on Bassini's technique, which involved using local anesthesia to apply an extension suture for a four-layer posterior wall closure. Shouldice made duplicates of the external obliques' aponeurosis, the internal spermatic fascia, and the cremaster fascia. Years later, the recurrence rate significantly decreased, and that approach became the norm. The three key components in the Shouldice repair method that contribute to its safety, effectiveness, and cost-effectiveness are local anesthesia, technical aspects of the repair, and early mobility (Shearburn & Myers, 1969). Later on, the tension-free method appears. In 1980, Irving Lichtenstein performed and introduced a more advanced tension-free hernia operation with mesh placed anteriorly to the transversalis fascia, and his method of repair became accepted as the standard easy-to-perform hernia operation and is still performed today (Komorowski, 2014). In his own words: „There is evidence that to incise a strong posterior layer and, then, to reconstruct it as in the Bassini, Shouldice, or McVay repair is inappropriate, disruptive, and even meddlesome. The application of a wide sheet of harmless prosthetic mesh, one which serves only to strengthen such a floor, is harmless and should reduce the incidence of recurrences" (Lichtenstein & Shulman, 1986). And indeed, his results were and still are exceptional.

With the progress of medicine, there is further development of minimally invasive techniques where inguinal hernias are repaired with a laparoscopic ap-

proach. The two most commonly used techniques are the total extraperitoneal approach (TEP) and the transabdominal preperitoneal approach (TAPP).

The Shouldice repair, the Lichtenstein repair, and the laparoscopic techniques of transabdominal preperitoneal repair and total extraperitoneal repair are currently still the most common surgeries performed. The unique benefits of Shouldice and Lichtenstein repairs include the ability to perform the procedure under local anesthesia, as well as their low rates of long-term recurrence and postoperative complications. The Lichtenstein repair has the added advantage of a simpler operation with a shorter learning curve than the Shouldice repair. The benefits of laparoscopic surgeries include reduced pain and quicker return to normal daily activities. General anesthesia and much higher surgical costs are two drawbacks of the laparoscopic approach.

Conclusion

Many years ago, inguinal hernia repair lured the interest of skilled surgeons. Various techniques have been established throughout history and have evolved over the years. Each surgeon, whether using a similar or completely different approach, has contributed to key guidelines still in use today. While one cannot affirm which method is ideal and should be used, it is important to consider each patient individually.

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SAŽETAK

Kila je izbočenje peritoneuma sa ili bez organa kroz otvor trbušne stijenke. Vrlo je vjerojatno da su ingvinalne kile problem od početka ljudske povijesti. Mnogim kirurzima u prošlosti bio je izazov kako kirurški liječiti hernije. Iako se više ne prepoznaju kao smrtonosna bolest, česte su u općoj populaciji, a mogu se klinički i komplicirati. Tijekom povijesti došlo je do napretka u kirurškom popravku kila. Najveći napredak postignut je u kasnim 1800-ima kada je Eduardo Bassini objavio svoju metodu trostrukog šivanja fascije i mišićnog tkiva za pojačavanje stražnje stijenke ingvinalnog kanala. Korištenje protetskih materijala u popravku ingvinalnog kanala označilo je sljedeći veliki razvoj. Irving Lichtenstein zaslužan je za korištenje prolenske mrežice za popravak bez napetosti. Posljednji je značajan razvoj uvođenje laparoskopskih tehnika u kirurgiju, koje se danas vrlo često koriste u laparoskopiji.

***Ključne riječi**: povijest, preponska kila, kirurške tehnike*

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ŞEREFFEDDIN SABUNCUOĞLU (1386–147?): AN OVERLOOKED YET BRILLIANT OTTOMAN PHYSICIAN

ŞEREFFEDDIN SABUNCUOĞLU (1386. – 147?): NEPREPOZNATI, ALI SJAJAN OSMANSKI LIJEČNIK

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SUMMARY

Şereffeddin Sabuncuoğlu was a skilled surgeon from the early Ottoman period (15th century) in the Anatolian city of Amasya. He was a physician, surgeon, trainer, scientist, miniature artist, calligrapher, and the author of three significant books in addition to four other known manuscripts. In this study, unlike the previous historical clinical articles about him focused only on certain chapters he had written in his book 'Imperial Surgery', we have tried to focus on his whole life, including his personal experiences and things happening in his immediate environment.

***Keywords**: Şereffeddin Sabuncuoğlu, Cerrahiyetü'l-Hanniye, Ottoman Medical History, Ottoman physician, Amasya Darüşşifa*

Introduction

Although official documents have been lost in time, *Şereffeddin Sabuncuoğlu* is thought to have lived between the years 1386 and the 1470s. This estimate is based on his writings and the information that can be gleaned from them, including the medical masterpiece that was completed before his death. Perhaps unsurprisingly,

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no grave or tomb has been found for him (Sabuncuoğlu, 1465; Uzel & Süveren, 2000; Uzel, 2020) (Figure 1).

Figure 1. Şereffeddin Sabuncuoğlu (1386–147?), depicted by Ilter Uzel.

Despite this uncertainty about his personal life, we can be fairly certain that he was one of the more skilled surgeons of the Ottoman period, as there is documentary evidence that he conducted surgical operations that can be considered fairly complex for the period. His surgical interventions were in almost every field of modern surgery such as General Surgery, Neurosurgery, Urology, Obstetrics & Gynecology, Orthopedics, Thoracic surgery, Vascular surgery, Ear-nose-throat (ENT), and even Ophthalmology (Batirel, 1997; Darçin & Andaç, 2003; Doğan & Tutak, 2021a, 2021b; Er, 2013; Oguz, 2006, Sarban et al., 2005; Verit et al., 2003; Verit & Kafali, 2005). He was almost certainly also an experimental scientist, the author of some medical writings, and a master medical preceptor for his trainers (Uzel, 2020). He lived and worked all his life in the city of *Amasya* in the centre of the Anatolian peninsula, which at the time was a major agricultural and commercial city in the early Ottoman period, and he is thought to have witnessed the great Ottoman conquest of *Constantinople*. Nevertheless, he never gained the admiration of *Fatih Sultan Mehmet*, the conqueror, despite his efforts to reach the

ruling inner circle where he hoped to present his detailed and illustrated surgical Turkish notes named "Imperial Surgery" (*Cerrahiyetü'l-Hanniye*). However, the lack of acknowledgement from the Ottoman leadership did not deter him, and he continued to work feverishly. We suspect that the reasons the Ottoman elite ignored him were due to the initial societal transition from a military migratory culture to a settled one, which history has shown preserved very little literature. Additionally, it is assumed that the bureaucratic environment at the Palace was not as intellectually oriented as it would become later. Secondly, *Sabuncuoğlu* lived in a provincial Anatolian city far away from Istanbul, which, as it is now, was a truly global city. Lastly, according to the scholars of the era, the main reason was most likely that he produced his masterpieces in Turkish, while classical Arabic and Persian were the preferred literary and academic languages of the Ottoman court instead of the vernacular. Nevertheless, although he knew Arabic and Persian very well, he insisted on writing in Turkish. He explained the reason in his own words: *"The average physicians in this country are generally illiterates, and the ones who are literate can only understand Turkish texts"* (Uzel, 2020). Moreover, there is little doubt why the surgical textbooks he penned featured so many detailed illustrations. Although previous articles in clinical journals about *Şereffeddin Sabuncuoğlu* focused only on chapters from his book 'Imperial Surgery', this study reports his whole life, including his experiences and works within the historical and social context of his own environment.

Methods, results & discussion

The life story of Şereffeddin Sabuncuoğlu

Based on what can be ascertained from his own writings, he spent all his life in *Amasya,* where he wrote his manuscripts and treated his patients, with the exception of his trip to Istanbul, where he attempted to present his book to the Sultan as well as several journeys to *Kastamonu,* a nearby city where he sometimes treated patients (Uzel, 1992, 2020). *Amasya* is an ancient city located near the river "*Yeşilirmak - Green River*" with a long history dating back from 7500 BC and is well known for its royal tombs from the "Pontus Kingdom" (333-26 BC) that were carved in the rocks (UNESCO World Heritage) (Wikipedia, 2021) (Figure 2).

Figure 2. A scene from the central Anatolian city *Amasya*.

His father's name was *Ali,* and his grandfather, who was also a well-known physician, was *Ilyas.* Uzel (2020) established that *Şereffeddin Sabuncuoğlu* came from a prominent local medical family, and there is still an ancient neighborhood in *Amasya*, which was probably named after the family, "*Sabuncuoğlu",* according to local historians.

He was trained and later worked at Amasya *Darüşşifa* (the Central State Hospital), which was built by the Mongolian Anatolian state *Ilkhanate* before the Ottomans, in the year 1308 (Oguz, 2006; Uzel, 2020; Wikipedia, 2021) (Figure 3A-B).

Figure 3A/B. Amasya *Darüşşifa* (Central State University Hospital), est. 1308. External/Internal (A/B) view respectively.

He was proud to mention in his books that he had been a member of the surgical staff for 14 years in that hospital, which, in modern terms, can be considered an equivalent to today's State University hospitals that were funded by the Ottoman rulers and active until the 19th century (Uzel, 2020). Actually, only the most able could achieve those positions in the Ottoman health system, and we can infer that those state positions were not life-long and there might be a retirement system based on the knowledge that even *Sabuncuoğlu,* as a long-lived brilliant physician and surgeon, was only employed there for a limited time. Later, in his 80s, he seemed to mostly wanted to put his academic and practical experience into medical writing.

He reported that one day, while he had been walking in the center of *Amasya*, one of his former patients was standing in front of him, pointing at his tracheostomy orifice treated by *Sabuncuoğlu* that undoubtedly saved his life and gave thanks to him (Uzel, 1992). This anecdote can be considered a clear example that *Şereffeddin Sabuncuoğlu* lived an unassuming life among the public. On the other

hand, another strikingly groundbreaking example of Anatolian medical practices that we learn from *Sabuncuoğlu's* manuscripts is the existence of female surgeons referred to in his writing as "*Tabiba*" (a female doctor) (Uzel, 2020) (Figure 4).

Figure 4. A female physician (Tabiba) performing a gynecological operation to address a vaginal prolapsed excess mass, probably a prolapsed myoma.

The principles of medical training and practice in the early Ottoman period

Medical physicians were generally divided into two groups: those with their own shops/premises and traveling ones. It has been reported that a thousand physicians were practicing in 700 medical shops (surgeries) in private practice in Istanbul in the 16th Century. Medical training was classified into three consecutive phases: apprenticeship, journeyman, and master's degree. After being confirmed as a master, the trainee received his "certificate", which enabled him to perform medical procedures unaccompanied (Köken & Büken, 2018).

His handwritten manuscripts

There are three main books, among a total of seven, known to have been written by *Şereffeddin Sabuncuoğlu. Akrabattin* was the initial masterpiece that had been translated from a Persian manuscript related to the preparation of drugs, to which he contributed several chapters in his mid-50s. The last one was *Mücerrebname,* which was committed to paper at the ripe old age of 85 (Uzel, 2020). It is composed of various drug concoctions surprisingly closely related to modern

medical multidisciplines. Additionally, this book is noteworthy in regard to current medical practice in that he mentioned strategies to improve the composition and efficacy of certain medications and tested them on himself in an early form of modern phase I clinical trials. To test his newly formed antivenom, he let a poisonous snake bite him after taking the medicine in front of his assembled patients (Sabuncuoğlu, 1465; Uzel & Süveren, 2000; Uzel, 2020).

Figure 5. *Şereffeddin Sabuncuoğlu* performing an abscess drainage in the axillary region. Notice the positions of both the patient and surgeon, and also the handled instrument.

The previous book "Imperial Surgery" (*Cerrahiyetü'l-Hanniye*), which was originally published in duplicate form, is better known in contemporary medical literature circles and there are sample of historical clinical articles for almost all surgical disciplines based on the original one (Batirel, 1997; Darçin & Andaç, 2003; Doğan & Tutak, 2021a, 2021b; Er, 2013; Oguz, 2006; Sarban et al., 2005; Verit et al., 2003; Verit & Kafali, 2005). The book was rediscovered in the first quarter of the 20th Century by Süheyl Ünver and Ilter Uzel, who compiled the original copies of the manuscripts into a book in the year 1992 and 2020 (Darçin, 2003; Oguz, 2006; Uzel, 1992, 2006, 2020). Today, there are three original but slightly differing handwritten copies of "Imperial Surgery" surviving in Istanbul and Paris (Sabuncuoğlu, 1465a, 1465b; Uzel, 2020). Actually, this book is generally considered by Western historians as a Turkish replica of an Arabic book by *Abul-Qasim Al-Zahrawi, At-Tasrif* (On Surgery by Abulcasis) (936–1013AD) with some

original contributions (Elcioglu et al., 2010). However, Uzel I (2020) opposed this point of view because he claimed there was no known exact equivalent of the Arabic original. Nevertheless, even these contributions are important for that time when the evolution of medical science was so slow. However, the main difference between *Cerrahiyetü'l-Hanniye* and the others was that it was the first known illustrated surgical textbook. *Sabuncuoğlu* had decorated his pages with miniature diagrams of almost all surgical applications in related sections, unlike his inspiration, *Abulcasis*. In these colored pictures, the author mostly drew himself as the main surgeon and featured patients positioned with the related devices and his surgical assistant, if any (Figure 5).

Nevertheless, surely, "Imperial Surgery" by *Sabuncuoğlu* was the pioneer of the systematically designed surgical textbook (Uzel, 2020). The illustrations in this historical treasure composed of 138 unique surgical scenes and featured 168 different surgical instruments – 11 of which were of his own invention (Kadıoğlu et al., 2017; Uzel, 2020).

Conclusion

Şereffeddin Sabuncuoğlu, as an ethical physician, surgeon, trainer, scientist, and especially as the author of medical literature with his intricately beautiful diagrams and calligraphy, should be ranked among the most prominent figures of the 15th century, especially when we consider his Western contemporaries who were just emerging from the Dark Ages. Although he was not a well-known clinician in his time, in modern times, he has been gaining the reputation and recognition he deserves.

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The authors declare that there is no conflict of interest.

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SAŽETAK

Şereffeddin Sabuncuoğlu bio je vješt kirurg iz ranog osmanskoga razdoblja (15. stoljeće) u anatolijskome gradu Amasya. Bio je liječnik, kirurg, trener, znanstvenik, umjetnik minijatura, kaligraf i autor tri vrijedne knjige i četiri poznata rukopisa. U ovom istraživanju, za razliku od prijašnjih povijesnih kliničkih članaka o njemu koji su se usredotočili samo na pojedina poglavlja njegove knjige "Imperial Surgery", pokušali smo se fokusirati na njegov cjelokupan život, uključujući njegova osobna iskustva i događaje koji su se zbivali u njegovu neposrednu okruženju.

Ključne riječi: *Şereffeddin Sabuncuoğlu, Cerrahiyetü'l-Hanniye, osmanska medicinska povijest, osmanski liječnik, Amasya Darüşşifa*

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NOBELOVE NAGRADE U KLINIČKOJ RADIOLOGIJI

NOBEL PRIZES IN CLINICAL RADIOLOGY

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SAŽETAK

Nobelova nagrada dodjeljuje se od 1901. godine od kamata glavnice koju je s tom svrhom u obliku zaklade utemeljio izumitelj dinamita švedski kemičar Alfred Nobel. Discipline za koje se dodjeljuje jesu fizika, kemija, medicina, fiziologija, književnost i mir, a počevši od 1969. i ekonomija. Već prigodom prve dodjele 1901., Nobelovu nagradu za fiziku primio je njemački fizičar Wilhelm Conrad Röntgen za svoje otkriće rendgenskih zraka 8. studenoga 1895., što se smatra utemeljenjem suvremene medicinske discipline kliničke radiologije. Uslijedila su brojna otkrića, primjerice kompjutorizirane tomografije, odnosno magnetske rezonancije, koja su značajno unaprijedila kliničku radiološku dijagnostiku. Na tom tragu cilj je ovoga rada osvijetliti i druge dobitnike Nobelove nagrade za otkrića i izume vezane uz specijalnost kliničke radiologije, analizirati područja njihovih znanstvenih istraživanja za koja su dobili nagradu te evaluirati njihov utjecaj na razvoj kliničke radiologije.

***Ključne riječi**: kliničke radiologija, povijest medicine, Nobelova nagrada, Alfred Nobel, Wilhelm Conrad Röntgen*

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Uvod

Nobelova nagrada dodjeljuje se od 1901. godine od kamata glavnice koju je s tom svrhom u obliku zaklade utemeljio izumitelj dinamita švedski kemičar Alfred Nobel (1833. – 1896.). Svake se godine redovito dodjeljuje za fiziku, kemiju, medicinu i fiziologiju te književnost u Koncertnoj dvorani, a banket se održava u Gradskoj vijećnici u Stockholmu (slika 1.). Nobelova nagrada za mir dodjeljuje se u Gradskoj vijećnici u Oslu jer je u vrijeme utemeljenja nagrade do 1905. Kraljevina Norveška bila u zajedničkoj državi s Kraljevinom Švedske. Poslije se počinje dodjeljivati i za ekonomiju iz posebne zaklade ustanovljene 1968. godine. Prigodom prve dodjele 1901., Nobelovu nagradu za fiziku primio je njemački fizičar Wilhelm Conrad Röntgen za svoje otkriće rendgenskih zraka 8. studenoga 1895., što se smatra datumom utemeljenja kliničke radiologije kao medicinske discipline koja se koristi različitim vrstama zračenja u dijagnostičke, odnosno terapijske svrhe (Zaklada A. B. Nobela, 2023).

Slika 1. Gradska vijećnica u Stockholmu (Foto: Bruno Atalić).

Uslijedila su brojna otkrića, primjerice kompjutorizirane tomografije, odnosno magnetske rezonancije, koja su znatno unaprijedila kliničku radiološku dijagnostiku. Na tome tragu cilj je našega rada bio osvijetliti i druge dobitnike Nobelove nagrade za otkrića vezana uz specijalnost kliničke radiologije. Na službenim stranicama Dobitnika Nobelove nagrade navedeni su znanstvenici čija su otkrića utjecala na razvoj kliničke radiologije, pri čemu iznimku čini svestrani portugalski znanstvenik Antonio Egas Moniz (1875. – 1955.) koji je 1949. dobio Nobelovu nagradu za istraživanja iz područja psihijatrije, ali su njegova istraživanja značajno unaprijedila i razvoj intervencijske radiologije (Zaklada A. B. Nobela, 2023).

Za svakoga dobitnika Nobelove nagrade navedeno je državljanstvo, završeno obrazovanje, područje znanstvenog istraživanja za koje je dobio nagradu, institucija na kojoj je diplomirao i institucija na kojoj je proveo istraživanja, što je iskorišteno u završnoj analizi. Na taj je način evaluiran njihov utjecaj na razvoj kliničke radiologije. Tako je preko dobitnika Nobelove nagrade i njihovih životopisa sustavno prikazan razvoj kliničke radiologije, što je bilo moguće upravo zbog toga što disciplina započinje s otkrićem rendgenskih zraka 8. studenoga 1895., dakle neposredno prije utemeljenja Nobelove zaklade 1901. godine.

Do kraja Prvoga svjetskog rata

Za otkriće rendgenskih zraka zaslužan je njemački fizičar **Wilhelm Conrad Röntgen** (Lennep, Porajnje, 27. ožujka 1845. – München, Bavarska, 10. veljače 1923.). **Rendgenske zrake** (engl. *X-rays*) osnova su suvremene radiološke dijagnostike s obzirom na to da se na njima temelje klasična radiografija s dijaskopijom, kompjutorizirana tomografija i intervencijska radiologija. Njihovim otkrićem 8. studenoga 1895. utemeljena je radiologija kao teorijska znanstvena i primijenjena medicinska disciplina, a taj se datum obilježava kao Svjetski dan radiologije (Janković i Eterović, 2002). Po ocu Friedrichu Conradu, Röntgen je podrijetlom iz bogate industrijske i trgovačke obitelji koja se bavila proizvodnjom i prodajom sukna i odjeće. Tijekom revolucionarne 1848. godine obitelj je emigrirala u Apeldoor u Nizozemskoj, odakle je bila njegova majka Charlotte Constanze rođena Frowein. Godine 1861. zbog karikature učitelja, koju je narisao njegov kolega čiji identitet nije želio otkriti, izbačen je iz gimnazije u Utrechtu bez položene mature, što mu je onemogućilo upis na sveučilište. Zbog toga se 1862. upisuje na tehničku školu u Utrechtu (u germanskim zemljama tehničke škole nisu dijelovi sveučilišta, već veleučilišta) (Zaklada A. B. Nobela, 2023).

Godine 1865. upisuje *Eidgenössische Technische Hochschule* (ETH) u Zürichu i studira na Mehaničko-tehničkom odjelu te 1868. stječe diplomu inženjera strojarstva. Već sljedeće godine na temelju svojih istraživanja iz eksperimentalne fizike brani doktorat znanosti o kinetičkoj energiji plinova. Godine 1870. zajedno sa svojim mentorom, njemačkim fizičarom Augustom Kundtom (1839. – 1894.), prelazi na Sveučilište u Würzburgu, ali, za razliku od njega koji dobiva profesuru, ne postaje docentom jer nije imao položenu maturu. Zbog toga prelazi u novoosnovano njemačko Sveučilište u Strasbourgu, koje je nakon Francusko-pruskoga rata 1871. pripalo Drugome Njemačkom Carstvu, i 1874. postaje naslovni docent (Zaklada A. B. Nobela, 2023).

Slika 2. Prvi učinjeni radiogram koji prikazuje lijevu šaku Röntgenove supruge Ane Berthe rođ. Ludwig (Izvor: Muzej Wilhelma Conrada Röntgena).

Potom mu karijera kreće uzlaznim tokom. Godine 1875. postaje profesor fizike i matematike na Poljoprivrednoj školi u Hohenheimu, a 1876. izvanredni profesor na Sveučilištu u Strasbourgu. Godine 1878. pročelnik je Katedre za fiziku na Sveučilištu u Giessenu na kojemu se intenzivno bavi znanstvenim radom te objavljuje 18 znanstvenih radova o različitim fenomenima kristala. Svoju profesionalnu satisfakciju doživljava 1894. kada postaje redovni profesor, voditelj Zavoda za fiziku i rektor Sveučilišta u Würzburgu (Hacking, 2005).

Ondje se bavi proučavanjem katodnih zraka te kasno navečer u petak 8. studenoga 1895. uočava pojavu fluorescencije kristala u blizini Hittorfove cijevi, koju je konstruirao njemački fizičar i kemičar Johann Wilhelm Hittorf (1824. – 1914.) za proučavanje prolaska električne struje kroz razrijeđene plinove, i zaključuje da je izazivaju neke do tada nepoznate zrake koje zbog toga naziva X-zrakama. Posvećuje se njihovu proučavanju i opisuje njihove osobine poput raspršenja, prodornosti, fosforescencije i fluorescencije – objašnjenja koja su prihvaćena i danas. Dana 22. studenoga 1895. Röntgen je pomoću novootkrivenih zraka snimio lijevu šaku svoje supruge Ane Berthe rođene Ludwig (1839. – 1919.) i tako učinio prvi

radiogram (slika 2.). Svoje otkriće objavio je 28. studenoga 1895. u časopisu Fizikalno-medicinskoga društva u Würzburgu, što je imalo velikog odjeka u javnom mišljenju te je 13. siječnja 1896. održao predavanje na dvoru njemačkoga cara Vilima II. (slika 3.) (Zaklada A. B. Nobela, 2023).

Slika 3. Wilhelm Conrad Röntgen (izvor: Zaklada A. B. Nobela).

Dana 23. siječnja 1896. održao je predavanje na sjednici Fizikalno-medicinskoga društva u Würzburgu, na kojemu je učinio radiogram lijeve šake svojega prijatelja, švicarskoga anatoma, histologa i fiziologa Alberta von Köllikera (1817. – 1905.) (slika 4.). Upravo je von Köllikera, unatoč Röntgenovu protivljenju, predložio da se X-zrake u čast njihova otkrivača nazovu **Röntgenove zrake**, što je i prihvaćeno u većini svjetskih jezika, pa tako i u hrvatskom. Godine 1901. dodijeljena mu je prva Nobelova nagrada za fiziku (Zaklada A. B. Nobela, 2023). Od 1900. do umirovljenja 1920. radi kao redovni profesor fizike i voditelj Fizikalnoga instituta na Sveučilištu u Münchenu gdje nastavlja ispitivati fizikalna svojstva kristala (Zaklada A. B. Nobela, 2023). Tri godine nakon umirovljenja umire od karcinoma crijeva, a pokopan je pokraj svoje supruge i roditelja na groblju u rodnome Giessenu, u kojemu je u njegovoj rodnoj kući uređen Röntgenov muzej (Hacking, 2005).

Slika 4. Radiogram lijeve šake Röntgenova prijatelja, švicarskoga anatoma, histologa i fiziologa Alberta von Köllikera (izvor: Muzej Wilhelma Conrada Röntgena).

Slika 5. *Sir* Joseph John Thomson (izvor: Zaklada A. B. Nobela).

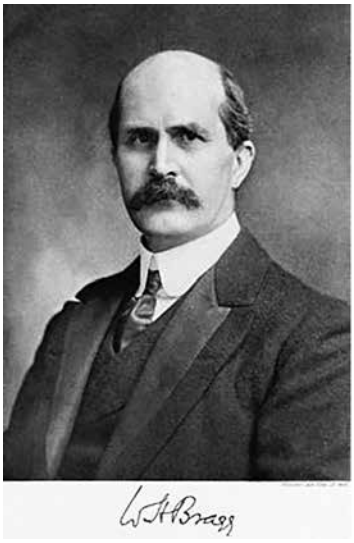
Unatoč štetnu djelovanju, proučavanje rendgenskih zraka intenzivno se nastavlja. Engleski fizičar i pobožni anglikanac ***Sir* Joseph John Thomson** (1856. – 1940.) (slika 5.) svoju edukaciju iz fizike započinje na Owensovu koledžu u Manchesteru, današnjemu Sveučilištu u Manchesteru, da bi 1876. prešao na *Trinity College Cambridge* na kojemu je diplomirao 1880. i magistrirao 1883. godine. Predavač postaje 1881., Cavendishov profesor fizike 1884., a 1918. dekan *Trinity College Cambridge*. Za otkriće raspršenja rendgenskih zraka, do kojega dolazi tijekom proučavanja prolaska električne energije kroz razrijeđene plinove 1897., a pri kojemu fotoni rendgenskih zraka udarom u elektrone atoma tkiva, izbacuju ih iz njihovih ljuski, predajući im pritom čitavu svoju energiju te posljedično sami prestaju postojati, poslije po njemu nazvanog **Thomsonova raspršenja**, 1906. dobiva Nobelovu nagradu iz fizike, a 1908. viteško titulu (Zaklada A. B. Nobela, 2023). I njegovi studenti Charles Glover Barkla (1877. – 1944.) i William Henry Bragg (1862. – 1942.) dobivaju Nobelovu nagradu iz fizike za istraživanja svojstava rendgenskih zraka, a Nobelovu nagradu iz fizike 1937. dobiva i njegov sin George Paget Thomson (1892. – 1975.) za svoje otkriće valnih svojstava elektrona difrakcijom pomoću kristala (Zaklada A. B. Nobela, 2023).

Slika 6. Max Theodor Felix von Laue (izvor: Zaklada A. B. Nobela).

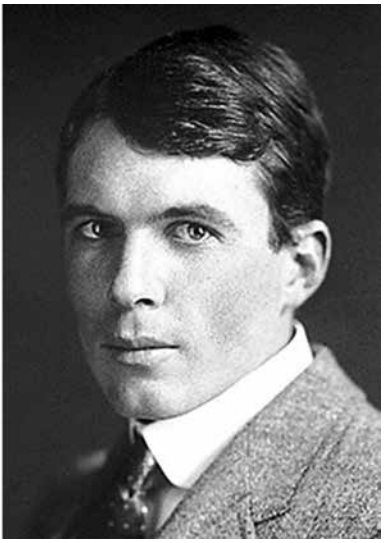
Njemački fizičar **Max Theodor Felix von Laue** (1879. – 1960.) (slika 6.) studira matematiku, fiziku i kemiju na sveučilištima u Strasbourgu, Göttingenu, Münchenu i Berlinu na kojemu 1906. postaje naslovni docent iz fizike. Tijekom 1911. i 1912. kao izvanredni profesor na Sveučilištu u Zürichu proučava distrakciju rendgenskih zraka pomoću kristala, što se poslije naziva **von Laueovim fenomenom**, a

za što 1914. dobiva Nobelovu nagradu za fiziku. Poslije se ističe kao oštar protivnik nacizma (Zaklada A. B. Nobela, 2023).

Već sljedeće, 1915. godine Nobelovu nagradu za fiziku dobivaju britanski fizičari, otac i sin, Bragg (Zaklada A. B. Nobela, 2023). ***Sir* William Henry Bragg** (1862. – 1942.) (slika 7.), školovan te zaposlen na *Trinity College Cambridge*, između 1895. i 1915. proučava analizu kristala pomoću rendgenskih zraka, što je osnova kasnijih disciplina **ionizirajuće spektrometrije** kojom se ionizacijom analiziraju molekule na temelju njihove mase i naboja, te **ionizirajuće kristalografije** kojom se ionizacijom analiziraju kristali i druge kristalne strukture (Zaklada A. B. Nobela, 2023). U istraživanjima mu pomaže njegov sin i suradnik ***Sir* William Lawrence Bragg** (1890. – 1971.) (slika 8.), također školovan i zaposlen na *Trinity College Cambridge*, po kojem je nazvan **Braggov zakon difrakcije rendgenskih zraka** koji opisuje ogib rendgenskoga zračenja na kristalu kao refleksiju na usporednim ravninama postavljenim kroz čvorišta kristalne rešetke (Zaklada A. B. Nobela, 2023).



Slika 7. Max Theodor Felix von Laue (izvor: Zaklada A. B. Nobela).



Slika 8. *Sir* William Lawrence Bragg (izvor: Zaklada A. B. Nobela).

Još jedan britanski fizičar i izrazito religiozan metodist, **Charles Glover Barkla** (1877. – 1944.) (slika 9.), školovan na *Trinity te King's College Cambridge*, a poslije predavač na sveučilištima u Liverpoolu (1902. – 1909.) i Londonu (1909. – 1913.), godine 1913. tijekom boravka na Sveučilištu u Edinburghu otkriva katakteristične rendgenske zrake različitih kemijskih elemenata. Time utemeljuje **rendgensku spektroskopiju**, disciplinu koja proučava spektre rendgenskih zraka nakon njihove

interakcije s različitim atomima i molekulama. Za to 1917. dobiva Nobelovu nagradu za fiziku (Zaklada A. B. Nobela, 2023).

Slika 9. Charles Glover Barkla (izvor: Zaklada A. B. Nobela).

Međuratno razdoblje

Švedski fizičar **Karl Manne Georg Siegbahn** (1886. – 1978.) (slika 10.), školovan na Sveučilištu u Lundu, od 1914. do 1924. na Sveučilištu u Uppsali proučava određivanje rendgenskih zraka različitih elemenata i za svoj doprinos razvoju rendgenske spektroskopije 1924. dobiva Nobelovu nagradu iz fizike (Zaklada A. B. Nobela, 2023). Godine 1937. postaje voditelj Nobelova instituta za eksperimentalnu fiziku u Stockholmu. Njegov sin Kai Siegbahn (1918. – 2007.) nastavlja njegovim stopama, najprije kao voditelj Nobelova instituta, a 1981. također dobiva Nobelovu nagradu za fiziku za svoj doprinos razvoju **rendgenske fotoelektronske spektroskopije** koja se bavi određivanjem kemijskih elemenata u pojedinim materijalima pomoću fotoelektričnoga efekta (Zaklada A. B. Nobela, 2023).

Američki fizičar **Arthur Holly Compton** (1892. – 1962.) (slika 11.) sa Sveučilišta Princetone, 1922. tijekom rada na Sveučilištu Saint Louis otkriva, po njemu poslije nazvano, **Comptonovo raspršenje** pri kojemu fotoni rendgenskih zraka samo dio svoje energije predaju elektronima, koje izbijaju iz atoma tkiva kroz koje prolaze, dok se sami odbijaju i nastavljaju gibati u drugom smjeru od ulazne putanje, čime objašnjava čestičnu prirodu rendgenskoga zračenja, za što 1927. dobiva Nobelovu nagradu za fiziku. Tijekom Drugoga svjetskoga rata (1939. – 1945.), kao jedan od

ključnih znanstvenika, sudjeluje u **Projektu Manhattan** koji dovodi do konstrukcije atomske bombe. Nastojeći pomiriti svoju znanstvenu uvjerenost u kvantnu neodređenost sa svojom prezbiterijanskom vjerom u spasenje predodređenošću, razvija svoj filozofski poučak o dva stadija modela slobodne volje prema kojemu nakon prvoga slučajnoga odabira između različitih mogućnosti slijedi voljna odluka u skladu s karakterom, vrijednostima i željama pojedinca (Zaklada A. B. Nobela, 2023).

Slika 10. Karl Manne Georg Siegbahn (izvor: Zaklada A. B. Nobela).

Slika 11. Arthur Holly Compton (izvor: Zaklada A. B. Nobela).

Magnetsku rezonanciju (MR) prvi je 1938. uočio i opisao američki fizičar **Isidor Rabi** (1898. – 1988.) (slika 12.) (Škrobonja, Muzur i Rotschild, 2003). Iako potomak siromašnih imigranata poljsko-židovskoga podrijetla iz Galicije u tadašnjoj Austro-Ugarskoj Monarhiji, a današnjoj Ukrajini, zahvaljujući stipendiji studij je završio na prestižnom *Ivy League* Sveučilištu Cornell. Do svojeg otkrića došao je na temelju pokusa izvedenih na Sveučilištu *Columbia* u New Yorku. Njime je proširio **Stern-Gerlachov pokus**, nazvan tako po američkom fizičaru njemačkoga podrijetla Ottu Sternu (1888. – 1969.) i njemačkom fizičaru Waltheru Gerlachu (1889. – 1979.), koji su neovisno jedan o drugome proučavali magnetske momente atoma u magnetskom polju te zaključili da se oni mogu orijentirati isključivo u točno određenim smjerovima. Tako su došli do otkrića spina, odnosno kutne vrtnje čestica (protona, neutrona, elektrona, pozitrona). Njihova istraživanja omogućila su kvantizaciju prostorne orijentacije kutnoga zamaha pojedinoga spina. Na temelju toga Isidor Rabi je konstruirao radiofrekventu zavojnicu koja je proizvo-

dila oscilirajuće magnetsko polje kojim se mijenjala orijentacija spinova osnovnoga magnetskoga polja. To čini osnovu rada današnjih MR-uređaja kod kojih se na osnovno longitudinalno magnetsko polje (B0) djeluje radiofrekventnim transverzalnim magnetskim poljem. Za svoje otkriće dobio je 1944. Nobelovu nagradu za fiziku (Zaklada A. B. Nobela, 2023).

Slika 12. Isidor Raby (izvor: Zaklada A. B. Nobela).

Nakon Drugoga svjetskog rata

Portugalski neurolog **António Caetano de Abreu Freire Egas Moniz** (1874. – 1955.) (slika 13.) dobitnik je Nobelove nagrade za medicinu i fiziologiju za svoja istraživanja u psihijatriji. Rođen u Avanci u Estarreji, diplomirao je medicinu na najstarijem portugalskom Sveučilištu u Coimbri, osnovanom 1290. godine. Na svojemu matičnom Sveučilištu predaje temeljne medicinske znanosti do 1911. kada biva izabran za profesora neurologije na Sveučilištu u Lisabonu, na kojemu ostaje do umirovljenja 1944. godine. Uz medicinu, bavi se i politikom pa tako obnaša dužnost portugalskoga veleposlanika u Kraljevini Španjolskoj tijekom Prvoga svjetskog rata (1914. – 1918.) te kao predstavnik Portugala sudjeluje na Versailleskoj mirovnoj konferenciji 1919. (Zaklada A. B. Nobela, 2023).

Iako sâm nije operirao, jer nije bio neurokirurg, smatra ga se utemeljiteljem psihokirurgije jer je teorijski osmislio metodu leukotomije. Ta se metoda temeljila na uklanjanju prefrontalnih girusa frontalnih režnjeva mozga bolesnika sa psihozama, što je rezultiralo promjenom njihove osobnosti, pri čemu je u ranim

stadijima bolesti imala dobre rezultate. Poslije je postala poznata pod imenom lobotomija, a danas se zbog etičkih razloga više ne koristi. Za svoj doprinos razvoju psihijatrije primio je 1949. **Nobelovu nagradu za medicinu i fiziologiju** kao jedini liječnik na našoj listi (Zaklada A. B. Nobela, 2023).

Slika 13. António Egas Moniz (izvor: Zaklada A. B. Nobela).

Bavio se i **intervencijskom radiologijom (IR)**, kao supspecijalizacijom kliničke radiologije koja u jednom aktu spaja dijagnostičku metodu i terapijski postupak, zbog čega je i uključen na našu listu. Ta radiologija koristi perkutane minimalno invazivne intervencijske zahvate pod kontrolom različitih radioloških metoda (digitalna suptrakcijska angiografija, dijaskopija, kompjutorizirana tomografija, ultrazvuk, nuklearna magnetska rezonancija) kao zamjenu za kirurške operacijske zahvate. Sami intervencijski zahvati mogu se podijeliti na **vaskularne** i **nevaskularne**, koji su u suvremenoj intervencijskoj radiologiji podjednako zastupljeni. Dok su vaskularni intervencijski zahvati prvenstveno usmjereni na liječenje periferne cirkulacije ruku i nogu, nevaskularni uglavnom obuhvaćaju tri velike regije ljudskoga tijela: toraks, abdomen i muskuloskeletni sustav (Prokop, 2003). Posebno područje čine **neurointervencijski zahvati** kao podskupina vaskularnih intervencijskih zahvata kojima se tretiraju aneurizme, malformacije i začepljenja krvnih žila glave i vrata. Imajući na umu sve izneseno, ne iznenađuje što je radiologija najbrže razvijajući dio suvremene kliničke radiologije (Bushong, 2008).

Godine 1926. i 1927., tijekom rada na Sveučilištu u Lisabonu, Moniz razvija cerebralnu angiografiju. Želeći prikazati krvožilnu opskrbu tumora mozga koristi

stroncij te litij-bromid, ali doživljava neuspjeh, pri čemu mu čak i umire jedan bolesnik. Uspjeh postiže s 25%-om otopinom natrij-jodida, korištenjem koje uspijeva rendgenskim zrakama snimiti prvi cerebralni angiogram te prikazati krvne žile pluća, što objavljuje 1931. u članku pod naslovom *Angiopneumographie* (Moniz, 1931). Potom razvija primjenu kontrastnoga sredstva **Thorotrasta**, odnosno suspenzije radioaktivnih čestica thorij-dioksida, koje je zbog visokog atomskoga broja Thorija imalo veliku apsorpcijsku sposobnost rendgenskih zraka te je posljedično omogućavalo veliku kontrastnost angiograma. Zbog toga što se taložilo u ljudskom organizmu i emitiralo zračenje štetnim alfa-česticama, odnosno jezgrama helija sastavljenim od dva protona i dva neutrona, nakon Drugoga svjetskog rata izbačeno je iz uporabe, a danas se koristi isključivo u terapiji dobro prožiljenih tumora (Novak, 1953).

Slika 14. Felix Bloch (izvor: Zaklada A. B. Nobela).

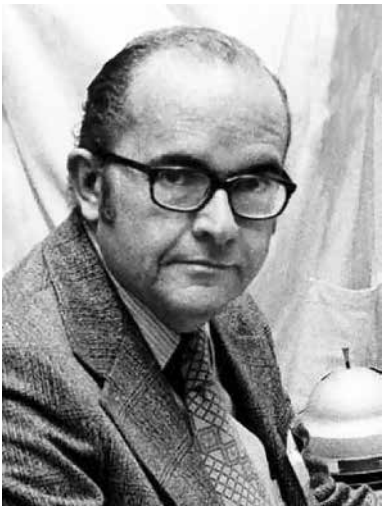
Američki fizičar **Felix Bloch** (1905. – 1983.) (slika 14.) sa Sveučilišta *Berkley*, podrijetlom Švicarac školovan na *Eidgenössische Technische Hochschule* (ETH) u Zürichu, u razoblju od 1938. do 1952. istražuje preciznost mjerenja magnetskom rezonancijom. Pritom u Stern-Gerlachov pokus uz krutine uključuje i tekućine i plinove (Zaklada A. B. Nobela, 2023). Istodobno, slične pokuse na *Massachusetts Institute of Technology* (MIT) u Bostonu u razdoblju od 1946. do 1952. izvodi američki fizičar **Edward Mills Purcell** (1912. – 1997.) (slika 15.), školovan na *Harvardu*. Njih su dvojica utvrdili da protoni vodika (H) i fosfora (P) mogu apsorbirati radiofrekventnu energiju kada ih se postavi u magnetsko polje, pri čemu njihova

rezonancija ovisi o kemijskom sastavu, čime su objasnili magnetizaciju pojedinih jezgara u periodnom sustavu elemenata (Zaklada A. B. Nobela, 2023). Otkrili su da jezgre u magnetskom polju primaju energiju vanjskoga radiofrekventnog izvora, pri čemu mijenjaju svoj položaj, a predavanjem spomenute energije ponovno se vraćaju u svoj prvobitni položaj. Za svoja otkrića su 1952. primili Nobelovu nagradu za fiziku (Zaklada A. B. Nobela, 2023).

Slika 15. Edward Mills Purcell (izvor: Zaklada A. B. Nobela).

Kompjutorizirana tomografija (CT) radiološka je dijagnostička metoda slojevnoga snimanja koja se temelji na kompjutorskoj rekonstrukciji tomografskih presjeka skeniranoga dijela tijela dobivenih iz različitih kutova prolaska ionizirajućega zračenja kroz tijelo, pri čemu je detektor na suprotnoj strani u odnosu na izvor zračenja. Karakterizira je izvrsna prostorna rezolucija i brzina dobivanja dijagnostičke infomacije, što je čini nezamjenjivom u hitnim stanjima. Sama ideja konstrukcije CT uređaja vezana je za američkoga neurologa i psihijatra **Williama Henryja Oldendorfa** (1925. – 1992.) (slika 16.). Dodiplomsku medicinsku edukaciju završio je 1945. na *Schenectady Union College* u svome rodnom gradu u državi New York u Sjedinjenim Američkim Državama, da bi već dvije godine potom, odnosno 1947., završio Medicinski fakultet na *Albany Medical College*. Potom je u bolnici *Elliss* u Schenectadyju završio specijalizaciju iz psihijatrije, a nakon toga 1955. u Sveučilišnoj bolnici *Minnesota* u Minneapolisu i specijalizaciju iz neurologije. Godine 1956. počeo je predavati psihijatriju na Kalifornijskom sveučilištu u Los Angelesu, na kojemu je 1975. postao profesor. Njegovo zanimanje za proučavanje mozga dovelo ga je do ideje o "konstrukciji uređaja koji bi mogao rendgenskim zrakama slojevno snimati mozak", što čini osnovu CT uređaja. Svoju je ideju

patentirao 1963., no zbog nedostatka sponzora nije ju uspio provesti u stvarnost. Uskraćena mu je i Nobelova nagrada, uz objašnjenje članova komisije da nagrada treba ići znanstvenicima teoretičarima umjesto liječnicima praktičarima. Na tragu takva razmišljanja može se pronaći objašnjenje zašto su dobitnici Nobelove nagrade za medicinu u većini slučajeva bili znanstvenici, odnosno „neliječnici" (Wolpert, 2000).



Slika 16: William Henry Oldendorf
(izvor: *The American Society of Neuroimiging*).

Nastavak priče vezan je za američkoga fizičara južnoafričkoga podrijetla **Allana MacLeoda Cormacka** (1924. – 1998.) (slika 17.). Rođen je u Johannesburgu, a fiziku je diplomirao 1944. na Sveučilištu *Cape Town*, na kojemu je i magistrirao 1945. godine. Doktorat znanosti stječe 1949. na prestižnom *St John's College Cambridge*. Potom odlazi na Harvard, da bi se 1957. trajno zaposlio na Sveučilištu *Tufts*, a oba se nalaze u državi Massachusets u Sjedinjenim Američkim Državama. Njegov interes za proučavanje rendgenskih zraka rezultirao je teorijskim proračunima izgradnje uređaja za njihovu tomografsku primjenu, što je objavio 1963. u *Časopisu primijenjene fizike* (engl. *Journal of Applied Physics)* (Zaklada A. B. Nobela, 2023).

Njegove matematičke rekonstrukcijske formule privukle su pozornost engleskoga elektroinženjera ***Sir* Godfreya Newbolda Hounsfielda** (1919. – 2004.). Diplomirao je na *Faraday House Electrical Engineering College* u Londonu, koji je bio poznat po kombinaciji teorijskoga znanja i praktičnih vještina. Njegova karijera bila je vezana za Grupaciju električne i glazbene industrije (*Electrical and Musical*

Industries (EMI) *Group Limited)* koja se prvenstveno bavila izdavanjem gramofonskih ploča, no bila je otvorena prema različitim industrijskim inovacijama, što je Hounsfieldu omogućilo financijsku potporu za njegova istraživanja. Najprije se bavio proučavanjem lasera, zatim konstrukcijom tranzistora, da bi se konačno posvetio istraživanju kompjutorskih rekonstrukcija slojevnih rendgenskih snimki. Godine 1967. dolazi na ideju konstrukcije uređaja koji bi sadržavao rendgensku cijev koja bi kružno snimala mozak smješten unutar samoga uređaja, pri čemu bi se snimljeni slojevi naknadno kompjutorski rekonstruirali, a novce za konstrukciju donira mu EMI od zarade dobivene prvenstveno prodajom gramofonskih ploča *Beatlesa*. Za razliku od Wilhelma Conrada Röntgena, koji je svojim uređajem za proizvodnju rendgenskih zraka snimao sve druge u svojoj okolini, uključivši vlastitu suprugu, samo ne sebe, Hounsfield svoj uređaj nakon snimanja ljudskoga i kravljega mozga, testira na sebi, što najbolje ilustrira njegov istraživački žar (Zaklada A. B. Nobela, 2023).

Slika 17. Allan MacLeod Cormack (izvor: Zaklada A. B. Nobela).

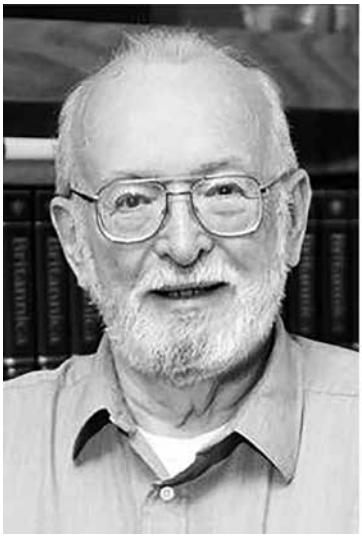
Prvi dijagnostički CT pregled glave učinjen je 1. listopada 1971. u Bolnici *Atkinson Morley* u Wimbledonu na CT uređaju nazvanom **Sirettom** i na njemu je opisana moždana cista. Skeniranje je trajalo nekoliko sati, a kompjutorska rekonstrukcija slojeva nekoliko dana, zbog čega ne iznenađuje da su rezultati objavljeni tek 1972. godine. Unatoč tome, CT ubrzo dobiva komercijalnu uporabu, ponajprije zbog mogućnosti prikaza mekotkivnih struktura unutar koštanog okvira, pri-

mjerice mozga i kralježnične moždine, što prijašnjim metodama nije bilo moguće. Tijekom 1973. CT uređaji se počinju primjenjivati i u Sjedinjenim Američkim Državama. Godine 1975. Hounsfield konstruira CT uređaj za skeniranje cijeloga tijela. Cormack i Hounsfield za svoj izum 1979. dobivaju podijeljenu Nobelovu nagradu za medicinu i fiziologiju, pri čemu Oldendorf zbog prije opisanih razloga ostaje zakinut, što prima gospodski te unatoč tome promiče uporabu CT uređaja u svakodnevnoj praksi. Englez Hounsfield prima i dodatno priznanje 1981. kada je proglašen vitezom. Međutim, najtrajnije priznanje njegovu otkriću je po njemu nazvana relativna skala za kvantificiranje denziteta struktura prikazanih na CT presjecima koja se mjeri u **Hounsfieldovim jedinicama (HU)** (engl. *Hounsfieldunits*) (Zaklada A. B. Nobela, 2023).

Slika 18. *Sir* Godfrey Newbold Hounsfield (izvor: Zaklada A. B. Nobela).

Iako otkrivena prije kompjutorizirane tomografije, magnetska rezonancija prvotno se koristila isključivo u eksperimentalne svrhe na poljima fizike i kemije, prvenstveno spektroskopije kristala, pri čemu je njezina naknadna primjena u medicini vezana za američkoga kemičara **Paula Christiana Lauterbura** (1929. – 2007.) (slika 19.). Školovan na Sveučilištu u Pittsburghu, 1971. tijekom svojega rada na Državnome sveučilištu Illinois primijenio je gradijente magnetskoga polja u sve tri dimenzije, s ciljem dobivanja MR prikaza točno određene prostorne rezolucije. Svoja otkrića objavio je 1973. u časopisu *Priroda* (engl. *Nature)* (Zaklada A. B. Nobela, 2023). Tijekom 1970-ih na Državnome sveučilištu Illinois s britanskim je fizičarem ***Sir*** **Peterom Mansfieldom** (1933. – 2017.) (slika 20.), školovanim na *Queen Mary College* u Londonu, razvio *echo-planar imaging* NMR metodu (EPI) koja je omogućila efikasnije korištenje gradijenata magnetskoga polja (Zaklada A.

B. Nobela, 2023). Za svoja otkrića podijelili su 2003. Nobelovu nagradu za medicinu i fiziologiju, a treba istaknuti da je Englez Mansfield još prije toga, 1993., proglašen vitezom (Zaklada A. B. Nobela, 2023).



Slika 19. Paul Christian Lauterbur (izvor: Zaklada A. B. Nobela).

Slika 20. *Sir* Peter Mansfield (izvor: Zaklada A. B. Nobela).

Zaključak

Može se zaključiti da je Nobelovu nagradu za otkrića povezana s kliničkom radiologijom dobilo 16 laureata. Od toga njih 11 za fiziku (Röntgen, Thompson, Laue, Bragg, Bragg, Barkla, Compton, Siegbahn, Raby, Bloch, Purcell), a pet za medicinu i fiziologiju (Moniz, Cormack, Hounsfield, Lauterbur, Mansfield). Pritom je do kraja Drugoga svjetskog rata dominirala Nobelova nagrada za fiziku, a nakon toga prevladava Nobelova nagrada za medicinu i fiziologiju.

Što se tiče državljanstva laureata, šestorica su bili Britanci (Thompson, Bragg, Bragg, Barkla, Hounsfield, Mansfield, pri čemu su svi, osim Barkle, u skladu s britanskom tradicijom odavanja počasti zaslužnim pojedincima primili viteške titule), šestorica Amerikanci (Compton, Raby, Bloch, Purcell, Cormack, Lauterbur), dvojica Nijemci (Röntgen, Barkla) te jedan Šveđanin (Siegbahn) i jedan Portugalac (Moniz). Treba istaknuti da je pri određivanju pripadnosti kao relevantno uzimano državljanstvo koje su laureati imali u trenutku dobivanja Nobelove nagrade, zbog čega su Raby, Bloch i Cormack, unatoč svojem podrijetlu iz Austro-Ugarske Monarhije, Švicarske i Južnoafričke Republike, pridodani na popis američkih lau-

reata. Može se zaključiti da do kraja Prvoga svjetskog rata prevladavaju Britanci, a nakon njega Amerikanci.

Vezano za završenu edukaciju laureata, najviše ih je, odnosno čak 13, bilo fizičara (Röntgen, Thompson, Laue, Bragg, Bragg, Barkla, Compton, Siegbahn, Raby, Bloch, Purcell, Cormack, Mansfield), što je i očekivano s obzirom na to da je i najveći broj Nobelovih nagrada dodijeljen upravo za fiziku (11), dok su preostala trojica bili kemičar (Lauterbur), elektroinženjer (Hounsfield) i liječnik specijalist neurolog (Moniz).

Što se tiče radioloških metoda koje su laureati istraživali, osmorica su proučavali rendgenske zrake, odnosno radiološku klasiku (Röntgen, Thompson, Laue, Bragg, Bragg, Barkla, Compton, Siegbahn), petorica magnetsku rezonanciju (Raby, Bloch, Purcell, Lauterbur, Mansfield), dvojica kompjutoriziranu tomografiju (Cormack, Hounsfield), a jedan (Moniz) intervencijsku radiologiju, pri čemu je Nobelovu nagradu za medicinu i fiziologiju dobio za svoja istraživanja iz psihijatrije. Zanimljivo je da je magnetska rezonancija, iako otkrivena tridesetak godina prije kompjutorizirane tomografije, ispočetka korištena isključivo u znanstvenim istraživanjima na polju fizike i kemije, prvenstveno spektroskopije kristala, da bi svoju medicinsku primjenu zadobila tek nakon kompjutorizirane tomografije, što se iščitava i iz činjenice da su laureati Cormack i Hounsfiled Nobelovu nagradu iz medicine i fiziologije za otkriće kompjutorizirane tomografije dobili već 1979. (osam godina nakon njezina otkrića), a Lauterbur i Mansfield za primjenu magnetske rezonancije tek 2003. (65 godina nakon njezina otkrića). Može se zaključiti da do kraja Prvoga svjetskog rata dominiraju istraživanja rendgenskih zraka, a nakon toga prevladavaju istraživanja preostalih radioloških metoda (intervencijska radiologija, kompjutorizirana tomografija, magnetska rezonancija).

Što se tiče institucija na kojima su školovani laureati, dominira Sveučilište u Cambridgeu s petoricom njih, odnosno četvoricom s *Trinity College Cambridge* (Thomspon, Bragg, Bragg, Barkla koji se nakon prve godine zbog želje za pjevanjem u svjetski poznatom zboru prebacio u *King's College Cambridge*) te jedan sa *Saint John's College Cambridge* (Cormack). Zatim slijedi *Eidgenössische Technische Hochschule* (ETH) u Zürichu s njih dvojicom (Röntgen, Bloch), a na kojem su svoj radni vijek provela i dvojica hrvatskih nobelovaca iz područja kemije: Lavoslav Ružička (1887. – 1976.) i Vladimir Prelog (1906. – 1998.). Sve ostale institucije zastupljene su sa po jednim laureatom (Berlin, Lund, Princeton, Cornell, Coimbra, Harvard, *Faraday House Electrical Engineering College*, Pittsburgh, London).

Što se tiče institucija na kojima su laureati proveli svoja nagrađena istraživanja, također prednjači Sveučilište u Cambridgeu, odnosno *Trinity College Cambridge* s

njih trojicom (Thomspon, Bragg, Bragg), slijedi Državno sveučilište Illinois s njih dvojicom (Lauterbur, Mansfield), dok su sve ostale institucije zastupljene sa po jednim laureatom (Würzburg, Zürich, Edinburgh, Uppsala, Saint Louis, Columbia, Lisabon, Berkley, MIT, Tufts, EMI). Uvjetno se može zaključiti da u školovanju prevladavaju europska, prvenstveno britanska sveučilišta, a što se istraživanja tiče američka. To se može objasniti dužom tradicijom europskih sveučilišta u prvome, odnosno boljim financijskim potporama američkih sveučilišta u drugom slučaju. Na prvom je mjestu po broju laureata, što se tiče i završenoga školovanja i provedenih istraživanja, Sveučilište u Cambridgeu, što ne iznenađuje ako se ima na umu da je ta institucija do sada iznjedrila ukupno 121 dobitnika Nobelove nagrade (Zaklada A. B. Nobela, 2023), od čega su njih 34 bili članovi *Trinity College Cambridge* (Zaklada A. B. Nobela, 2023).

Na kraju treba istaknuti da Nobelovu nagradu, bilo iz fizike ili iz medicine i fiziologije, do sada nije dobio nijedan klinički radiolog. Iako na prvi mah iznenađujuće, to je zapravo logično i očekivano jer se klinički radiolozi bave očitavanjem nalaza dobivenih radiološkim pretragama, a ne konstrukcijom radioloških uređaja. Pritom treba ponoviti i da je službeni stav Komisije za dodjelu Nobelovih nagrada taj da nagrade trebaju dobivati znanstvenici teoretičari, a ne liječnici praktičari, kako bi se isključio sukob interesa, zbog čega je Antonio Egas Moniz jedini laureat liječnik na našoj listi, i zbog čega je liječniku Williamu Henryiju Oldendorfu 1979. uskraćena Nobelova nagrada iz medicine i fiziologije za otkriće kompjutorizirane tomografije.

Zahvala

Prvi autor bi ovim radom želio zahvaliti svojoj mentorici doktorici Sofiji Kukić-Brusić na nadahnuću za izučavanjem raznovrsnosti kliničke radiologije.

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SUMMARY

The Nobel Prizes have been awarded since 1901 from the interest rate of the principal, established for this purpose in the form of a foundation by the inventor of dynamite, the Swedish chemist Alfred Nobel. The disciplines for which they are assigned are Physics, Chemistry, Medicine and Physiology, Literature and Peace, and, starting in 1969, economics. As early as the mentioned 1901, the year of the first awards, the Nobel Prize in Physics was received by the German physicist Wilhelm Conrad Röntgen for his discovery of the X-rays on the 8th of November 1895, which is considered to be the foundation of the modern medical discipline of clinical radiology. Further discoveries followed, such as the ones of computed tomography imaging or magnetic resonance imaging, which have significantly improved clinical radiological diagnostics. Other Nobel Prize winners for discoveries and inventions related to the speciality of clinical radiology will be highlighted on this trail. The areas of their scientific research from which they have received the aforementioned awards will be analysed, and their impact on the development of clinical radiology will be evaluated.

***Keywords**: clinical radiology, history of medicine, Nobel Prize, Alfred Nobel, Wilhelm Conrad Röntgen*

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Franjo Mijatović

ON KANT'S CONTRIBUTION TO THE COOPERATION OF PHILOSOPHY AND MEDICINE THROUGH EXAMPLES OF REASON AND BODY

O KANTOVU DOPRINOSU SURADNJI FILOZOFIJE I MEDICINE NA PRIMJERIMA UMA I TIJELA

Kant's critical philosophy poses a challenge to any thinker who seeks to address the relationship between reason and body, health and mental disorders, biology and anthropology, medicine and philosophy. These relationships had profound implications for Kant himself, as a natural and social being. Philosophy, which is accountable only to the individual and autonomous reason, has both the right and the duty to speak on topics not exclusively within its original domain of inquiry. These philosophical reflections extend to ethical concepts of autonomy and dignity, which today are particularly important in medical ethics. Despite the clear demarcation between philosophy and medicine in terms of the lower and higher faculties, the relationship between these disciplines and their representatives is inevitable. On the other hand, a closer reading reveals that Kant does not merely suggest that philosophy has the right to study the subjects of medicine; he also offers his own interpretations of certain mental disorders, human character, bodily discipline, emotional self-control, the suppression of unruly desires, moderation in food and drink consumption, and the benefits of daily walks—practices widely recommended and adopted today. Kant's writings on medicine, consistent with his overall theoretical and practical philosophy, advocate the development of one's own moral gymnastics, dietetics, and ascetics. Joint considerations of fundamen-

tal, broadly philosophical-medical questions, as well as the philosophical-medical transformation of topics such as euthanasia, abortion, debates on brain death, preimplantation diagnostics, stem cell research, and the use of artificial intelligence, aim to examine these ambivalences and test their applicability for the contemporary construction of systematic moral theory. Although the results can never be definitive, their consideration can always begin with interpretations grounded in Kant's works.

Not only does the affirmative invocation of Kant, particularly concerning the connection between morality and medicine, lead to continually new practical orientations, but the critical reformation of Kant's ideas also significantly shapes the bioethical philosophy of today's world. This issue applies to the philosophical grounding of human dignity based on reason, attributed to Kant as the thinker who most strongly influenced contemporary discussions on human dignity. For Kant, this dignity lies in the universal human potential to legislate moral action for oneself, marked by humanity's demand for respect. From this arises Kant's prohibition against instrumentalization, which forbids reducing people to mere means for the ends of others. This is the fundamental challenge to the identity of Kant's deontological medical philosophy. The criterion of rationality, embedded in Kant's conception of human dignity, is problematic because the absolute authority of reason does not, as Kant believed, necessarily lead to moral action. Furthermore, if the capacity for reason is considered central to justifying human dignity, then all those who fail to meet this criterion are excluded from the dignity they desperately need. This includes individuals with dementia, who, in advanced stages of the disease, lose self-awareness, rationality, the capacity for moral judgment, and autonomy. The concept of autonomy, while seemingly consistent at first glance, proves upon closer analysis to be ambivalent, allowing for various and often contradictory interpretations. Concepts of positive or negative freedom fail to meet the needs of groups of people dependent on direct positive support, such as children or individuals requiring care for any reason. Many ethical and political theories are built on the idea of an atomistic, self-sufficient, and individualistic subject, thereby neglecting the inherent human capacity for inevitable interdependence and this essential aspect of our human existence.

Such concrete examples urgently call for new interpretations of the problems related to the historical and systemic roots of the deontological tradition. These examples make it clear that an open discourse on medical-bioethical principles in ethics is more necessary today than ever. Recent approaches to (bio)medical science cannot avoid presupposing certain concepts from Kant's moral philosophy, the acceptance of which by representatives of other medical disciplines cannot be

taken for granted. Despite the ambiguities surrounding the definitions of human dignity and autonomy, it can be assumed that abandoning the effort to address the ideas of human dignity and autonomy, as elaborated by Kant, would lead to a reduction in responsibility at both individual and societal levels. This would pose significant challenges to both philosophical theory and everyday medical practice.

The contribution of Immanuel Kant to the historical development and identity of (bio)medical sciences (which Kant himself did not precisely locate) encapsulates a discomfort regarding (bio)medical sciences felt not only by moral philosophers but also by Kantians. This does not merely denote the problem that moral philosophy has grappled with concerning the autonomy and dignity of patients but also highlights a weak point in contemporary Kant research. Rarely is the question raised as to the extent to which Kant's moral philosophy can be situated within the history of the (bio)medical tradition. This still insufficiently explored topic was the focus of a conference held in Rijeka at the Faculty of Medicine, University of Rijeka, on June 13, 2024, titled "The Contribution of Immanuel Kant in the Historical Development and Identity of (Bio)medical Sciences." Three papers in this special issue of AMHA, dedicated to Kant's contribution to the cooperation of philosophy and medicine through the examples of reason and body, are based on presentations delivered at the conference, which have been significantly revised for publication. Other presentations have since been published elsewhere and are not included here.

The study *The Knowability of Biomedical Laws: A Kantian Approach* by Predrag Šustar focuses on exploring biological traces in Kant's work. His arguments first aim to highlight the fundamental "biological" elements in Kant's philosophy in a formal sense. Šustar interprets the knowability of empirical laws as an implicitly critical foundation within Kant's discursive cognitive capacity. According to him, this foundation "relies on subsuming procedures, which, in the life sciences—primarily biology and its application to medical practices—consist of an explanatory integration between normative teleological judgments and causal-mechanical ones." In this context, the key concepts include the issue of knowability, the reflective power of judgment, discursive intellect, discussions on biological functions, explanatory integration, and teleological normativity. The necessity and knowability of biological and medical laws lead to four interpretations of the problem of necessity and knowability and their apparent connection to "the unity of experience as a system" in Kant's philosophy. Thus, Šustar's work should be understood as both an indication of and a solution to the problem concerning the appropriate role of the biological sciences and their application in medical practice.

Annette Sell, in her article *Kant's Concept of Health as an Interaction of Mind and Body*, explains the concept of health through the key notions of psychosomatics and common sense. In this process, epistemic concepts also play a role. This becomes particularly evident in Kant's approach to disease and health. Although, according to Sell, this approach is guided by distinctions between the body and the mind, Kant's interpretations of health and his evaluations of psychosomatics clearly reveal inconsistencies. These inconsistencies can be explained by the philosophical concept involved, which continually forces the physician to expand beyond the boundaries of their designated discipline. For this reason, Sell concludes that Kant's understanding of both his own health and health in general is epistemologically highly ambiguous. It is neither purely a philosophical self-explanation of health nor an observation of health exclusively from a medical standpoint but rather an act in which philosophy distinguishes itself from medicine while simultaneously reformulating its content. Therefore, the concept of health demands reinforcement through philosophical and societal discourse. In other words, health is a hybrid of philosophical-medical education, as presented in Kant's philosophy of health, clearly establishing the unity and cooperation of mind and body in the treatment of illness.

A particularly intriguing exploration of a specific medical problem is found in Franjo Mijatović's article, *Hypochondria as a Distraction of the Reason within Kant's Transcendental Philosophy*. Kant's attempts to understand mental disorders clearly establish the connection between reason and body and the associated need for self-discipline. At the outset, Mijatović highlights the role of moral self-control as a determining factor in countering the distractions of the reason, emphasizing the necessity of dietetics as a condition for overcoming hypochondriacal anxieties. Kant's reflections on hypochondria and *the maladies of the head* continue to hold relevance for modern psychological and psychiatric research on the disturbed mind. Not only does Kant interpret hypochondria within the context of a healthy reason, but he also consistently links its origin to the physical and imaginative aspects of human beings. He advises hypochondriacs, as well as himself, to practice both bodily and mental self-control. As Mijatović highlights: "For hypochondriacs, this Kantian advice can represent a way out of the vicious cycle of self-observation and a return to a state of bodily and mental unity. It is undeniable that we must follow Kant in recognizing that body and mind are interconnected. This is a crucial indicator that a person must distance themselves from their deceptive feelings and choose the approach imposed by reason: distracting from distractions and recollecting oneself."

The issues presented in this special issue of AMHA are also highly relevant to the relationship between contemporary medicine and philosophical analysis. In this context, medical-historical and philosophical arguments do not necessarily need to be separated. The connection between the contemporary interests of medical scientists and the historical applicability of Kant's philosophy provides a framework for clarifying approaches to disease and health, as well as biological laws. In doing so, the foundational insights of philosophical medicine inspired by Kant's thought significantly enrich psychiatry, psychology, biology, and medical anthropology. Revisiting the philosophical dimension within medicine encourages a reassessment and renewed understanding of the human being while demonstrating how philosophy can contribute to medicine not only as therapy but also as dietetics. This philosophical contribution stems from the Stoic principle "sustine et abstine", which can be declared a general principle of philosophical dietetics. By applying this principle, medicine becomes philosophical "when the sheer power of man's reason to master his sensuous feelings by a self-imposed principle determines his manner of living."[1]

Kant's moral and (bio)medical philosophy achieves its full significance only in connection with a disciplined and self-governed individual who actively employs their reason and respects others. Every human reason requires guidance, and Kant's moral and (bio)medical principles, in this sense, open up possibilities for achieving a more perfect relationship with patients. Kant's moral philosophy helps ensure that physicians and philosophers reflect collaboratively, bearing in mind that their actions and ideas are not isolated—as they might initially seem—but instead have an impact on society and humanity as a whole. In this respect, philosophy and medicine are closely interconnected. An independent and reason-guided way of thinking pertains to what a person can and should become through their own efforts. Such rational beings must be willing and obligated to address the shortcomings of the past and the injustices that could harm the future. The call for mutual collaboration and improvement is not merely a need of the times nor just a heuristic tool to organize our knowledge. On the contrary, it is the most essential aspect of what it means to be a rational being in the world. Thus, Kant, as one of the greatest minds, can and should serve as a starting point in our medico-philosophical reflections on health, the body, and the reason.

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1 Kant, I. (1979). *The Conflict of the Faculties*. Translation and introduction by Mary J. Gregor. New York: Abaris Books, p. 181–182; 7:100.

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THE KNOWABILITY OF BIOMEDICAL LAWS: A KANTIAN APPROACH

SPOZNATLJIVOST BIOMEDICINSKIH ZAKONA: KANTIJANSKI PRISTUP

Predrag Šustar*

SUMMARY

In this paper, I focus on the knowability of empirical laws in Kant. Specifically, I explore the interpretative thread according to which the knowability of an item is secured through an appropriate classification within a hierarchical ordering. The relationship between the knowability and classification is ultimately based on Kant's characterization of our understanding as being "discursive", i.e., relying on subsuming-procedures. More specifically, the focus is on empirical laws referring to biological phenomena broadly construed, which are interestingly intertwined with the teleology-mechanism specific relationship. "Critique of the Power of Judgment" and related Kant's works, thus, address the class of teleological judgments and/or functional statements that should also have the status of a law of nature. I argue that the knowability of generally biological laws equally relies on subsuming-procedures, which in the life sciences, that is, primarily, biology plus its application to medical practices, consist in an explanatory integration between normative teleological judgments and those causal-mechanical. Finally, I try to clarify how a Kantian take on these issues fits within the current function debate: namely, in what way it acknowledges the explanatory and normative dimensions of function statements as they contribute to the practice of the life sciences.

Keywords: *knowability issue, reflecting power of judgment, discursive intellect, function debate, explanatory integration, teleological normativity*

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Introduction

In this paper, I address the problem of the knowability of empirical laws in Kant's general account of laws of nature, and the role that the presupposition of the unity of experience as a system (UES) has in coming to know an empirical law. Special emphasis is put on biological laws, broadly construed, as a distinct subset of empirical laws of nature that have the form of teleological judgments, which, then, are important in methodologically profiling the explanatory practice of the life sciences more generally.

In § 20n of the *Prolegomena*, Kant illustrates the distinction between the judgments of perception and those of experience, respectively, with the following examples, "When the sun shines on the stone, it becomes warm" and "The sun warms the stone" (4, p. 302 (53)).[1] The latter judgment instantiates an empirical or particular law in Kant's overall account of laws of nature. In that regard, the pivotal point is concerned here with the character of the connection between the concepts of sunshine and heat, which, according to the *Prolegomena,* is "necessarily universally valid, hence objective" (4, p. 302 (53); italics added). Now, as recently highlighted (see, in particular, Breitenbach, 2018), there are two main issues related to the general account of empirical laws of nature. Apart from the abovementioned necessity issue, which is standardly debated in the philosophy of science as an important criterion for laws of nature, there is also the *knowability issue*, namely, how we come to know an empirical law, such as "The sun warms the stone".

An additional question that arises is what is the role performed by Kant's presupposition of UES with respect to the necessity and knowability of biological and, additionally, as I argue and try to illustrate in Section 3 of the present paper, biomedical laws, as well. In other words, is this role substantial in solving the above two issues or only subsidiary or, even, non-existent?

Accordingly, there are four leading interpretations of the issues regarding the necessity and knowability and their obvious link to UES in Kant's philosophy of science: (1) the "Best System" interpretation, which, in brief, claims that UES solves both the issue of necessity and the knowability of empirical laws; (2) alternatively, the "Derivation Account", downplaying the role played by UES and claiming that the derivability from *a priori* laws of nature solves the corresponding issues; (3) The "Necessitation Account" further downplays the role of UES and grounds the

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[1] Citations from Kant's works will be located by section number (§), where available, and volume and page number of the so-called *Akademie* edition, *Kants gesammelte Schriften*, edited by the Königlichen Preussischen [now Deutschen] Akademie der Wissenschaften (Berlin: Walter de Gruyter, 1902-). The pagination of translated editions will be bracketed.

necessity of empirical laws in their reference to so-called 'natural properties'. However, as to the knowability issue specifically, this interpretation is still not entirely positioned in the debate. Finally, interpretation (4) combines some components of interpretations (2) and (3), but also in an important sense, as I point out in the central sections of the paper, interpretation (1), too.

In the next section, thus, I primarily focus on the knowability of empirical laws. Then, only secondly, to some extent, on the issues of necessity and the role of UES in Kant's overall account of laws of nature and their corresponding role in the scientific practice of the life sciences–that is, in the case addressed here, the biological sciences and their application to medical practices. I further explore a common interpretative thread advocated by (1) and (2) above, according to which the knowability of, for example, the causal mechanism of the sun's warming of an object is secured by its being classified within a hierarchical ordering of more general judgments–namely, certain physical laws. On my account, the relationship between knowability and classification of this kind is ultimately based on Kant's characterization of the human understanding as being "discursive", i.e., specifically relying on subsuming-procedures, as argued in the *Critique of the Power of Judgment* (see, in particular, §§ 75–77). In the same context, the third *Critique* addresses the topic of teleological judgments referring basically to individual organisms, which instantiate the related type of biological purposiveness, for example, in cases when we say, 'leaves of a tree perform photosynthetic processes for the maintenance of the containing biological system'. Now, this and similar teleological judgments, according to Kant's general account of the lawfulness of nature, should also have the status of an empirical law. Biological laws, hereafter, I will understand them in a more encompassing sense, that is, including also their applications to the medical domain, having specific features as laws pertaining to the special sciences (see Breitenbach, 2017; Šustar, 2013). In addition, as representing teleological judgments, they deal with the knowability issue in their own manner, as argued in the section titled *"By Their Deeds You Will Know Them": The Knowability of Laws in the Life Sciences*. As well-known, the specificity of empirical laws of nature referring to biological phenomena is a consequence of the teleology-mechanism specific relationship in Kant's philosophy of biology. In that regard, I argue that (i) the knowability of biological laws equally relies on subsuming-procedures, which, in this specific case, consist in an *explanatory integration* between teleological and causal-mechanical judgments; (ii) the role of UES is, through that integration, departing from a simply classificatory one, as standardly claimed in the literature or merely gestured towards an alternative view (for the latter, see especially Breitenbach, 2017; 2018). But, before delineating my account of the

knowability of biological or, more specifically, biomedical laws, let us see first some relevant outcomes of the empirical laws debate in the recent Kant literature.

Focuses and features in debating empirical laws of nature

The following options in focusing on Kant's overall account of empirical laws of nature have been advanced, according to which the corresponding debate in the literature will be assessed in this section:

1. The *nomic* status of empirical laws; and
2. The role of the idea of unity of experience as a *system* (UES).

The *nomic* status of empirical laws

In this subsection, I will focus on Friedman's "derivation account" and on the more recent "necessitation account" (see, e.g., Kreines, 2009). Friedman's "derivation account" can be summarized through the following main features:[2] (i) a minimal, exclusively methodological or, even, heuristic role played by Kant's UES assumption. Thus, according to this account, the role in question is not a 'nomic related' one, i.e., UES does not influence our considerations of why certain regularities detected in the empirical data may be elevated to the nomic status or be viewed as empirical laws of nature. (ii) What, instead, is 'nomically-related' pertains to the transcendental, *a priori*, and strictly universal laws of nature. More precisely, Friedman's "derivation account" sees in the so-called "grounding" or "nesting" procedure of perceived empirical regularities (think of the *Prolegomena* example 'When the sun shines on a stone, it becomes warm') *under*, ultimately, the *a priori* law(s) of nature. At the root, this is the only plausible solution to both the necessity and knowability issues that trouble Kant's account of particular or empirical laws of nature.[3]

Recently, different versions of the so-called "necessitation account" have been proposed. For the purposes of the present paper, it is important to point out that the "necessitation account" is decisively ontologically oriented, that is, advocates a bottom-up approach to this debate. Namely, one starts with the assumption that there are dispositional properties in the world that manifest themselves regularly, and then laws describe such regularities. But, most importantly for our discus-

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2 For the three-partite classification of interpretations concerned with Kant's account of empirical laws of nature, see Messina (2017), reconsidered by Breitenbach (2018), in which a fourth interpretation has been added.

3 I will not examine Friedman's elegant account in more detail, because of the absence of a specific analysis of biological laws in it; for the main objections to the "derivation account" more generally, see Breitenbach (2018); and Kreines (2009).

sion, the "necessitation account" deems that empirical laws of nature, specifically, belong to the group of laws of nature that are *unknowable* to a Kantian epistemic subject. This comes as a consequence of their robust ontological dependences in comparison to the transcendental and metaphysical laws of nature.

Now, what, on my account, remains unsatisfactory in the interpretations described above is concerned with, *first*, the exact role played by UES in this domain and, *second*, models worked out for solving the knowability issue. Namely, on the "derivation account", Kant's insistence on UES remains unclear, especially in the *Critique of the Power of Judgment.* On the "necessitation account", furthermore, empirical laws are not knowable, which is an implication that I find unconvincing. For those reasons, the paper now turns to the proposals that are focusing exactly on nomic specificities of the special empirical sciences, such as biology and biomedical sciences or the life sciences in a stricter sense, plus, on the previously highlighted role of UES.

The role of the idea of unity of experience as a system (UES)

In this subsection, I examine accounts that emphasize the role of Kant's UES *a priori* assumption in accounting for the nomic status of empirical regularities in nature, such as, primarily, the "best system interpretation" (see, most elaborately, Kitcher, 1994), and Breitenbach's "reflection model" (see Breitenbach, 2018; 2017).

Kitcher's "best system interpretation", which has the longest tradition in the debate under consideration, extensively evaluates the idea or presupposition of UES in solving the two main issues of empirical laws of nature in Kant's overall account. According to Kitcher's reading, UES solves both the necessity issue and, more importantly for the purposes of this paper, the knowability issue. In other words, we come to know a perceived empirical *regularity* as a particular or empirical *law* of nature if and only if its formulation is embedded within the most systematized of all the rival scientific theories at a given time. Ultimately, at a projected end of scientific investigations. Yet, apart from some differences between this notion of a "best system" and Kant's own use of UES throughout basically the first and third *Critiques*, the interpretation here at issue raises an important question: How is UES related to the way in which we explanatorily account for natural phenomena, especially, in the empirical sciences dealing with highly organized natural systems, such as so-called "organized beings"? Consider in particular in that regard Kant's third *Critique* and, additionally, its *First Introduction*. In my view, there is a connection between the notion of "best system" and Kitcher's *unificationist* account of scientific explanation. However, I claim that the latter does not fully match up with Kant's linking of UES, scientific explanation, and, specifically, the structure of explanations in the life sciences. I address that point in the next section, but

before that, I examine in more detail Breitenbach's account, which also endorses the extended interpretative focus onto the role played by UES, but quite differently than Kitcher's "best system interpretation" does above.

Breitenbach's interpretation (see, especially, her 2018 and 2017 papers) extends the focus even more toward UES in the debate in question, through which she includes not only its wider epistemological relations but also connections to philosophy of the empirical or so-called 'not proper' natural sciences. I will enumerate and briefly describe the main dependencies of Kant's UES with regard to his account of empirical laws more strictly and, then, compare this, fourth, reading to my views. In the upcoming section, then, the methodological outlook of the life sciences will be addressed as an instantiation of Kant's reflecting power of judgment.

Breitenbach's "reflection model" is the main interpretative notion not only for solving the knowability and necessity issues, but it is also related to several other notions in understanding Kant's epistemology and philosophy of science: the *unity* vs. *dis-unity* of nature or science, and the *forms* of this unity; notions concerned with the issue of *distinctively biological laws*, and the structure of *biological explanation* via these laws, as being some of the notions that are more closely related to this model. Thus, given the breadth of the "reflection model" and the fact that it, in certain significant respects, addresses the same issues in Kant's philosophy of biology as the account delineated in the next section, I will firstly examine the model's more important components and secondly its further ramifications.

We can distinguish the "reflection model" for the knowability of the *a priori* laws of nature, which appears to be less complex than the model for the knowability of empirical laws. The former model is based on the notion of an "*a priori* reflection" relating to the role of *a priori* or strictly universal laws of nature. In that regard, consider the way in which we come to know, for instance, the second analogy of experience or the analogy's *a priori* cognates. However, the (empirical) "reflection model" or the corresponding model in the strict sense, according to Breitenbach's interpretation, appears to have a far more challenging task. In that sense, the "reflection model" is contrasted to Friedman's "derivation account", namely, to the very idea of "derivation" or that the knowability issue should be solved through a "grounding" or "nesting" of empirical regularities (think again of the *Prolegomena* example of 'the sun shining on a stone') as more or less particular instances of the *a priori* or universal law(s), so to say, 'at the top' of law-hierarchy. Breitenbach (2018; 2017) extensively opposes this solution. The *apriori* laws do have a substantial role in solving the knowability issue of empirical laws, but not in the 'at the top' manner, but rather "from within" (see Breitenbach, 2018, Section 4). This brings us to the core components of the "reflection model", i.e., the central

part of the fourth interpretation in the debate, which, in a certain regard, upgrades the most valuable points deployed in the preceding interpretations.

The reflection on particular phenomena, as in the *Prolegomena* example, is guided by the two following conditions: (i) the *a priori* laws themselves, and (ii) UES, that is, this general assumption's more particular principles or maxims of homogeneity, specificity, and affinity, as they are fully explicated throughout the *Critique of the Power of Judgment*.[4] In other words, the reflection model's core-components acknowledge, on my account, both 'bottom-up' and 'top-down' approaches to the attainment of empirical laws of nature. Thus, Breitenbach's full interpretation excels in accounting for all the major components from the first and third *Critiques*, which enable our cognitive access to empirical laws.

In sum, I interpret her solution primarily to the knowability issue as an ultimate consequence of the extended interpretative focus, i.e., as an outcome of Kant's previous claims, defended initially in the Appendix to the Transcendental Dialectic of the *Critique of Pure Reason*. The "reflection model" with its two core-components represents a systematic interpretation of the relevant textual evidence and, contrary to other interpretative accounts, is not based on a single privileged relation, e.g., the derivational relation as in Friedman's account, but opts, instead, for a *pluralistic* approach.

In the next section, I will argue that when examined in more detail, Breitenbach's interpretative model ultimately suggests a *monistic* approach, based on a determined *explanatory relation*. Furthermore, if we put scientific explanation at the center of a solution to the knowability issue in Kant's account of empirical laws of nature, then, on my account, we may avoid an odd consequence in Breitenbach's reading, according to which the "reflection model" generates an "improper" knowledge or no scientific knowledge 'in the strict sense'.[5] I will instantiate my

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4 For a similar view on the relationship between the first and third *Critiques* and the role played by UES, see Geiger, 2009. In short, I give primacy to the overall account of the reflecting power of judgment and its maxims in that regard. For a detailed and comprehensive analysis of the abovementioned relationship, together with its broader setting, see in particular Spagnesi (2021).

5 For this consequence, see in more detail Breitenbach (2018, Section 4). Breitenbach may defend her abovementioned view, though, by emphasizing Kant's assessment of the natural sciences, apart from physics in the strict sense, as enjoying scientific status merely 'improperly'. However, as I argue in the next section, the whole cognitive machinery of the reflecting, and to some extent determining, power of judgment has been built up by Kant in order to more fully acknowledge a specific epistemic status of the life sciences, among other disciplines, in the third *Critique*. One of the main purposes in the next section of the present paper is exactly to flesh out how that machinery may be put at work when providing explanatory strategies in the life sciences.

account of the knowability of empirical laws through the structure of explanation in medical physiology, as reconstructed from the *Critique of the Power of Judgment* and its *First Introduction*.[6]

In solving the knowability and necessity issues in Kant's account, the *a priori* laws can have, as previously shown, the 'at the top' position ("derivation account") or the one 'from within' ("reflection model"). Hence, depending on the position we assign, the following features of the unity under consideration ensue: in the case of the "derivation account", a *single hierarchical* or *reductionist* form of the unity of cognitions, and in the case in which Breitenbach's "reflection model" position is endorsed, a *pluralist,'organicist'* or *non-reductive* form is obtained. Thus, Kant's position in the debate on the unity-disunity of science/nature issue, according to Breitenbach, is most accurately interpreted by endorsing the 'from within' position of the *a priori* laws, which, consequently, points to a certain pluralistic form, characterizing the unity of cognitions in the sciences. In my view, this position is further strengthened as we take into consideration the reflecting power of judgment applied by Kant's philosophy of biology in the Methodology of the Teleological Power of Judgment of the third *Critique*.

In what follows, I argue for an interpretation foregrounding the way(s) in which, according to Kant's philosophy of science, the empirical sciences *explain* and/or *predict* their phenomena of interest. One of the main reasons for that interpretative approach is prompted by the fact that the connection between the role played by UES and the attribution of nomic status to empirical regularities appears to be conclusively characterized in the third *Critique*'s analyses of our explanatory efforts. As we will shortly see, these efforts are dealing with the interface of physical and life sciences. This way of focusing on Kant's account will be further examined in the case of how we, according to the Methodology of the Teleological Power of Judgment, configure or structure biological and biomedical explanations via certain relationships between different types of laws. To illustrate these

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[6] There are additional difficulties in Breitenbach's corresponding reading, such as (i) how exactly reflection, as far as the first condition of the model in question is concerned, that is, the guidance of the *a priori* laws of nature, differentiates itself from Friedman's notion of derivation in the same context; (ii) the interplay between the two conditions of the "reflection model"; namely, in what way UES enables the initial regulative role of the *a priori* laws of nature, which, in a further step, leads to their standard constitutive role in the experience attainment. In addition to that, how UES as an *a priori* idea or presupposition relates to the actual unity of empirical cognitions that represent background beliefs for the model at a certain point of scientific research. From the questions left open in Breitenbach's reading, this paper concentrates on the relationship between the "reflection model" and the unity of science/nature issue and its exact form, as this form relates to the knowability of laws within the practices of the life sciences.

points concerned with laws in the specific domain of the life sciences, e.g., medical physiology, I will refer to examples from different levels of biological organization. Hopefully, this will also show how Kant's cognitive machinery of the reflecting power of judgment, in particular, may look like when we deliver epistemically good explanations of the natural phenomena in biology and medicine or the life sciences more generally.

"By their deeds you will know them": the knowability of laws in the life sciences

In my view, a determined convergence between Breitenbach's "reflection model" and Kitcher's "best system interpretation" can offer a plausible solution to the knowability issue. Now, the "best system interpretation" can be also viewed as an instantiation of Kitcher's more general account of scientific explanation, which, according to him, should be construed along the idea of a *unification* through argument-patterns (see Culp & Kitcher, 1989; Kitcher, 1994). Although I do not think that Kitcher's account in question is applicable to Kant's corresponding views, both generally and with respect to explanations in the life sciences, I do think that there is a close connection between UES, plus, its co-working with, especially, the reflecting power of judgment, and our explanatory practices in the empirical sciences. In order to explicate that connection, I refer, *first*, to the structure of the biomedical explanation of the phenomena related to the impairment of visual apparatus in humans, which works thanks to different types of laws of nature. And, *second*, I refer to the way in which UES, interpreted as in the preceding section, influences how we come to know judgments dealing with certain life systems *at the same time* as distinctively biological or biomedical laws.

Consider with regard to that Kant's example of the human vision, highlighted in the *First Introduction* (20, 236 (37); emphasis in original):

> E.g., by saying that the crystalline lens in the eye has the **end** of reuniting, by means of a second refraction of the light rays, the rays emanating from one point at one point on the retina, one says only that the representation of an end in the causality of nature is conceived in the production of the eye because such an idea serves as a principle for guiding the investigation of the eye as far as the part that has been mentioned is concerned, with regard to the means that one can think up to promote that effect.

Now, suppose we ask, "why John's eyes or their component-parts of the 'crystalline lenses' did not start to behave in the standard manner when strongly illuminated by a flashlight?", or so might go a follow-up situation stemming from

Kant's above well-known example for a teleological or function statement in medical physiology.[7]

The answer given by John's physician may go as follows: "John has diabetes." This answer, which also represents a compressed medical explanation of the particular natural phenomenon under consideration, when more fully explicated, has a multi-layered structure. Thus, according to Kant, a *first* layer is concerned with a *functional statement* or, in Kant's terminology, *teleological judgment* that states the so-called "inner possibility" of the biological object in question. In this case, the teleological judgment refers to an expected physiological behavior of the crystalline lens. More specifically, the judgment is basically the following one: 'The crystalline lens in the eye *has the end* of reuniting the light rays at one point on the retina' (see 20, 236 (37)). By using the notion of "inner possibility" in the above judgment, Kant seems to point out that biological objects have a range within which they show expected standard or *normal* physiological behavior. Accordingly, John's eyes, more specifically, their component-parts of the crystalline lenses, show a *specific dysfunctional* behavior because it is "out of the range of the standard physiological behavior", i.e., not producing the reuniting effect on the retina.[8]

That is why the above answer appears to us as an acceptable scientific explanation of the detected particular phenomenon. However, that is only one part of a more fully explicated scientific explanation. Moreover, according to Kant's philosophy of biology, the answer's explanatory power, by itself, is void if not related to a *second* layer in the structure of, here in particular, biomedical explanation, that is, the layer of a "*mechanism*" or "*merely mechanical laws*" or other terminology that Kant uses in this regard (see in more detail Teufel, 2013). Now, what enables a scientific explanation of a particular biological phenomenon, or even other types of explananda, is a specific interdependence of the two layers. In other words, taken

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7 For Kant's acknowledgment of a normative dimension of teleological or function statements in the life sciences, namely, the special investigative importance of how a biological object *ought* or *should* behave, think of a component-part in the human eye as illustrated above, or fails to do so, as far as the corresponding explanatory and other practices are concerned, see Šustar (2013; 2008). With this, I just wanted to emphasize (almost) equal importance between functional and dys-functional or mal-functional states in accounting, explanatorily in the life sciences (for this debate, see Garson, 2013; 2023). As for the function-mechanism relationship, this is a specific issue debated in the current philosophy of biology; see, most recently, Garson (2023). It is worth noting here that Kant's "subordination" relation appears to be attuned to leading views in the current debate. A further analysis, however, would exceed the scope of the present paper.

8 For a *normative* solution to the issue of distinctively biological laws, see Ginsborg (2001); I will refer to this issue when contrasting Breitenbach's solution that adds an extra layer of distinctively biological laws between the teleological layer itself and the basic one, concerned with "merely mechanical laws".

separately, no one explains the biological or biomedical phenomenon. Moreover, Kant, in The Methodology of the Teleological Power of Judgment, further characterizes the relationship in question as a "subordination" of the mechanism-layer under the layer of teleological judgment. This kind of structure alone, according to the *Critique of the Power of Judgment*, can act as a good explanans in any explanatory effort in the biological and related sciences (see, in this regard, Kant's additional example with the skin, hair, and bones metabolism (see 5, 377 (249)). The same applies to the above explanatory statement, 'John has diabetes'. It is explanatory because, in fact, it presupposes a two-layered structure that I have just described. Suppose, in that respect, a mechanism that tells what is going on in the crystalline lens, e.g., at the molecular level of biological organization. Nevertheless, that layer is always related to the teleological judgment or functional statement referring to a range of 'inner possibilities' of the biological objects involved; in our case, the physiological behavior of the crystalline lens in the human eye.

Breitenbach (2017), on the contrary, works out a *three-layered* structure for explanations in the life sciences via, correspondingly, three distinct groups of laws: teleological laws, biological ones, and "merely mechanical laws". I will not examine here Kant's exact position in the scientific explanation debate but, rather, the extent to which, if at all, Breitenbach's *biological laws* can be considered as being independent of teleological judgments or laws in Kant's philosophy of biology and, through that, allegedly forming a separate layer according to Breitenbach's reading. Additionally, given the outcome of the above point, it might also influence the issue of what kind of model best accounts for the knowability issue in the area of the life sciences. On both points, I depart from Breitenbach's "reflection model" and its ramifications, as I argue in the remainder of the paper.

First, on Breitenbach's account, teleological laws are not empirical, whereas biological laws are differentiated from the former exactly by being empirical. However, strictly speaking, there is no such independent group of laws of nature in Kant's philosophy of biology. But, as Breitenbach further claims, they can be discovered on the basis of Kant's position in the third *Critique*, if at least some desiderata in naturalizing biological concepts are fulfilled.[9] Apart from potential difficulties of that interpretative thread, my main worries at this point are somewhat different: (1) from Breitenbach's interpretation would, in the final analysis, follow that there are no biological laws in Kant, which would be contrary not only to his general account of laws of nature but also to Breitenbach's own position on this matter; (2) even more interesting point that seems to follow from Breitenbach's reading

[9] For this line of argument, see in more detail Breitenbach (2017, pp. 247–248).

allegedly states that there should be a rather sharp divide between biological and teleological laws. However, biological laws are, on my account, closely intertwined with teleological ones in Kant's philosophy of the biological and life sciences. This can be seen throughout the *Critique of the Power of Judgment*, where the extent of independence of the two layers in the overall explanatory structure dealing with explananda such as a specific malfunctioning of John's eyes: neither is clear-cut, as on Breitenbach's account (see Breitenbach, 2017, Section 12.3), nor non-existent, as in Ginsborg's normative reading (see, in particular, Ginsborg, 2001).[10]

Thus, I agree with the readings according to which from Kant's general account of laws of nature follows that there should also be *particular* laws referring to biological phenomena. I have advocated the two-layered explanatory structure in the examined scientific area, in which I have secured a place for *distinctively* biological and, equally, biomedical laws. These laws are, on the one hand, seen as particular outcomes of the reflection on biological phenomena, guided by teleological considerations. Namely, guided by the notion of "objective purposiveness", as illustrated above in Kant's example with the human vision from the *First Introduction*; and, on the other hand, this nomic structure, think again of the example of function ascription to the standard activity of crystalline lens as a function bearer in the containing system, is linked to "merely mechanical laws" (consider here the physical and chemical laws used by the reflecting power of judgment in the human vision example).[11] This, it is a specific capacity of particular teleological judgments in the life sciences, such as the one instantiated in this section, that is, by establishing as many as possible explanatory connections with other groups of laws of nature, what justifies us in considering them as biological and, more specifically in the above context, biomedical laws.

Second, the same capacity in building up a most stratified *explanatory* type of hierarchy of laws of nature in a certain scientific area is what makes them recognizable as empirical laws, in the first place. In other words, it is primarily explanatory and predictive capacity, as previously specified and illustrated, the feature that is, in fact, at the core of the interpretative models for solving the knowability issue – at least, those epistemically oriented. Finally, as suggested throughout Kant's philosophy of natural science, the explanatory capacity, more explicitly, involves

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10 For an illuminating introduction to this specific issue in Kant's account of biological concepts and judgments, see Steigerwald (2006).

11 The same also applies to other areas in the life sciences, e.g., plant physiology, frequently addressed by Kant's philosophy of biology; for a reconstruction and assessment of Kant's analysis of illustrative case studies from this scientific area, see Šustar (2014; 2013).

different types of explanatory relations, not exclusively a unificationist one, as, instead, appears to be the case with the "best system interpretation".

Concluding remarks

The above assessment of the recent debate on the issue of knowability in Kant's account of empirical laws of nature, in particular, as far as laws in the life sciences are concerned, has shown that (1) we come to know a teleological judgment referring to a biological phenomenon also as a law of nature in virtue of its ability to form a determined local hierarchy, and other similar forms related to the UES deployment, with "merely mechanical laws", as I instantiated by the case studies stemming from medical physiology; (2) this essentially *systemic* account of lawlikeness (see especially Lewis, 1973) keeps the main idea of a hierarchical subordination of species to genera, which, nevertheless, assumes a different form in biology and medicine. That is, the present paper highlighted the fact that Kant's subordination of "merely mechanical laws" to a corresponding teleological judgment with regard to the explanandum phenomenon departs from an exclusively hierarchical subordination, which is most usually attributed to Kant's account in question. I characterized that type of hierarchy, by which we come to know a biological judgement having the status of an empirical law, as an *explanatory integration*. Namely, teleological judgments are hierarchically integrated thanks to the epistemic roles they enable through a specific 'super-ordination' of the already embedded, thus warranted, mechanical laws; and (3) as a further implication of the proposed reading, I suppose that this approach to the knowability issue of laws of nature in the special empirical sciences sheds some light on the ways in which the reflecting power of judgment in particular, at least as this crucial Kant's invention is generally characterized in the Introductions to the third *Critique*, *concretely* plays out in the intricate area of the life sciences.[12]

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[12] By that, I am not setting aside the determining power of judgment, together with its *a priori* concepts and corresponding principles. In the paper, I have emphasized the corresponding role performed by the reflecting use, given Kant's analyses, especially in the Methodology of the Teleological Power of Judgment. Differently put, it is a matter of a certain 'division of cognitive labor' between the two uses or types of the power of judgment what is at stake here. In short, it is not a question of their respective epistemic superiority.

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SAŽETAK

Članak se usredotočuje na problem spoznatljivosti empirijskih zakona kod Kanta. Pobliže se istražuje interpretativna potka prema kojoj se spoznatljivost nekog predmeta postiže pomoću odgovarajuće klasifikacije unutar hijerarhijskog sustava. Odnos između spoznatljivosti i klasifikacije zasniva se, u krajnjoj liniji, na Kantovu određenju ljudskog razuma kao „diskurzivne" spoznajne moći, to jest činjenici da se temelji na supsumirajućim procedurama. Posebna pozornost posvećena je empirijskim zakonima koji se tiču bioloških pojava u širem smislu, što je onda dalje na karakterističan način povezano s posebnim odnosom između teleologije i mehanizama. "Kritika moći suđenja" i srodna Kantova djela bave se tako skupinom teleoloških sudova i/ili funkcijskih iskaza koji bi također trebali posjedovati status zakona prirode. Članak brani gledište kako se spoznatljivost općenito bioloških zakona jednako tako zasniva na supsumirajućim procedurama u znanostima o živim sustavima (life sciences), to jest biologiji i njezinoj primjeni na medicinsku praksu, koje se nadalje sastoje u eksplanatornoj integraciji normativnih teleoloških i uzročno-mehaničkih sudova. Konačno, članak nastoji pojasniti kako se kantijanski pristup tim pitanjima pozicionira u recentnoj raspravi o biološkim funkcijama. Odnosno, na koji način može obrazložiti eksplanatornu i normativnu dimenziju funkcijskih iskaza u njihovu doprinosu znanstvenoj praksi.

Ključne riječi: *problem spoznatljivosti, refleksivna moć suđenja, diskurzivni intelekt, rasprava o biološkim funkcijama, eksplanatorna integracija, teleološka normativnost.*

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KANT'S CONCEPT OF HEALTH AS AN INTERACTION OF MIND AND BODY

KANTOV KONCEPT ZDRAVLJA KAO INTERAKCIJA UMA I TIJELA

Annette Sell*

SUMMARY

This paper examines Kant's concept of health under four aspects. Part 1: Kant speaks of health primarily in terms of common sense (gesunder Menschenverstand) and healthy reason (gesunde Vernunft). The concept of health is, therefore, mainly an epistemological concept. Part 2: Health stands in the context of disease. For Kant, disease is always linked to a lack of cognitive capacity. Kant's thoughts on disease and health can be found above all in his late writings "Anthropology from a Pragmatic Point of View" (1798) and "The Conflict of the Faculties" (1798). The early work "Essay on the Maladies of the Head" (1764) and a speech on "On Philosophers' Medicine of the Body" (1786) should also be included. Since health is primarily in the context of cognition, mental illnesses are at the centre of Kant's work. Part 3: Kant repeatedly presents his own state of health as an example. When Kant wrote his own "dietetics" in response to Christoph Wilhelm Hufeland's "Macrobiotics or The Art of Prolonging Human Life", it became clear that the attainment of physical health is also linked to mental health. After all, we can speak of psychosomatics. Part 4: For Kant, the preservation of health is also the task of the government. This political dimension of health is evident in Kant's writings. This discovery of psychosomatics is part of a medical-historical context that originated with Kant, among others, and which has not yet been sufficiently researched.

***Keywords**: Kant, medicine, health, disease, psychosomatics*

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Introduction

Immanuel Kant's interest in medicine manifests itself in different ways. He did not study medicine and did not write a monograph on medicine. However, there are numerous statements on medical topics in his works and his correspondence, especially with Markus Herz, Christian Garve, and Christoph Wilhelm Hufeland. His own physical and mental condition plays just as much a role as medical issues of the time. Kant does not develop a systematic or unambiguous concept of health in his philosophy, but essential aspects of health can be found in Kant's works, which are informative for a definition of health and his concept of medicine. All in all, Kant and medicine are topics that are still rarely treated in German research. Urban Wiesing and Heiner Klemme have conducted important studies on the subject (Klemme, 2020; Wiesing, 2008). A monograph on Kant and medicine by Hans Förstl was published in September 2024 (Förstl, 2024). In my paper, I will discuss Kant's concept of health under four aspects. As a result of this consideration, it can be stated that Kant's concept of health implies essential aspects of psychosomatics. Up to now, this aspect has hardly played a role in research. Only Reinhard Brandt speaks explicitly of psychosomatics against the background of a speech by Kant, which will be considered later in the text (Brandt, 1999a, p. 355). Heiner Klemme also emphasises the body-mind relationship in his essay (Klemme, 2020). Nicola Zambon (Zambon, 2021) examines the body-soul relationship in Kant's speech of 1768 (Brandt, 1999a) and places this in relation to moral philosophy.[1] These are some of the few examples that deal with the topic of body and soul in relation to Kant's discussion of medicine.

Health and understanding

Kant speaks of health in terms of common sense and sound or healthy reason. The concept of health is, therefore, first and foremost an epistemological concept. Thomas Schramme presents an important compilation of current international theories of disease.[2] He himself divides the concept of disease into epistemology, ontology, and axiology. Diseases are always also entities or concepts that are based

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1 "The thesis I will therefore be defending in this work is that Kant's philosophy of medicine is guided not only by a theoretical interest, but also – indeed, perhaps primarily – by a fundamentally practical one, linked to moral philosophy, and especially the doctrine of virtues" (Zambon, 2021, p. 34).

2 Schramme's publication contains mainly American studies on the concept of disease. There are texts by H. Tristram Engelhardt, Jr., Christopher Boorse, K., Caroline Whitbeck, Lennart Nordenfelt, Jerome C. Wakefield, and Robert E. Kendell, among others (Schramme, 2012).

on epistemological questions.[3] This theory is not based on Kant but is an example of how the concept of disease can be thought of in contemporary epistemological concepts. For Kant, common sense is a faculty of cognition, namely a practical faculty of cognition that produces a concrete result. In this sense, healthy means that people are bound to common sense. It is about a concrete application that a person carries out in a specific area and not about philosophical, a priori thinking. Common sense is a low level of cognition (Kant, 2006, p. 169).

It is the mind of a healthy person who has a natural capacity for judgement. Common sense appears in various contexts in Kant and is criticised as common sense for epistemological thinking and emphasised as indispensable for aesthetic judgement (Kant, 1987, p. 294). Robert Nehring dedicates his book to these forms and the critique of common sense (Nehring, 2010). Kant calls the scientist who deals with principles the *bright mind* (lat. *ingenium perspicax*) (Kant, 2006, p. 139). The person with common sense is thus focused on the concrete. This thought is expressed in the following quote:

> But sound understanding can demonstrate its superiority only in regard to an object of experience, which consists not only in increasing knowledge *through* experience but also in enlarging experience itself; not, however, in a speculative, but merely in an empirical-practical respect. For in the speculative employment of the understanding, scientific principles *a priori* are required; however, in the empirical-practical employment of understanding there can also be experience, that is, judgements which are continually confirmed by trial and outcome. (Kant, 2006, p. 140)

The connection between common sense is also shown by the fact that Kant links mental illness with the *sensus privatus*. According to Kant, madness is a loss of common sense (Kant, 2006, p. 219). What all forms of madness have in common is the loss of common sense (lat. *sensus communis*), which is replaced by logical stubbornness (lat. *sensus privatus*). In this logical stubbornness (lat. *sensus privatus*), the person has perceptions and thoughts that are only for himself. Accordingly, he is distanced from common sense, which means he is mad. Kant criticises this state of affairs because it would no longer be possible to communicate rationally if we always had our own private ideas. However, a healthy mind is characterised by the fact that "we also restrain our understanding by the *understanding of others*, instead of *isolating* ourselves with our own understanding and judging *publicly* with our private representations, so to speak" (Kant, 2006, p. 219). Reason is always bound to general comprehensibility. The content must be communicable to others. If this is not the case, the intellect or the mind is ill. Kant

[3] Schramme (2012, p. 9–40).

speaks of a disease of the mind, and this brings me to the second part, which I will call health and disease.

Health and disease

Kant's thoughts on disease and health can be found above all in his late writings *Anthropology from a Pragmatic Point of View* (1798) and *The Conflict of the Faculties* (1798). Stefanie Buchenau presents an important study on medicine in the last-mentioned work. She shows Kant's different aspects of the therapeutic and practical confrontation with Hufeland's dietetics (Buchenau, 2019). The early work *Essay on the Maladies of the Head* (1764) and a speech on *On Philosophers' Medicine of the Body* (1786) are also relevant to this topic. Since, as mentioned above, health is primarily in the context of knowledge and cognition, mental illnesses are the focus of Kant's work. When Kant wrote his own dietetics in response to the work of the physician Christoph Wilhelm Hufeland, *The Art of Prolonging Human Life* (1797)[4], it became clear that the attainment of physical health is also linked to mental health. After all, we can speak of psychosomatics. It was the neurologist and professor of psychiatry Johann Christian August Heinroth who first used the term "Psychosomatik" in 1818.[5] The book by Alexa Geisthövel and Bettina Hitzer (Geisthövel & Hitzer, 2019) provides information on the history of psychosomatics and the historical development of psychosomatic medicine. This book gives an overview of the scientific significance and clinical importance of what is known as psychosomatics in the 20th century. The anthology by Heinz Böker, Paul Hoff, and Erich Seifritz (Böker, Hoff & Seifritz, 2019) is indispensable for the current understanding of psychosomatics. In addition to the historical change of this term, the various psychosomatic clinical pictures and associated physical effects are presented. This volume also contains studies on the legal and financial implications of psychosomatics. One of the co-founders of psychosomatic medicine in Germany was Karl Kuno Thure von Uexküll (1908–2004), whose book on psychosomatic medicine is still a standard work for current practice in updated editions (Uexküll, 2017). Uexküll was in favour of psychosomatic medicine being an integral part of all practical medical disciplines. He always spoke out against the separation of body and soul in medical practice and advocated an integrated medicine that encompasses the whole person and overcomes the mind-body dualism.

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4 This book was published in the third edition (1805) and onwards under the title *Macrobiotics*.

5 Heinroth (1818, p. 49). For the first use of the term "Psychosomatik" by Heinroth, see also the text by Holger Steinberg (2018).

There is little research on Kant's thinking of "psychosomatics", so my approach is to explore psychosomatics in Kant's writings.[6] Body and mind are always interrelated. Kant even goes so far as to say: "On the power of the mind to master its morbid feelings by a sheer resolution". This is the title of the third chapter in his work, *The Conflict of the Faculties*. This discovery of psychosomatics is part of a medical-historical context that originated with Kant, among others, and which has not yet been sufficiently researched. For a long time, Kant's statements on medicine and his lectures on anthropology and psychology were not at the centre of research on Kant, which focused primarily on the three *Critiques* and the associated theoretical, practical, and aesthetic problems. It was primarily with Reinhardt Brandt's research around 1999 that interest in Kant's anthropology and thus also the questions about the human being in connection with the mind-body relationship became more pronounced in Germany.[7]

We see that Kant's interest does not focus exclusively on physical health. Hufeland's medical book is particularly interesting to him because Hufeland presents dietetics for a man that treats him as a moral being. In this medical treatise, man is seen as a moral being who needs culture to strengthen his physical nature or remain healthy and live a long life. Kant follows Hufeland in showing how the mind can affect the body and also heal it.[8] Kant finds examples of such a power of the mind in introspection. At the same time, this procedure causes him a certain discomfort. After all, Kant finds it deeply distasteful to bombard the reader with subjective impressions without any objective significance.

> To want to entertain others with the inner history of the play of my thoughts, which has subjective importance (for me) but no objective importance (valid for everyone), would be presumptuous, and I could justly be blamed for it. But if this sort of introspection and what I found by it is something rather uncommon, which it is worthwhile for everyone to try though it must be pointed out to them, the nuisance of telling others about my private feelings can at least be excused. (Kant, 2012b, 7:98)

Kant thus expresses his personal feelings in the context of the matter, which here is the dietetic way of life. He reveals various practices to prevent a cold, for ex-

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6 Andreas Heinz, an important contemporary psychiatrist, also ignores the aspect of psychosomatics in his study of Kant's theory of mental illness within Kant's *Anthropology* (Heinz, 2014, pp. 172–194).

7 Brandt's commentary on the speech *Über die Heilung des Körpers, soweit sie Sachen des Philosophen ist* (Brandt, 1999a) and his commentary on *Anthropology from a Pragmatic Point of View*, which contains important statements on mental illness (Brand, 1999b), led to a greater interest in Kant's statement on illness and opened up the topic of psychosomatics.

8 The German word for mind is *Gemüt*. This refers to the soul in the sense of *animus*.

ample. Kant's dietetics certainly seems antiquated and sometimes humorous today. One particular gem is Kant's description of his resolution to draw breath. When he had a cough or cold, he would draw air through his nose with his lips closed. This ultimately enabled him to fall asleep at night. Closing his mouth prevented the expulsion of air and suppressed the urge to cough by forming saliva and swallowing the liquid. The conclusion of Kant's detailed description of drawing breath with closed lips is that the power of the mind can lead to the alleviation of illness (Kant, 2012b, 7:110–112). Self-healing is, therefore, possible through intention. Of course, Kant notes in his writing that this procedure cannot apply to all illnesses.

Kant's preoccupation with medicine and illness is primarily focused on mental illness. Here, he even attempted a nosology or classification of diseases. He developed this as early as 1764 in the *Essay on the Maladies of the Head* (Kant, 2012a). In this text, Kant presents onomastics, i.e., a nomenclature of the ailments of the head. Not without irony, he remarks that doctors thought they had helped their patients by giving their illnesses a name. Imitating this fashion of doctors to a certain extent, Kant now sketches short onomastics of the infirmities of the head with an ironic undertone. In doing so, he not only presents clinical pictures of mental defects but also holds up a mirror to bourgeois society, including the medical profession, by first writing about infirmities of the head, which can be despised and ridiculed. Kant wittily and in a socially critical way recognises diseases of the head as diseases of civilisation. It is not uncommon to find fools and weak-minded people among well-mannered citizens. The second form of diseases of the head, which today are called psychoses, must be treated medically. At the end of our consideration of Kant's *Essay on the Maladies of the Head*, we should point out an astonishingly topical remark. When Kant enquires into the causes of mental illnesses and thus the infirmities of the cognitive power, he states the following:

> I have also only paid attention to their appearances in the mind without wanting to scout out their roots, which may well lie in the body and indeed may have their main seat more in the intestines than in the brain, as the popular weekly journal that is generally well known under the name of The Physician, plausibly sets forth in its 150th, 151st, and 152nd issues. (Kant, 2012a, 2:270)

Kant is referring here to Johann August Unzer's weekly journal *Der Arzt*, in which the connection between digestion and mental illness is described. This comment on the relationship between body and soul or mind is a further concession to the effect of the physical on the mental state of the human being and, thus, to the possibility of a pathological disturbance of the power of cognition. In

a speech from 1786, Kant clearly expresses that health refers to both the mind and the body:

> It must be ensured that a healthy mind is in a healthy body. In this interrelation it is the business of physicians to help the sick mind by curing the body, but it is the business of philosophers to help the afflicted body by controlling the mind. (Kant, 2007, 15:939)

In the rest of the text, Kant recognises that the mind has the power to have a positive as well as a negative effect on the body. Kant even goes so far as to say that the power of imagination has an influence on the body. "And everyone knows how we can promote digestion by the emotions stirred in friendly but lively conversation, or by turning away from our meditations during dinner" (Kant, 2007, 15:940).

The mind can, therefore, support vital functions. The effects, which Kant understands as movements of the mind, have a particular effect on the body. The connection between mind and body is also reflected in the relationship between physician and philosopher, so that the two professions are intertwined in such a way that "the doctors'" business is to help the ailing mind by caring for the body; the philosophers', to assist the afflicted body by a mental regimen (Kant, 2007, 15:940). This speech from 1786 is an important testimony to Kant's recognition of psychosomatics. Mind and body are related to each other in a way that is also reflected in the actual practice of the professions of physician and philosopher and, thus, also in the relationship between the medical and philosophical faculties. If Kant is concerned with physical health, it is also against the background of his own experiences, which brings me to section III, which deals with Kant's health.

Kant's health

Kant's endeavours for his own health also include the body and the soul and must, therefore, be seen in the context of the body-soul relationship. Kant even developed his own dietetics. His own health is particularly evident in his correspondence (especially with the physician Marcus Herz) and in writing *The Conflict of the Faculties* (1798). These deal primarily with Kant's weak physical condition. He also speaks of frequent ailments that affect him. Above all, he began to suffer from age-related ailments and shortly before his death, a few months before his 80th birthday, he suffered a stroke. Hans-Joachim Schwarz has written an excellent book about Kant's life crisis and his dietetic turnaround (Schwarz, 2019). It shows in detail the physical and, above all, psychological problems Kant was confronted with and how he was able to overcome them. The fact that Kant confessed to a form of hypochondria is expressed both in his letters and in the writing

Conflict of the Faculties. In this writing, he primarily comments on his own illness. Kant justifies this approach by stating that he was a philosopher and not a physician, leaving him with only self-observation and inner experience as a basis for judging illness or disease. In this sense, Kant consciously chooses the subjective point of view for his statements on illness. Kant writes about the dietary lifestyle that should enable him to stay or become healthy.[9] He also describes various practices to prevent a cold. It is also about self-healing through self-control. Today, we would also speak of self-efficacy (German: *Selbstwirksamkeit*) at this point. In the *Conflict of the Faculties,* Kant even put forward the theory that his physical constitution was the cause of his hypochondria, which even triggered depressive moods.

> I myself have a natural disposition to hypochondria because of my flat and narrow chest, which leaves little room for the movement of the heart and lungs; and in my earlier years this disposition made me almost weary of life. (Kant, 2012b, 7:104)

Kant goes on to describe how he countered this condition with the thought that the morbid state only affected his body, not his mind. Distractions through mental labour also helped. The physical anxiety remained, but by distracting his concentration from the feeling, he was able to counteract the hypochondria. Here, too, we can recognise a kind of self-healing through mental effort. However, self-healing does not succeed in every case, so physicians are needed for treatment. Hans Förstl analyses Kant's critical attitude to medicines in an essay. However, there is evidence that Kant consumed some remedies (e.g., *Chinarinde and Trummersche Pillen*) (Förstl, 2022).

Maintaining his own health was also part of Kant's lifestyle. For him, this was expressed in the realisation of a precise daily routine, which he adhered to meticulously. This is documented as follows: Getting up at 4.45 a.m. every day, lecturing at the university between 7 a.m. and 10 a.m., then working on his own writing, having lunch, including table talks, followed by a walk, resuming reading and writing, and going to bed at around 10 p.m. This discipline and routine were intended to promote physical and mental health. The ascetic lifestyle enabled Kant to work on his philosophical works in a disciplined manner. At the same time, Kant makes a disciplined lifestyle generally binding and even recognises an excessive amount of entertainment or distraction as a weakness of the mind (Kant, 2006, p. 206). When Kant writes about the feeling of pleasure and displeasure, as well as the capacity for desire, the self-management of pleasures, which should

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[9] An important aspect of the dietetic life is the observance of regular sleep. See the study by Matthias Leanza on Kant's own sleeping habits (Leanza, 2009).

be experienced in good measure and in reasonable harmony with society, plays a role. Excess or opulence should be avoided.

> *The art of good living* is the due proportion of living well to sociability (thus, to living with taste). One sees from this that luxury is detrimental to the art of living, and the expression 'he knows how to live', when used of a wealthy or distinguished man, signifies the skillfulness of his choice in social enjoyment, which includes moderation (sobriety) in making pleasure mutually beneficial, and is calculated to last. (Kant, 2006, p. 250)

Food intake is one of the factors that should facilitate physical and mental health. It has already been noted above that Kant ate lunch in company. This dinner party, which Kant regularly organised in his house in Königsberg from 1786, is not only an expression of a social event but also evidence of Kant's insight into the connection between body and soul. In addition to physical satisfaction, the mind is stimulated by the conversation.

> When I manage a dinner party composed of nothing but men of taste (aesthetically united), in so far as they intend not merely to have a meal in common but to enjoy one other's company (this is why their number cannot amount to many more than the number of graces), this little dinner party must have the purpose not only of physical satisfaction – which each guest can have by himself alone – but the social enjoyment, for which physical enjoyment must seem to be only the vehicle. That number is just enough to keep the conversation from slackening or the guests from dividing into separate small groups with those sitting next to them. (Kant, 2006, p. 278)

The dinner party was mainly attended by younger men from various disciplines. The fact that women were not present at his table is certainly a major shortcoming. Kant also comments on this in a footnote and fears that the presence of a lady may restrict the conversation or inhibit the men, leading to what we would call today an awkward silence that overtakes the dinner party (Kant, 2006, p. 278). However, Kant's reflections on table society show how important social life was to him. The fact that health is always an expression of a socio-political aspect is also shown when Kant recognises health as a task of the government. This aspect is examined in the fourth and final paragraph.

Health as a government matter

As a member of the medical faculty, the physician is not only committed to the health of the human body but also to legal requirements. Kant elaborates on this observation in his essay, *The Conflict of the Faculties*. Here, he shows the differences between the faculties of the university and describes their conflicts with

each other. This late treatise is the last work published by Kant himself. It is not a systematic, epistemological work but a popular writing that draws attention to an educational policy problem. In the university, there are the upper faculties, which include theology, law, and medicine. Furthermore, there is the philosophical faculty, primarily committed to the truth. This is not about usefulness, but the philosophical faculty can research and teach freely and without authority. The higher faculties, including the medical faculty, have to justify themselves to the government. The doctor is, therefore, always bound by legal requirements. It is, therefore, still relevant today what Kant stated as early as 1798: that the government has an interest in the health of the people.

> But since the way physicians deal with the people's health must be of great interest to the government, it is entitled to supervise their dealings with the public through an assembly chosen from the businessmen of this faculty (practicing doctors) – *a board of public health* – and through medical regulations. (Kant, 2012b, 7:26)

Thus, the political dimension of medicine is also relevant in Kant's thinking, and the role of the state in health is repeatedly thematised by Kant. The preservation of health is a governmental matter, as Kant also demands in the *Conflict of the Faculties*. Kant also repeatedly criticised the relationship between government and medicine. The relationship between the state and medicine continues to be a topic in current politics in the course of various reforms, as well as in scientific publications. The anthology by Sigrid Graumann and Katrin Grüber provides a comprehensive overview of the various aspects and disciplines for a fair organisation of the healthcare system. Economic conditions and distributions play a special role here (Graumann & Grüber, 2004). The term "health policy" (German: *Gesundheitspolitik*) also bears witness to the connection between medicine and politics, already recognised by Kant and the associated goal that health policy reforms should always be in harmony with respect for patients' rights.[10]

Another political issue of the time was smallpox vaccination, which Kant discusses in his "Theory of Virtue" in the context of suicide. Kant asks whether smallpox vaccination was morally justified at all, as it could also have fatal side effects.

> Anyone who decides to be vaccinated against smallpox puts his life in danger, even though he does it *in order to preserve his life*; and, insofar as he himself brings on the disease that endangers his life, he is in a far more doubtful situation, as far as the law of duty is concerned, than is the sailor,

[10] A definition of this term and further literature can be found on the homepage of the German Federal Centre for Health Education (https://leitbegriffe.bzga.de/alphabetisches-verzeichnis/gesundheitspolitik/).

> who at least does not arouse the storm to which he entrusts himself. Is smallpox inoculation, then, permitted? (Kant, 1996, p. 424)

Kant fails to provide a concrete answer here. There are other ambivalent statements that show that Kant did not take a clear position on vaccination in view of its side effects. However, it was clear to him that vaccination had to be prescribed by the government. Lambros Kordelas and Caspar Grond-Ginsbach analyse the passages in which Kant deals with smallpox vaccination and show the ethical implications that this had for Kant. They also describe the historical development of smallpox vaccination in the 18th century. The authors formulate the aim of this text as being to provide a systematic orientation aid for current controversies in medical ethics (Koredlas & Grond-Ginsbach, 2000). During the years of the global coronavirus pandemic, the public media and politicians repeatedly referred to Kant in order to legitimise or not legitimise vaccination against COVID-19. In 2022, German Health Minister Prof. Dr Karl Lauterbach campaigned for corona vaccination, referring to Kant's Categorical Imperative:

> From my point of view, it can be assessed as follows: Anyone who refuses the vaccination offer is actually violating the moral precept of the categorical imperative as defined by Immanuel Kant. Such a refusal could never be the maxim of action for all of us. If we all refused to use the well-researched and low-side-effect vaccination to protect ourselves and others from death and serious illness, we would probably never be able to end the pandemic.[11]

In an article in the newspaper *Die Welt*, however, Kant researcher Dieter Schönecker surmises that Kant would not have allowed himself to be vaccinated. Schönecker's arguments mainly centre on compulsory vaccination. Since, for Kant, this would be a duty of virtue and not a legal obligation, it is unlikely that Kant would have agreed to compulsory vaccination by the state. Moreover, Kant does not see vaccination in the context of protecting other people; rather, he sees vaccination as something that could benefit or harm his own life, as vaccination (then as now) also harbours considerable risks. Kant thus discusses smallpox vaccination exclusively in the context of the duty towards oneself. If it could injure or kill the self, then it is not permitted. The conclusion of Schönecker's considerations is, therefore, that Kant could not justify compulsory vaccination by the state (Schönecker, 2021).

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[11] Lauterbach, 2022, January 13, translated by A. Sell

Conclusion

These four aspects form the core of Kant's concept of health. Health is linked to a healthy mind or common sense. A healthy common sense enables life in a community. If the mind is disturbed or ill, the individual is isolated and can no longer actively participate in social life. Kant says that man has the desire for a long life and health. This desire has its origin in the mind. A healthy lifestyle should ensure that this desire can be fulfilled. The importance of individual lifestyle behaviour for health is also relevant in contemporary medicine. In this sense, G. A. Fava also speaks of patients as 'health producers', as they can promote their own health through healthy behaviour (practising regular physical activity, not being overweight, following sound nutrition, getting adequate sleep, and refraining from smoking and substance abuse). This connection between individual activity and health ties in with Kant's dictum of living responsibly, even though Kant is not explicitly mentioned here. Fava also shows that psychosomatic medicine can play an important role in his illuminating essay, which also traces the developments of these medical methods in the USA in recent years (Fava, 2023).

However, it can also happen that a person feels healthy but is not healthy. The subjective feeling of health can be deceptive. Furthermore, Kant reports of friends who thought they were healthy but were ill (Kant, 2012b, 7:100). People cannot fulfil the desire for health on their own, but health is also linked to a form of publicity, so the political dimension of health is also addressed here. We thus find here the formulation of a preliminary form of a welfare state and a general health insurance scheme. Kant's comments on health are significant, as he assumes that body and mind influence each other. A healthy mind can have an effect on physical health, and the body can have an influence on the mind. This interaction is also reflected in the relationship between physician and philosopher. Both have different tasks, but their activities are also intertwined by the connection between body and mind: "[T]he doctor is qualified to treat the disordered mind by measures applied to the body; the philosopher, to treat the body through the influence of the mind" (Kant, 2007, 15:943).

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SAŽETAK

Ovaj rad ispituje Kantov koncept zdravlja s četiri stajališta. Prvi dio: Kant govori o zdravlju prvenstveno što se tiče zdravoga ljudskog razumijevanja (njem. gesunder Menschenverstand) i zdravog razuma (gesunde Vernunft). Koncept zdravlja je, dakle, uglavnom epistemološki pojam. Drugi dio: Zdravlje je u kontekstu bolesti. Za Kanta je bolest uvijek povezana s nedostatkom kognitivnih sposobnosti. Kantova razmišljanja o bolesti i zdravlju mogu se pronaći prije svega u njegovim kasnim spisima "Antropologija u pragmatičnom pogledu" (1798.) i "Spor fakulteta" (1798.). Treba uključiti i rani rad "Zapažanja o bolestima glave" (1764.) i govor "O medicini tijela za filozofe" (1786.). Budući da je zdravlje prvenstveno u kontekstu spoznaje, mentalne su bolesti u središtu Kantova djela. Treći dio: Kant uzastopno predstavlja svoje zdravstveno stanje kao primjer. Kada je Kant napisao vlastitu „dijetetiku" kao odgovor na "Makrobiotiku ili umijeće produljenja ljudskog života" Christopha Wilhelma Hufelanda, postalo je jasno da je postizanje tjelesnog zdravlja također povezano s mentalnim zdravljem. Uostalom, možemo govoriti o psihosomatici. Četvrti dio: Za Kanta je očuvanje zdravlja i zadatak vlade. Ta politička dimenzija zdravlja očita je u Kantovim spisima. Ovo otkriće psihosomatike dio je medicinsko-povijesnog konteksta koji između ostalog potječe od Kanta, a koji još uvijek nije dovoljno istražen.

***Ključne riječi**: Kant, medicina, zdravlje, bolest, psihosomatika*

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HYPOCHONDRIA AS A DISTRACTION OF THE REASON WITHIN KANT'S TRANSCENDENTAL PHILOSOPHY

HIPOHONDRIJA KAO RASTRESENOST UMA UNUTAR KANTOVE TRANSCENDENTALNE FILOZOFIJE

Franjo Mijatović[*]

SUMMARY

The primary aim of this paper will be to understand hypochondria as a philosophical problem, rather than a medical-psychological one, since there is a significant difference between the modern (medical-psychological in the true sense of the word) understanding of hypochondria and all earlier anthropological, philosophical, and physiological understandings, including that of Kant. Kant's interpretation of hypochondria, as a mental illness, highlights an interesting dichotomy between actual bodily sensations and distorted perception. The hypochondriac experiences real physical sensations but interprets them in a way that is not grounded in actuality. Kant argues that these sensations result from the (lack of) attention the hypochondriac gives to certain physical signals. On the other hand, if one were to focus their attention on something else or engage in activities that distract their thoughts from pathological feelings, the feelings could diminish and, with enough composure, even disappear entirely. One of the key problems with hypochondria is that rational arguments often cannot change the beliefs of a person who feels symptoms in their body and mind. In order for a person to regain control over themselves, Kant turns to the principles of moral and philosophical dietetics. Therefore, this paper will specifically follow two aspects: Kant's scattered analysis of hypochondria and its transcendental philosophi-

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cal assumptions. Conclusions from transcendental philosophy should help in overcoming hypochondriac whims.

Keywords: *Kant, hypochondria, sense, sensation, perception, imagination, reason*

Introduction

According to recent medical manuals on mental disorders (DSM-IV), hypochondria falls under the category of psychological disorders, specifically those involving excessive concern and fear of serious illness based on the interpretation of bodily symptoms and feelings without any objective foundation. Today, the issue of hypochondria is approached solely from a medical-psychological perspective. Even with the current and daily advancements in science, it cannot be definitively stated what the fundamental problem of hypochondria is or how to treat it, if it can even be adequately treated since hypochondria has no exclusively physical cause. Its roots are manifold. Due to the difficulty in easily defining and locating it, hypochondria is subject to many interpretations. As a psychological abnormality, rather than a pathological condition of the body, hypochondria holds a significant place in the philosophy of Immanuel Kant, especially in his works *Essay on the Maladies of the Head, Anthropology from a Pragmatic Point of View*, and *The Conflict of the Faculties*.

The main goal of this paper[1] will be to understand hypochondria as a philosophical *problem* rather than a medical-psychological one, as there is a significant difference between the modern (in the true medical-psychological sense of the word) understanding of hypochondria and all earlier anthropological, philosophical, and physiological understandings, including Kant's. The difference is primarily qualitative. Kant considers hypochondria a mental illness, or a particular form of "the fantastic mental condition" (Kant, 2011a, p. 211; 2:266), i.e. "as the morbid preoccupation with inner sense, potentially creating an overly active and possibly 'woeful' imagination"(Kiblinger, 2015, p. 210). In his works, Kant provides a descriptive systematic division of *mental deficiencies* and *mental illnesses*, based on his own *mechanical* body and experience of hypochondria. In *The Conflict of the Faculties*, Kant precisely summarizes the complexity of hypochondria as a mental weakness when he says:

> I myself have a natural disposition to hypochondria because of my flat and narrow chest, which leaves little room for the movement of the heart and lungs; and in my earlier years this disposition made me almost weary of life. But by reflecting that, if the cause of this oppression of the heart was purely mechanical, nothing could be done about it, I soon came to pay no

[1] "This work has been fully supported by the Researcher support fund of the Faculty of Medicine in Rijeka".

> attention to it. The result was that, while I felt the oppression in my chest, a calm and cheerful state prevailed in my mind […]. But I have mastered its influence on my thoughts and actions by diverting my attention from this feeling, as if it had nothing to do with me. (Kant, 1979, p. 189; 7:104)[2]

This quote, where Kant self-diagnoses hypochondria while discussing its effects on his body and mind, can be considered a starting point for further discussion of hypochondria. Although at first glance, his self-diagnosis may seem unusual and unconventional, his texts on illnesses of the soul and cognitive faculties are significant and useful in combating "hypochondriacal exhalations" (Kant, 1992, p. 305; 2:317). They are characteristic for yet another reason: "to learn how to avoid blatant extravagance" (David-Ménard, 2000, p. 87). Kant vividly describes what distracts every hypochondriac:

> a kind of insanity; for though some sort of unhealthy condition (such as flatulence or constipation) may be the source of it, this state is not felt immediately, as it affects the senses, but is misrepresented as impending illness by inventive imagination. (Kant, 1979, p. 187; 7:103)

In hypochondriacs, personal experience and interpretation of symptoms outweigh any external rational analysis or medical explanation. Kant was well aware of this. That is why his personal experience with hypochondria is very important.

However, Kant's reflection on hypochondria should be viewed in the context of his overall philosophy, i.e., transcendental philosophy and critical philosophy (Kiblinger, 2015). Although Kant's transcendental philosophy differs from modern psychological approaches, it provides a unique perspective and solutions for hypochondria, seeing it as a challenge that the reason must overcome in order for an individual to develop into a mature and moral being (Moran, 2023), while emphasizing the need for self-control (Vujošević, 2020), the cultivation of one's emotions (Thomason, 2017) and taming the imagination (Kiblinger, 2015). His writings: *Essay on the Maladies of the Head, Anthropology from a Pragmatic Point of View, and The Conflict of the Faculties* will be key not only for understanding the phenomenon of hypochondria itself but also for the broader philosophical implications these works carry, such as issues of perception, imagination, voli-

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[2] In that context, Kiblinger writes: "Kant's attention to his lifelong struggle with hypochondria represents for him the lived and self-aware experience of the liminal status of the imagination, which, as the mediating link between sensibility and understanding, is poised on the boundary between bodily existence and mental or spiritual life. The ambiguous status of hypochondria as both bodily and spiritual (geistig) is precisely the characteristic that makes it significant as a part of Kant's intellectual, and not just personal, biography" (Kiblinger, 2015, p. 208).

tion, self-mastery (Grinnell, 2010), apperception, maxims, and the philosophical dietetics and therapeutics of hypochondriacal states. Further research into this Kantian concept could contribute to a better understanding of various psychoanalytic, philosophical, and existential interpretations of hypochondria, as well as of other mental disorders such as hysteria, melancholy, schizophrenia, paranoia, etc. For example, the *madman* is clearly distinct from the *amentia*, who are incapable of connecting their presentations in the way necessary for the possibility of experience. Thus, Kant's analyses are consistent with current knowledge in psychiatry (Rauer, 2007).

The novelty of Kant's idealism lies in his emphasis on human dependence on sense experiences. However, regardless of how the individual senses function, Kant's argument in *Critique of Pure Reason* does not rely on the human sense apparatus as a whole or on the nature of individual senses as premises. He is not concerned with the specific structure and functioning of the senses but with epistemological argumentation that fundamentally depends on sensuality. From an epistemological standpoint, one could already assert that (analogous to Swedenborg's visions of spirits) hypochondria does not concern a sensory illusion, as Kant's epistemology leaves no room for deception of sensibility. Finally, it is important to mention the mind's characteristic in relation to hypochondria:

> that with the assistance of the power of the imagination it can concoct desires not only without a natural drive directed to them but even contrary to it, which desires in the beginning receive the name of concupiscence; but through them are hatched bit by bit, under the term voluptuousness, a whole swarm of dispensable inclinations, which are even contrary to nature. (Kant, 2007a, p. 165; 8:111)

One of the key problems with hypochondria is that rational arguments often cannot change the beliefs of a person who feels symptoms in their body and mind. For further consideration, it will be necessary to follow two aspects: a) Kant's analysis of hypochondria in his works, and b) his theory of knowledge and its transcendental philosophical presuppositions. Conclusions from transcendental philosophy should help in understanding the role of the reason and feelings in creating a hypochondriacal state.

Hypochondria – an empty whim?

In Kant's works, there is no textual passage of several pages specifically dedicated to hypochondria, nor a separate essay on the subject, although hypochondria in the true sense of the word was a widespread illness among the bourgeoisie of

the 18th century (Grinell, 2010), with a strong element of narrative dramatization (Flucher, 2023). Kant's references to hypochondria are mostly brief or occasionally longer remarks, such as in the *Essay on the Maladies of the Head*. From this perspective, it seems that for Kant, hypochondria, which he himself suffered from, as mentioned in the introduction, did not present a truly challenging problem. Thus, in *Essay on the Maladies of the Head*, Kant mockingly refers to hypochondria as simply "an empty whim" (Kant, 2011a, p. 211; 2:266), which arises from "pathological feelings" (Kant, 1979, p. 187; 7:103). As an internal burden, it should not influence our thoughts and actions because it is a matter of exaggerated and unfounded sensations. It involves chimeras that disturb our emotions, or as Kant puts it:

> The chimeras, which this malady hatches do not properly deceive the outer senses but only provide the hypochondriac with an illusory sensation of his own state, either of the body or of the soul. (Kant, 2011a, p. 211; 2:266)

Mental activity must evoke a deeper sense of life that transcends physical weaknesses. In hypochondria, this positive effect of observing the body is absent. Instead, even the tiniest physical sign can lead to the assumption of a serious illness, almost as if the hypochondriac is actively seeking signs of disease. When changes or symptoms are noticed, the hypochondriac already experiences the corresponding illness. According to Kant's transcendental philosophy, we should focus on the reason and isolate only those parts of thought that originate from the reason.

> On the other hand, no one can deny
>
> that all representations in us, whether they are objectively merely sensible or else entirely intellectual, can nevertheless subjectively be associated with gratification or pain, however unnoticeable either might be (because they all affect the feeling of life, and none of them, insofar as it is a modification of the subject, can be indifferent). (Kant, 2000, pp. 158–159; 5:277)

In this internal activity, the presentation is entirely related to the subject, specifically to his feeling of life as a feeling of pleasure or displeasure. According to Epicurus, whom Kant references, feelings such as pleasure or displeasure (pain), although psychological in nature, are essentially physical, as life is reduced to the awareness of existence, not necessarily to the feeling of well-being or discomfort. However, Kant believes that life is a constant struggle between pleasure and displeasure (pain), which makes life a scheme of stimuli and responses. When this understanding is connected with the progress of recognising feelings of pleasure and displeasure as an independent faculty, the feeling in *Critique of the Power of Judgment* even helps explain the concept of life. For life, it is essential to have "a

feeling of well- or ill-being, i.e., the promotion or inhibition of the powers of life" (Kant, 2000, p. 159; 5:278). Before pain becomes "the incentive of activity" (Kant, 2006, p.128; 7:231), it must first be felt as such, which falls under the jurisdiction of feeling. The faculty to understand does not arise only from outer senses, although they are the starting point in our interpretation of the world and actuality. While external objects may be necessary for developing a certain self-awareness, it is not necessary that every intuitive representation of these objects always includes their actual existence. This interpretation of feeling is the fundamental problem for the hypochondriac.

Although hypochondria is difficult to define with certainty, as this disorder is deeply rooted in the complex aspects of the human psyche, including imagination, will, and compulsion (Grinell, 2010), it is indeed a mental illness and a distressing condition. Hypochondria relates not only to physical symptoms but also to the ways in which a person shapes their perception of themselves. Furthermore, the body is subject to unpredictable changes and degradations that affect health and general well-being. For this reason, hypochondria is not merely a matter of physical condition but also a reflection of internal psychological and emotional processes (Thomason, 2017). It involves constant anxiety and concern about one's health, even when there are no clear medical reasons for concern (Fuchs, 2015). Every thought or perception, no matter how imperceptible, touches upon our feeling of existence, either through pleasure or through displeasure (pain). Here, Kant recognises the double-edged sword of hypochondria: while it may disrupt our enjoyment of life (Schreiner, 2003), it is nonetheless an inevitable part of the human experience, reminding us of the fragility of both mental and physical states.

Thus, in *Anthropology from the Pragmatic Point of View*, Kant, when discussing illnesses of the soul, including hypochondria, emphasises another key aspect of the hypochondriac experience: thoughts. Under the title *On Mental Deficiencies in the Cognitive Faculty*, Kant writes:

> Illnesses of the soul with respect to the cognitive faculty can be brought under two main types. One is *melancholia* (hypochondria) and the other is *mental derangement* (mania). With the *former*, the patient is well aware that something is not going right with the course of his thoughts, in so far as his reason has insufficient control over itself to direct, stop, or impel the course of his thoughts. (Kant, 2006, p. 96; 7:202)

Two things are important: first, the person is aware that something is wrong with their body and reason, and second, the person feels that their thoughts are not flowing correctly, but at the same time, they cannot direct that feeling towards something else. Kant's interpretation of hypochondria highlights an interesting

dichotomy between physical sensations and distorted perception. The hypochondriac experiences real physical sensations but interprets them in a way that is not grounded in actuality. Kant argues that these sensations result from the undue attention the hypochondriac pays to certain physical signals. On the other hand, if the person directed their attention to something else or occupied themselves with something that diverted their thoughts, the feelings might weaken, and with enough focus, even completely disappear. "The first freedom is attention: hypochondria epitomizes the skill and danger of attention" (Kiblinger, 2015, p. 211).

In contrast, control over the body is absent, which then opens up space for human imagination that "(as fantasy) plays just as frequently with us, and sometimes very inconveniently" (Kant, 2006, p. 68; 7:175). The hypochondriac thus becomes trapped in these fantasies, as they cannot rationally refute them and cannot free themselves from their influence, leading to a state of constant distraction.

> Thus to distract oneself without being distracted is an art that is not common. If distraction is habitual, it gives the human being who is subject to this ill the appearance of a dreamer and makes him useless to society, since he blindly follows his power of imagination in its free play, which is not ordered by any reason. (Kant, 2006, p. 102; 7:208)

Therefore, hypochondria is not only a matter of sensations but also the way in which a person interprets those sensations through imagination. Kant's concept of fantasy involves involuntary ideas that arise through the power of imagination and play a key role, not only in creating fantasies but also in shaping ideas in general, even when the object of those ideas is not present. These fantasies evade the criticism of the reason because they appear to stem from real physical sensations. Since these fantasies are so strong that the person experiences them as actuality, it is understandable that it is difficult "to deceive the deceiver in ourselves" (Kant, 2006, pp. 42–43; 7:151), and even harder to distance oneself from one's immediate experiences.

Fantasy – where's the problem?

Kant categorises mental disorders according to three fundamental mental faculties: reason, understanding, and the power of judgment. According to these mental faculties,

> The frailties of the disturbed head can be brought under as many different main genera as there are mental capacities that are afflicted by it. I believe to be able to organize them all together under the following three divisions: first, the reversal of the concepts of experience in *derangement*, second,

> the power of judgment brought into disorder by this experience in *dementia*, third, reason that has become reversed with respect to more universal judgments in *insanity*. (Kant, 2011a, p. 210; 2:264)

Psychological suffering, such as that found in hypochondria, can be attributed to the disorder of one of these faculties: "the reversal of the concepts of experience in *derangement*" (Kant, 2011a, p. 210; 2:264). One of the key contexts for understanding "the reversal of the concepts of experience in *derangement*" is Kant's critique of occultist ideas of his time, particularly those advocated by E. Swedenborg, who claimed to communicate with spirits. In several parts of his work, Kant draws parallels between Swedenborg's visions of spirits and hypochondria as an illusion of illness. He somewhat sarcastically describes the disorders of both as "hypochondriacal exhalations" or "a hypochondriacal wind" that rages "in the guts", creating "heavenly inspiration" (Kant, 1992, p. 336; 2:348). Like spiritual seers, hypochondriacs see things that no one else sees because "their heads were already filled with them beforehand" (Kant, 1992, p. 347; 2:360). These false beliefs and perceptions are not signs of a spiritual experience but rather the result of mental states that distort our perception of actuality. It is this distorted perception of actuality that leads the hypochondriac into a state of constant discomfort and unease. They do not trust their feelings but are paradoxically completely obsessed with them. Real sensations become the source of fantasies about serious illnesses, further complicating the distinction between the real and the imaginary. A closer observation reveals that the chimeras of spiritual seers are also fantasies arising from the waking state, where the natural focus on sensible impressions is overridden. Similarly, the hypochondriac, even though aware that their symptoms are imaginary, cannot free themselves from the feeling of their presence. It is futile to try to convince a spiritual seer that their spirits are merely products of the imagination. In the same way, it is impossible to dissuade a hypochondriac from the belief in the existence of the illness that troubles them. Both are convinced that their experiences are real perceptions, even though their sense organs and power of judgment suggest otherwise.

However, there is a crucial difference between hypochondriacs and spiritual seers. While hypochondriacs are somewhat "aware that it is imaginary, but every now and then he cannot refrain from regarding it as something real" (Kant, 2006, p. 106; 7:212), the spiritual seer fully believes in their visions. This phenomenon shows how fragile and prone to error human perceptions can be, whether in dreams or the sensibility of a hypochondriac. In both cases, actuality and imagination intertwine in a way that confuses the reason, leading the unreal to be perceived as real, "for it would be in vain to set rational arguments against a sen-

sation or that representation" (Kant, 2011a, p. 210; 2:265). Sense experiences are so deeply rooted in our perception of actuality that even logical conclusions of the reason seem powerless.

Kant is even more precise in his *Essay on the Maladies of the Head*, where he says:

> At least someone bewitched by these chimeras can never be brought by reasoning to doubting the actuality of his presumed sensation. One also finds that persons who show enough mature reason in other cases nevertheless firmly insist upon having seen with full attention who knows what ghostly shapes and distorted faces, and that they are even refined enough to place their imagined experience in connection with many a subtle judgment of reason. This property of the disturbed person, due to which, while being awake and without a particularly noticeable degree of a vehement malady, he is used to representing certain things as clearly sensed of which nevertheless nothing is present, is *derangement*. (Kant, 2011a, p. 211; 2:265)

In the context of *Dreams of a Spirit-Seer, Illustrated by Dreams of Metaphysics*, the intensity of the images that appear without the influence of sense organs is the decisive factor for the degree of fantasy. Chimeras that arise in the dream state are not the result of stimuli received through the sense organs but are autonomous products of the reason, which recede only upon awakening, when the stronger certainty of the sense organs such as sight, hearing, and touch, which Kant describes as objective, takes over. At first glance, there seems to be a clear distinction between the images in dreams and the sensations of the hypochondriac in the waking state. While the sense organs in sleep are almost entirely inactive and send no data, the sensations of a hypochondriac patient may seem to be the result of real stimuli coming through the senses, especially sight and touch, and influencing cognitive faculties. "*The senses do not confuse*" (Kant, 2006, p. 35; 7:144) because they do not judge. Although feelings manifest in sensibility, they originate in the pure reason that governs will (Klemme, 2014).

The particular difficulty with Swedenborg's vision of spirits lies in the fact that he reports on things and circumstances he claims to actually perceive. The question that arises is how Kant can determine what constitutes valid experience. If Swedenborg indeed claims to experience spirits as real sensible impressions, such impressions cannot simply be dismissed as mere speculation. However, Kant refuses to take Swedenborg's claims seriously, considering him "the arch-spirit-seer of all spirit-seers" (Kant, 1992, p. 341; 2:354). In this context, the concepts of madness and fantasy become significant, as it is necessary to distinguish cognitive faculties in the dream state from those in the waking state (Kohns, 2007). Yet

the question remains: how do we define the difference between the sensations in dreams and those we experience while awake, and what leads us to perceive some as real and others as fantasy? Kant's stance is clear. The reason follows the same laws in both the dream and waking states. The difference between the waking state and the dream state lies not in the laws of cognition but in the intensity of sensible impressions. While in the waking state sense stimuli are stronger and override illusory images, in sleep, these stimuli are absent, allowing fantasies to dominate. In the waking state, we have the faculty to critically reflect on what we perceive, enabling us to distinguish them from real experiences. However, the problem arises when this control is absent, for

> the soul of every human being is occupied even in the healthiest state with painting all kinds of images of things that are not present, or with completing some imperfect resemblance in the representation of present things through one or another chimerical trait which the creative poetic capacity draws into the sensation. (Kant, 2011a, p. 210; 2:264)

According to Kant, sense, the synthesis of apprehension, and imagination should resolve the question of the relationship between perception and the sensation.

Imagination as a mediator between perception and sensation

Our knowledge is not merely a product of pure sense experience nor exclusively of intellectual concepts. Imagination acts as a mediator, allowing the creation of images and representations by linking general concepts of understanding with concrete sense experiences. Imagination is a necessary and integral part of "perception itself" (Kant, 2007d, p. 239; A120). Kant's concept of imagination is not just the faculty to mentally visualize. It is an active force that structures and organizes raw data from our senses to make them meaningful. Without imagination, our experience would be fragmented and disjointed, as general concepts and individual sensations would remain separate. Therefore, imagination ensures the coherence and continuity of our experience (Russell, 2024), enabling us to form a unified picture of actuality.

On a methodological level, Kant, in his *Transcendental Deduction,* explains how imagination functions as spontaneity, connecting various aspects of intuition "as the synthesis of apprehension". The counterpart (not in the literal sense, as it ultimately concerns "one and the same spontaneity") is the synthesis of apperception, which – already contained within the categories – intellectually connects the

manifold of intuitions in the understanding (Kant, 2007d, p. 262; B162). Both of these faculties, the synthesis of apprehension and the synthesis of apperception, must be linked in order to "bring combination into the manifold of intuition" (Kant, 2007d, p. 262; B162). The synergy that imagination creates between different intuitive elements allows us to recognize and understand complex objects and events in our experience. For example, the perception of a house in space or the change of water states over time requires imagination to connect various pieces of information to create a coherent representation of these objects and processes. This connection allows us to understand space and time as structured dimensions that organize our perception.

Understanding reproductive imagination is crucial for hypochondria. According to Kant's classification, reproductive imagination refers to the faculty to remember and reproduce previous experiences by relying on already existing images. On the other hand, productive imagination can create new ideas or representations, but it still relies on material from already known experiences, as it cannot create something that has never existed in sense experience. A hypochondriac typically either has a specific image of an illness or is at least familiar with the experience of illness in general. Imagination, as the synthesis of apprehension, participates in the process of connecting different elements. However, neither productive nor reproductive imagination is creative. Reproductive imagination does not create real sensations or external objects (Horstmann, 2018) but merely repeats or modifies them based on previous experiences. Although a hypochondriacal patient may have a strong sense of being ill, this feeling does not necessarily reflect their actual health status, since "'untamed' imagination […] is a dangerous and misleading power" (Kiblinger, 2105, p. 203).

> From the fact that the existence of outer objects is required for the possibility of a determinate consciousness of our self, it does not follow that every intuitive representation of outer things includes at the same time their existence, for that may well be the mere effect of the imagination (in dreams as well as in delusions); but this is possible merely through the reproduction of previous outer perceptions, which, as has been shown, are possible only through the actuality of outer objects. (Kant, 2007d, p. 328; B278)

The experiences of illness in hypochondriacs may be deeply rooted in their reproductive imagination, which uses prior knowledge and fears and transforms them into a belief about their own illness. However, imagination itself cannot create real sensations or physical illnesses; it only reconstructs and potentially exaggerates what is already known (Holzhey-Kunz, 2017). The existence of external sensations, through the receptivity of sense organs and reproductive imagination,

influences our faculty to form a clear awareness of ourselves (Russell, 2024). If the power of imagination were actually counted among sensible faculties, it would cause problems for its reproductive function (e.g., in association), given its character as receptivity, which is opposed to any activity. In that case, productive imagination is no longer receptivity but spontaneity, as the understanding of sensibility occurs in its synthesis. In this way, space and time as intuition become only possible. Imagination and its effects, or products (space and time), must be placed between the higher cognitive faculty (reason) and the lower cognitive faculty (sensibility) as mediators.

Subjectivity of feeling and objectivity of the mind

In contrast to sensation, and in order to thoroughly examine a hypochondriac on a transcendental philosophical level, which is the goal here, Kant's claims about perception are of crucial importance. "Perception is empirical consciousness, i.e., one in which there is at the same time sensation" (Kant, 2007d, p. 290; B207). Sensation, the synthesis of apprehension and imagination, must be connected with transcendental apperception and occur in accordance with the categories. The discussion Kant began in the *Critique of Pure Reason* continues in *Anthropology from a Pragmatic Point of View*, stating that inner sense is not pure apperception, which is called original or transcendental and is distinguished from empirical apperception. If empirical apperception can be called inner sense (Kant, 2007d, p. 232; A107), it should not be overlooked that inner sense fully belongs to the receptive side of inner perception, allowing the human mind to be "affected by the play of his own thoughts" (Kant, 2006, p. 53; 7:161). On the other hand, pure apperception fully belongs to the spontaneity of the reason and is the ultimate reason why the material resulting from inner sense through affection serves as a component of empirical apperception.

> The manifold that is given in a sensible intuition necessarily belongs under the original synthetic unity of apperception, since through this alone is the **unity** of the intuition possible (§ 17). That action of the understanding, however, through which the manifold of given representations (whether they be intuitions or concepts) is brought under an apperception in general, is the logical function of judgments (§ 19). Therefore, all manifold, insofar as it is given in **one** empirical intuition, is **determined** in regard to one of the logical functions for judgment, by means of which, namely, it is brought to a consciousness in general. But now the **categories** are nothing other than these very functions for judging, insofar as the manifold of a given intuition is determined with regard to them (§ 13). Thus, the man-

> ifold in a given intuition also necessarily stands under categories. (Kant, 2007d, p. 252; B143)

To observe and assess the state of one's body, we need observations that arise from outer sense.

> By means of outer sense (a property of our mind), we represent to ourselves objects as outside us, and all as in space. In space, their form, magnitude, and relation to one another are determined, or determinable. (Kant, 2007d, p. 157; B37)

The perception of certain concerning changes occurs according to the criteria of outer sense. For a hypochondriac, his sensations display a reality that, according to Kant's teaching, belongs to the category of quality, but actuality (as a modality) requires the category of relation. While the concept of actuality can initially be understood as all that is, this concept must further be divided into the corresponding modality of being, i.e., into possibility and necessity. Dreams and illusions are opposed to actuality. From an epistemological perspective and apart from transcendental philosophy, the state of the hypochondriac and the method of observation are both subject and object (Reinhart, 2022). In the case of the hypochondriac, his bodily sensations become unreliable for judging sickness or health. While objects and things in the external world can be evaluated from different perspectives, the patient's personal condition is unchangeable and cannot be viewed outside of his own experience. The hypochondriac is in a unique position. He is both the observer and the observed.

When it comes to cognition, the subject requires a criterion of truth outside of himself, otherwise, any claim to knowledge would be arbitrary. This criterion, in the theoretical field, is the reference of all judgments to the *a priori* form of sensibility, which Kant emphasizes in *Critique of Pure Reason*, not as an anthropological fact, but as a feature of the human knowing reason. Therefore, Kant will define sensibility in *The Metaphysics of Morals* generally "as the subjective aspect of our representations" (Kant, 1991, p. 40; 6:212). However, Kant faces a problem when trying to reconcile this subjectivity with the fact that cognition and desire also have an objective dimension of representation, as they are connected to how we represent the external world. On the other hand, feelings (such as pleasure and displeasure) are not related to external objects but only to the internal state of the subject. How, then, do different aspects of the human reason, such as cognition,

desire, and feelings (Frierson, 2014), interact with each other, and how do they differ in their connection to subjective and objective realities?[3]

Every feeling is sensible and represents "the receptivity of the subject" (Kant, 2006, p. 45; 7:153). However, as a feeling, this sensibility is more precisely directed towards pleasure or displeasure, which cannot be further clarified or explained as they are absolutely subjective and have no connection to the object (Kant, 1991, p. 40; 6:211). Therefore, feelings can only be understood and "only inadequately explained through the influence that a representation has on the activity of the powers of the mind by means of this feeling" (Kant, 2000, p. 33; 20:232). Feeling, therefore, is nothing other than pleasure and displeasure, and pleasure and displeasure must not only be logically distinguished but must also be opposed. To emphasize the distinctness of feeling, Kant often stresses that the feeling of pleasure does not belong to the cognitive faculty but "lies outside the cognitive power altogether" (Kant, 2007d, p. 675; A801/B829). In *Critique of the Power of Judgment*, especially in *Analytic of the Beautiful*, Kant establishes that every relation of representations can be objective

> but not the relation to the feeling of pleasure and displeasure, by means of which nothing at all in the object is designated, but in which the subject feels itself as it is affected by the representation. (Kant, 2000, p. 89; 5:203)

Feeling is so exclusively subjective that even something as subjective as sensation, which represents the actual empirical representation of the object, is excluded; hence feeling is primarily distinguished from sense, which is defined as the receptivity of sensibility.

Kant's goal is to distinguish feeling as a particular form of sensibility from that associated with the power of cognition. Under the concept of sensation often used in this context, Kant constantly implied a sensuous and thus subjective representation, which, however, can also relate to the object for its cognition, and thereby, he undoubtedly meant the objective sensation of perception. The subjectivity of sensation is important not only for external but also, and primarily, for inner sensations to differentiate the subjectivity of feeling. This connection is actually much closer than with external sensations. Inner sense is also responsible as the organ of perception for providing the necessary material for perceiving my inner well-being, including my emotional mood. Accordingly, my aesthetic state also represents "the way in which inner sense is affected" (Kant, 1991, p. 201; 6:399).

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[3] "In *Anthropology* the correlation between mental disorder and Kant's tripartite account of the soul is clear, in that he structures his *Anthropology* in terms of cognition, feeling, and desire, and he includes specific mental disorders for each faculty"(Frierson, 2014, p. 199).

However, there is a danger of neglecting the distinction between the perception of feeling and what is perceived as mere feeling, as well as between inner sense and feeling. This is precisely the case in *Critique of Practical Reason*, where the feeling of pleasure and displeasure is marked as "a receptivity belonging to inner sense" (Kant, 2015, p. 49; 5:58). The addition of mere subjective feeling relevant to objective connections (within its own jurisdiction) must seem strange for inner sense.

However, in *Anthropology from a Pragmatic Point of View*, this connection is understood less ambiguously and far more precisely. In § 15, Kant explains that within the sensibility of the cognitive faculty, sense and imagination must be distinguished. Senses, before their individual processing, can still generally be divided into outer and inner sense:

> Outer sense is where the human body is affected by physical things; inner sense, where it is affected by the mind. It should be noted that the latter, as a mere faculty of perception (of empirical intuition), is to be thought of differently than the feeling of pleasure and displeasure; that is, from the receptivity of the subject to be determined by certain ideas for the preservation or rejection of the condition of these ideas, which one could call *interior sense* (*sensus interior*). (Kant, 2006, p. 45; 7:153)

In contrast, the approach to the subjectivity of other people or their view, which is necessary when speaking of action and its evaluation, is not analogous to this objectifying cognition. For instance, a parallel can be drawn with Kant's moral and practical philosophy. If the practical power of the reason is examined, the question arises as to what constitutes rational action. Since this must involve a self-imposed obligation by the subject to certain standards of practical rationality, as Kant's moral philosophy maintains, the unconditional necessity of the moral law cannot become real in action. The influence of all objectified representations, behaviours, and other objects must be excluded to securely assess and justify one's own actions.

However, in Kant, another approach can be found to address the problem of determining fundamental powers or faculties. Namely, if we observe the effects of our mind and their results, we notice, with the help of certain concepts, a significant difference among the representations present within it.

> For there is always a great difference between representations belonging to cognition, insofar as they are related merely to the object and the unity of the consciousness of it, and their objective relation where, considered as at the same time the cause of the reality of this object, they are assigned to the faculty of desire, and, finally, their relation merely to the subject, where they are considered merely as grounds for preserving their own existence

in it and to this extent in relation to the feeling of pleasure. (Kant, 2000, p. 11; 20:206)

The representations that can be attributed to cognitive and volitional faculties are objective in both cases; some relate to the object in a way that merely determines it, while others relate in a way that also makes that object real. In contrast, representations belonging to the feeling of pleasure and displeasure relate only to the subject and are, therefore, subjective, as are the perceptions of the hypochondriac.

Indissoluble connection between sensibility and reason

As a transcendental philosophical prerequisite, it is essential to briefly describe the complex structure of sensibility and sensation in their interaction with the power of judgment and the understanding in order to examine the structure of hypochondria as a mental disorder. Every being that possesses the capacity for desire is subject to natural-sense conditions, including humans. From the reason's perspective, sensibility is often an "obstacle"(Kant, 1991, p. 186; 6:380) to the rational conduct of life. This perspective can also be reversed. From the perspective of nature, when it comes to self-preservation and the pursuit of well-being, humans do not appear to be particularly privileged by the fact that they possess reason and will. If the contemplation of one's own well-being (happiness) were the only and true purpose of their existence, humans would be better off, for that empirical, natural purpose, relying on pure natural guidance rather than being subjected to "that weak and deceptive guidance" (Kant, 2011b, p. 19; 4:395) of reason. Regarding the natural mastery of existence, Kant, in the *Groundwork of the Metaphysics of Morals*, believes that reason "meddle(s) with Nature's purpose" (Kant 2011b, p. 19; 4:395). Namely, "that the more a cultivated reason engages with the purpose of enjoying life and with happiness" (Kant, 2011b, p. 19; 4:395), the more humans distance themselves from satisfaction, as reason itself multiplies human needs.

In the *Critique of Practical Reason*, Kant not only significantly reduces the previous argument but corrects a key and obvious mistake from the *Groundwork of the Metaphysics of Morals*. If instrumentalized reason truly clumsily *meddled* in mastering human existence, it is unclear how humans managed to become the most powerful beings, a status they owe primarily to their technical-practical reason. In the new argument, reason "has a commission from the side of his sensibility which it cannot refuse" (Kant, 2015, p. 52; 5:61). Although instrumental reason is no longer considered deceitful, Kant still emphasizes that

> reason […] in that case would only be a particular model nature used to equip the human being for the same end to which it has destined animals. (Kant, 2015, p. 52; 5:61)

If humans used reason "merely as a tool for the satisfaction of their needs as a sensible being" (Kant, 2015, p. 52; 5:61), despite its undeniable effectiveness, they would still be only a luxury of nature and, as such, fundamentally unnecessary. If reason were meant to serve humans "for the sake of what instinct accomplishes for animals" it would remain essentially within the domain of nature and therefore "in worth above mere animality […] without destining him to a higher end" (Kant, 2015, p. 52; 5:61).

The new argument in the *Critique of Practical Reason* avoids the obvious error in assessing the effectiveness of reason used merely as a tool but introduces a new weakness. Kant now emphasizes that humans are not completely animal to the point where they could be indifferent to everything reason itself dictates. Instead, humans actively participate and have an interest that cannot arise from the sensibility but must be articulated by reason itself. In this case, it is to be healthy and not to succumb to what sensibility suggests, as in the case of hypochondria.

On the other hand, we cannot delude ourselves into thinking that reason is given to us merely as a practical capacity that should influence our will. The true purpose of reason does not lie in its instrumental function aimed at natural goals but in its autonomous function and in good will, which is good in itself. From this perspective, humans carry within them a different world from the one in which they are placed. They are beings that stand between these two worlds or spheres and mediate between them. Therefore,

> the will stands halfway between its a priori principle, which is formal, and its a posteriori incentive, which is material as it were at a crossroads. (Kant, 2011b, p. 29; 4:400)

Humans are not compelled by what directly affects their sense organs to necessarily become the determinant of their will. They can follow representations, based on reason, of what is useful or harmful, regardless of whether "representations—whether sensations, intuitions, or concepts—can be obscure to varying degrees, whether degrees of consciousness or degrees of comprehension" (Russell 2024. p. 7). We know this faculty as a negative trait within us, that is, as a faculty that does not compel us to act based on stimuli. In this acknowledgment of the role of reason, Kant also brings forth the positive concept of freedom of will and, thus, the faculty of pure rationality, which by itself is meant to be practical.

Reason and its incentives do not have absolute, unchanging power of decision-making, just as stimuli do not have the force that necessarily compels, but only motivating strength. Human will is not necessarily determined by incentives. This is a fact that we humans are well aware of, as we often, despite knowing better, do not follow good or useful principles of rational life practice. Therefore, actions that are objectively recognized as necessary are subjectively contingent. Thus,

> the determination of the will of a rational being by grounds of reason, to which this will is not, however, according to its nature necessarily obedient. (Kant, 2011b, p. 45; 4:413)

Reason is capable of inventing many things because it is a power that "can extend itself beyond the limits within which all animals are held" (Kant, 2007a, p. 165; 8:112). With this capacity, humans are "on the brink of an abyss" (Kant, 2007a, p. 165; 8:112), as before them opens the infinity of objects toward which their desires can be directed, while the number of objects for satisfying their natural desires (within the limits of their instincts) is generally limited. It is appropriate to speak of the notion of an abyss because humans not only develop an entire range of ethical inclinations but also unnatural tendencies: they drink alcohol instead of water, eat processed food and sweets, inhale smoke, deceive themselves, and "find in themselves symptoms of every disease they read about in books" (Kant, 1979, p. 187; 7:103). Therefore, an individual himself determines what and how he will act, and in quite diverse ways,

> and indeed, thanks to the involvement of his understanding with his imagination and his senses, in so many ways and with such frequent changes that even if nature were to be completely subjected to his will it could still assume no determinate universal and fixed law at all by means of which to correspond with this unstable concept and thus with the end that each arbitrarily sets for himself. (Kant, 2000, p. 297; 5:430)

Kant's dietary advice in overcoming Hypochondria

Kant, in his reflections on hypochondria, particularly in his *Essay on the Maladies of the Head*, states that it can be treated "through some medication" (Kant, 2011a, p. 212; 2:266). In this regard, he almost mockingly claims that a few "pills containing bread crumbs" (Kant, 2006, p. 107; 7:213) are sufficient to cure the

crickets'[4] illness. The crucial importance here does not lie in the pharmacological effectiveness of the medicine.[5] Kant was clearly familiar with the psychosocial functioning of the placebo effect. In this sense, two dimensions are essential for understanding and treating hypochondria: the outer and inner actuality of the senses. The hypochondriac's experience and perception of illness are not merely the result of physical symptoms but also of their mental and emotional interpretations. Our perception of our own body must also be understood as a phenomenon occurring within the framework of our cognition. Therefore, treating hypochondria also involves working on changing the way one experiences and interprets one's symptoms, as "The hypochondriac has lost trust in their natural bodily processes and now attempts to reassure themselves of their body's functionality through medical monitoring" (Fuchs, 2011, p. 147). Since the hypochondriac is influenced by faulty reasoning, an independent expert— a physician— is needed. Medications alone may not be sufficient. What matters is how the hypochondriac perceives and reacts to the treatment. However, the question remains to what extent the hypochondriac will trust the physician, as the hypochondriac's world, his inner world, is torn by doubts and imbued with constant identification with what has been read. The hypochondriac

> is incorrigible; he cannot stop his actions because every new discovery of a supposed symptom of illness exposes him to fear, which he cannot bear and thus tries to get rid of by acting. (Holzhey-Kunz, 2017, p. 138)

Thus, Kant points to the importance of a holistic approach to treating hypochondria, where medicine and philosophy must be combined to achieve a successful outcome.

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4 For hypochondria, Kant uses the mocking expression "cricket disease". In *Anthropology from the Pragmatic Point of View*, Kant explains this metaphor, comparing it to the experience of hearing a cricket in the middle of the night. That sound may be barely noticeable, but once we focus on it, it becomes impossible to ignore without disturbing our inner peace and sleep. Similarly, hypochondria refers to a situation where a person becomes obsessed with their own bodily sensations or health. When a hypochondriac directs their attention to a specific part of their body or what their senses suggest to them, thoughts and feelings begin to diverge. This divergence does not mean that thoughts or feelings overpower one another, but rather it "confuses the line between the 'sign' and the 'signified,' turning his delusion into a distortion of both language and meaning" (Kohns, 2007, p. 78). This excessive attention to one's own body leads to a state of inner unrest, where feelings and experiences become dominant, disrupting the hypochondriac's inner balance.

5 "Kant refers to this kind of dietetics or 'psychological medicine' as an experiment and states that it deserves to become part of the 'teaching of medicine'" (Unna, 2012, p. 274).

> The physician would also not refuse his assistance to the philosopher, if the latter attempted now and then the great, but always futile cure of foolishness. (Kant, 2011a, p. 217; 2:271)

In *The Conflict of the Faculties*, Kant will further explore the connection between philosophy and medicine, focusing on how philosophy can contribute not so much to curing diseases but to preventing them, that is, dietetics.

> Kant thus changes the traditional view of dietetics as part of medicine by assigning it to philosophy. According to him, that part of medicine devoted to prevention is not the business of the physician, but of everyone, particularly the philosopher. (Unna, 2012, p. 280)

For Kant, dietetics is not merely the practice of preserving physical health but also a philosophical inquiry through which anyone can become their own "physician". He describes medicine as the art of treating diseases (Wiesing, 2007), in contrast to commercial medical practice, and as a "negative pharmaceutics" (Unna, 2012, p. 276) that mandates only the avoidance of harmful practices. As part of hygiene, alongside gymnastics, dietetics focuses on disease prevention, unlike therapy, which involves surgical and pharmacological interventions (Unna, 2012). According to Kant, doctors and philosophers have different but complementary roles in caring for human beings.

> In this, the doctors' business is to help the ailing mind by caring for the body; the philosophers', to assist the afflicted body by a mental regimen. (Kant, 2007b, p.184; 15:940)

This distinction in roles points to a deeply Kantian belief: caring for human beings requires a holistic approach in which doctors and philosophers collaborate, each operating according to their unique abilities and perspectives. The body and mind, although distinct, together shape the entirety of human experience, and their harmony is the key to human well-being. Only through the coordinated efforts of doctors and philosophers can true psychophysical balance be achieved, enabling long-term health and stability. In extreme cases, such as mental disorders, Kant suggests that physical interventions—like bloodletting or the use of strong herbal remedies—are sometimes more effective than relying on the power of reason. The reason lies in the fact that, in such situations, the mind can be "dethroned"(Kant, 2007b, p. 185; 15:943), and imagination runs wild, creating illusory fears and terrors that logic cannot resolve.

Kant's philosophical contribution to preventing hypochondria stems from the basic Stoic principle "*sustine et abstine*", which can also be taken as a general principle of dietetics. By applying this principle, treatment becomes philosoph-

ical, "when the sheer power of man's reason to master his sensuous feelings by a self-imposed principle determines his manner of living" (Kant, 1979, p. 181; 7:101). This self-imposed principle refers to a maxim, a truly philosophical one, as it is a moral maxim: to be the master of one's feelings. In an ethical sense, to be the master of oneself. To clarify what is meant by this maxim, Kant introduces the reader to a series of his own (private) experiences in the form of self-observation, for which he asks forgiveness (Kant, 1979, p. 56; 7:98).

From these personal testimonies emerges the truth about the subject addressed in the third dispute: *On the Power of the Human Mind to Master Its Morbid Feelings Merely by a Firm Resolution*. Kant connects the idea of resolution with dietetics, where resolution is not just a fleeting thought but a firmly established maxim, that is, a moral principle guiding a person in life. In the third essay, *The Conflict of the Faculties*, Kant highlights, as previously mentioned, the importance of controlling one's emotions and feelings through self-imposed rules that help a person avoid illness. Among the firm resolutions through which one can conquer their morbid feelings (Kant having become their master) are the resolution "to breathe only through […] nose" (Kant, 1979, p. 201; 7:111) or "by going to sleep early" (Kant, 2006, p. 74; 7:181). Although he calls these firm resolutions dietary maxims, they are not maxims. They would only be maxims if they contained several practical rules beneath them. This is not the case here, unlike a general dietary principle, which is undoubtedly such and must be regarded as a case of resolution. These resolutions are certainly life rules, but just ordinary rules for whose adherence in certain situations greater willpower is certainly required. That is why Kant had to adopt "the proper dietary rules that enabled him to avoid the potentially negative effects of continuous hard mental work" (Unna, 2012, p. 273).

Kant's contribution to the contemporary understanding of Hypochondria and his solution

Kant's discussion of resolution and maxim in the context of dietetics can be linked to the modern understanding of hypochondria. Hypochondria, as a condition in which a person excessively worries about their health, can be seen as the opposite of Kant's idea of balanced dietetics."In particular, they (hypochondriacs, author's note) have a despondent maxim of attempting to avoid hardship or disappointment at all costs, and this puts self-love ahead of the moral law" (Moran, 2023, p. 138). Instead of developing rational maxims that guide them towards health preservation, hypochondriacs willingly indulge in irrational worries and unnecessary self-examinations by reading medical literature. Unlike in Kant's time, today's hypochondriacs have far more accessible media (Internet),

whose source reliability is much more questionable compared to medical books that are factual and scientific. Online pseudodiagnoses lead to problematic situations that hinder communication between doctors and patients and epistemically undermine the doctor's knowledge and expertise. In this context, hypochondria, dissatisfaction with one's appearance, narcissistic personality disorder, and other bodily-mental self-examinations belong to the same group of psychological abnormalities or disorders of corporeality. For instance, people dissatisfied with their appearance do not view their body from the perspective of possible illness, like hypochondriacs, but are primarily concerned with a distorted perception of their own physical appearance. Such feelings can be very detrimental. Kant's analyses are strongly aligned with contemporary psychiatric knowledge, particularly regarding fantasy and imagination (Frierson, 2014).

Kant systematically connects fantasy with imagination, where imagination is not exhausted in fantasy but generally refers to the ability to create representations even without the direct presence of an object. Imagination in Kant's theory of knowledge has immeasurable significance. Images arise because imagination acts as an intermediary between the general concepts of reason and sensibility. During sleep, imagination stimulates the body's activity, but when awake and preoccupied with a problem, it can drain physical energy. Therefore, "the imagination must be disciplined and educated" (Kiblinger, 2015, p. 203). This phenomenon demonstrates how interconnected the mind and body are. Kant's approach could, therefore, help develop a healthy relationship with one's body, focused on prevention through rational and "moral dietetics" (Unna, 2012, p. 286), rather than unfounded fear of illness.

Another important element in Kant's overall transcendental philosophy, especially in the context of thought directing, provides insight into how hypochondria can be understood and controlled. Kant claims that every person can reach a point in life when they feel *weary of life*. However, "he himself, by disciplining the play of his thoughts, can put an end to these harassing notions that arise involuntarily" (Kant, 1979, p. 187; 7:103). A hypochondriac must battle their inclinations, allowing the reason to take the lead until they achieve control over inner sense that prevents liberation from morbid emotions. Through self-control (Vujošević, 2020), an individual is capable of acting according to moral principles despite internal and external temptations. "Self-control is therefore not simply about ensuring that our rational faculties control our sensible ones but also about reason's controlling itself" (Vujošević, 2020, p. 117). However, this is also the most challenging task, as the hypochondriac's behaviour is determined by a disorder in their sensation and strongly shifted towards imagined illness. Distracting from negative feelings

and *recollecting oneself* "promotes mental health by restoring the balance between one's powers of soul" (Kant, 2006, p. 101; 7:207). In this way, Kant's dietetics forms a bridge between medicine, philosophy, and morality, promoting the idea that health rests on rationality, moderation, and ethical self-discipline.

Kant points out that

> Doctors usually advise a patient to drive all *thoughts* from his head; but they return, or others come in their place, and keep him awake. The only disciplinary advice [for the insomniac] is to turn away his attention as soon as he perceives or becomes conscious of any thought stirring (just as if, with his eyes closed, he turned them to a different place). This interruption of any thought that he is aware of gradually produces a confusion of ideas by which his awareness of his physical (external) situation is suspended. (Kant, 1979, p. 191; 7:105)

For hypochondriacs, this Kantian advice can represent a way out of the vicious cycle of self-observation and a return to a state of bodily and mental unity. It is undeniable that we must follow Kant in recognizing that body and mind are interconnected. This is a crucial indicator that a person must distance themselves from their deceptive feelings and choose the approach imposed by reason: distracting from distractions and *recollecting oneself*. Although hypochondria can bring great suffering, it is not invincible. However, Kant warns of the high likelihood of recurrence of such episodes, implying that it is difficult to restore the previous order (Thomason, 2021). Therefore, daily work on disciplining thoughts is necessary to prevent the recurrence of hypochondriac states.

Conclusion

The analysis of Kant's understanding of hypochondria from the system of transcendental philosophy shows that it is possible to overcome hypochondria, but only in terms of the absolutely necessary distraction of thoughts from *pathological feelings*. In his personal struggle against hypochondria, Kant mobilized all the forces of his reason, reconciling the doubts of feelings with the knowledge of reason. In his *Lectures on Logic*, Kant defines practical attitudes as attitudes "that state the action whereby, as its necessary condition, an object becomes possible" (Kant, 1992, p. 605; 9:110), which means that they encompass all kinds of instructions and rules for behaviour in all areas of human activity. A particular subtype of practical attitudes, in terms of the degree of generality, are principles or maxims of action: "Practical principles are propositions that contain a general determination of the will, having under it several practical rules" (Kant, 2015, p. 17; 5:19). Kant

thus implies that our actions are not only determined by the objects we strive for but also by practical attitudes and principles, through which our reason introduces regularity, constancy, and organization into the processes of satisfying needs, desires, and inclinations. Without such an intervention of reason, human behaviour would be mostly an automatic reaction to stimuli, i.e., it would essentially be determined by instinctual structure and, in this sense, would not qualitatively differ from animal behaviour. This human faculty to distance oneself from immediate needs and stimuli and to introduce generality and regularity into behaviour is a consequence of human rationality.

In its practical use, reason establishes the object in the sense that it determines willing and action through its concepts. Therefore, reason requires, above all, a guide that it can provide for itself, i.e., a subjective basis for differentiation in orientation towards its principles.

> To make use of one's own reason means no more than to ask oneself, whenever one is supposed to assume something, whether one could find it feasible to make the ground or the rule on which one assumes it into a universal principle for the use of reason. This test is one that everyone can apply to himself; and with this examination he will see superstition and enthusiasm disappear, even if he falls far short of having the information to refute them on objective grounds. For he is using merely the maxim of reason's *self-preservation*. (Kant, 1998, p. 14; 8:146)

Without this subjective guideline, reason becomes incapable of defending itself from its own irrational impulses, which is the fundamental problem with hypochondriac thinking. Ultimately, concepts such as virtue or common sense cannot be properly integrated into a reason that has lost its faculty for autonomous guidance and differentiation of thought. Autonomy, in this sense, implies self-control, control over one's feelings, control over all mental faculties that can provoke *hypochondriacal exhalations*. Autonomy is also material and spiritual independence with regard to "fainthearted brooding about the ills that could befall one, and that one would not be able to withstand if they should come" (Kant, 1979, p. 187; 7:103). The autonomous being should behave in accordance with medical recommendations and dietary principles. In such circumstances, when "self-devised illness" (Kant, 1979, p. 189; 7:104) is defined by such autonomy (self-control, independence with regard to "harassing notions" (Kant, 1979, p. 187; 7:103), and the faculty to orient oneself in thinking as the only rule of behaviour and action), the question arises: how necessary is it to be a hypochondriac? Admittedly, *hypochondriac exhalations* cannot be avoided, but at least we can prevent them from swarming in our heads, as Immanuel Kant once did.

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SAŽETAK

Osnovni cilj ovoga rada bit će razumijevanje hipohondrije kao filozofijskog problema, a ne medicinsko-psihološkog, s obzirom na to da postoji bitna razlika između modernog (medicinsko-psihološkog u pravom smislu riječi) razumijevanja hipohondrije i svih ranijih antropološko-filozofsko-fizioloških razumijevanja, pa tako i onoga Kantova. Kantova interpretacija hipohondrije, kao duševne bolesti, ističe zanimljivu dihotomiju između stvarnih tjelesnih osjeta i iskrivljene percepcije. Hipohondar doživljava stvarne fizičke osjete, ali ih interpretira na način koji nije utemeljen u realnosti. Kant tvrdi da su ti osjeti rezultat (ne)pažnje koju hipohondar pridaje određenim fizičkim signalima. S druge strane, ako bi svoju pažnju usmjerio na nešto drugo ili se zaokupio nečim što mu odvlači misli od boležljivih osjećaja, osjećaji bi mogli oslabjeti, a uz dovoljno sabranosti, čak i potpuno nestati. Jedan od ključnih problema s hipohondrijom jest taj što umni argumenti često ne mogu promijeniti uvjerenja osobe koja osjeća simptome u svome tijelu i svome duhu. Da bi ljudsko biće ponovno zadobilo kontrolu nad samim sobom, Kant se okreće načelima moralne i filozofijske dijetetike. Stoga će se u ovom radu posebno pratiti dva aspekta: Kantova raštrkana analiza hipohondrije i njezine transcendentalno-filozofske pretpostavke. Zaključci iz transcendentalne filozofije trebali bi pomoći u svladavanju hipohondrijske mušičavosti.

Ključne riječi: *Kant, hipohondrija, osjetilo, osjet, zamjedba, uobrazilja, um*

2nd International Conference on the History of Health: Epidemiology and Health Infrastructure in European History (19th–21st Century)

From 9 to 11 December 2024, the *2nd International Conference on the History of Health: Epidemiology and Health Infrastructure in European History (19th–21st Century)* took place in the Museum of Health and Pharmacy in Lisbon. The conference was organised by a consortium of academic partners, primarily the Interuniversity Centre for the History of Science and Technology (CIUHCT) in Lisbon, NOVA FCT, FCUL, CHSTM, the Faculty of Arts, University of Ljubljana, Lab2PT, IN2PAST, the Institute of Social Sciences of the University of Minho, the Museum of Health and Pharmacy in Lisbon and COST Action – EuroHealthHist.

Two professors, Isabel Amaral and Alexandra Estevez, meticulously managed the organisational logistics of the conference together with their PhD students in medical history from Portugal and Brazil. Their joint work ensured the smooth running of the academic event and drew on their extensive expertise in the history of medicine.

The aim of the conference was an in-depth, comparative study of health infrastructures and epidemiological practises in Europe, as well as in South and Central America, since the 19th century. Over three days, more than 30 speakers from Europe, Brazil, and Mexico presented their own research on the development of public health infrastructures, responses to epidemics and health crises, the role of medical and scientific institutions in shaping health policy, and the impact of social, political and economic factors on public health systems. The keynote speaker was Professor of Health History Barry Doyle from the University of Manchester, a historian specialising in the development of hospitals, healthcare in colonial and post-colonial British and French West Africa, and first aid in Britain and France.

The conference sections comprehensively examined critical medical challenges, focussing on the treatment of infectious diseases such as cholera, smallpox,

tuberculosis, and tropical diseases such as malaria, yellow fever, sleeping sickness, and AIDS. Discussions also centred on co-infections, co-epidemics, the development of health systems, and the development of hospitals and sanatoria for the treatment of these diseases. The participants took a critical look at the introduction of vaccines, their public acceptance, and the long-term social stigmas that affect the health of the population. The diversity of the speakers was also reflected in their educational backgrounds, as they came from different areas of the humanities and medicine. The contribution of young researchers currently working on or have completed a dissertation in the field of medical history was particularly valuable. The organisers made a special effort to include them in the conference.

On the first evening of the conference, the speakers were invited to visit the Museum of Health and Pharmacy, a cultural jewel located in two cities in Lisbon and Porto. They were guided through its medical and pharmaceutical history by the erudite Dr João Neto, the museum's charismatic director. This remarkable institution is far more than a simple collection of medical curiosities. Since its foundation in 1996, the museum has compiled a panoramic view of the worldwide development of healthcare and exhibited more than 15,000 artefacts documenting 5,000 years of medical innovation. Supported by the Portuguese Pharmaceutical Society and a network of passionate donors, the museum's collections offer visitors a profound journey through time, showing how different cultures have approached healing, pharmacy, and medical practises.

Three Slovenian researchers in the field of medical history took part in the conference: Prof. Dr Mojca Ramšak from the University of Ljubljana, who also co-organised the event, together with Dr Katarina Keber, Senior Research Associate, and Jaroš Krivec, MA, a young researcher from the Milko Kos Institute of the Scientific Research Centre of the Slovenian Academy of Sciences and Arts. Their presentations focussed on the 19th-century cholera and smallpox epidemics on Slovenian territory and offered a nuanced exploration of local health challenges. Through their insights into the systemic and subjective dimensions of these epidemics, the Slovenian researchers enriched the conference's interdisciplinary dialogue on medical experiences and revealed the complex interplay between national health history and broader regional trends.

The conference successfully brought together a diverse group of scholars who contributed to a deeper understanding of historical epidemiological challenges and the development of health infrastructure. The combination of established academics and emerging researchers, as well as the interdisciplinary approach encompassing both the humanities and medicine, fostered rich discussions and new perspectives. The choice of the Museum of Health and Pharmacy in Lisbon as

the venue proved particularly appropriate, as it offered participants tangible links to the history of medicine through its extensive collection. This conference not only facilitated a valuable academic exchange but also demonstrated the continued relevance of historical health studies for understanding today's public health challenges.

Mojca Ramšak

Figure 1. Prof. Isabel Amaral and Prof. Mojca Ramšak, Lisbon, Museum of Health and Pharmacy

UPUTE AUTORIMA

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Tekst treba biti oblikovan u skladu s **Predloškom za pisanje rada**. Tekst treba biti napisan *Times New Roman fontom*, veličina slova 12, prored 1,5. Tablice i grafikoni trebaju biti smješteni unutar teksta. Stranice se numeriraju u donjem desnom kutu na svakoj stranici (uključujući i stranicu/e s bibliografijom). Bilješke (fusnote) kreiraju Alatom za oblikovanje fusnota u aplikaciji *Word*, a nalaze se na podnožju stranice gdje se nalazi brojčana oznaka fusnote.

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Grafikoni, **tablice** i **slike** u pravilu se prilažu unutar teksta na mjestu gdje trebaju biti prikazani, ali obavezno i odvojeno kao zasebni prilozi. Slike unutar priloga trebaju biti povećane na čitavu stranicu i posjedovati adekvatnu razlučivost (najmanje 300dpi). Svaki grafikon, tablica i slika trebaju biti numerirani i imati naslov. Ako su preuzeti, mora biti naveden izvor.

Uvriježeni strani izrazi, uključujući nazive dokumenata i institucija na stranom jeziku pišu se kurzivom – npr. *de facto*. Sva isticanja u tekstu naznačuju se **podebljanim slovima (bold)**. Isticanja podvlačenjem ne koriste se.

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Elektronički izvor: Jordan, D. (2019, December 17). *The Deadliest Flu: The Complete Story of the Discovery and Reconstruction of the 1918 Pandemic Virus*. Centers for Disease Control and Prevention,

National Center for Immunization and Respiratory Diseases (NCIRD). https://www.cdc.gov/flu/pandemic-resources/reconstruction-1918-virus.html

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Electronic sources: Jordan, D. (2019, December *17*). *The Deadliest Flu: The Complete Story of the Discovery and Reconstruction of the 1918 Pandemic Virus*. Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases (NCIRD). https://www.cdc.gov/flu/pandemic-resources/reconstruction-1918-virus.html

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