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PUPIL OF CARL VON LINNE

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MORBI ARTIFICUM – A POST-RAMAZZINIAN ACADEMIC DISSERTATION ON OCCUPATIONAL DISEASES BY A PUPIL OF CARL VON LINNÉ

MORBI ARTIFICUM – AKADEMSKA DISERTACIJA O PROFESIONALNIM BOLESTIMA UČENIKA CARLA VON LINNÉA U RAZDOBLJU NAKON RAMAZZINIJA

Timo Hannu*, Jacobus Kritzinger**

SUMMARY

*This study presents the first full translation from Latin to English of the Linnaean dissertation *Morbi Artificum* or Occupational diseases, submitted by Nicholas Skragge in 1765. It consists of an essay that places the dissertation in historical and scientific context and of the translation. Skragge's thesis has not only significance in the history of occupational medicine but also provides a perspective on Linnaeus' thinking on dietetics. Skragge's doctoral thesis is one of the 186 academic dissertations defended by students of Carl Linnaeus. Prior to the present study, only three of these 186 dissertations have been translated from Latin to English in our own times. The first extensive compendium on occupational diseases by Bernardino Ramazzini, with the title *De Morbis Artificum Diatriba*, served as a blueprint for Skragge's thesis. The background for Skragge's thesis was Linnaeus' general interest in systematizing objects according to certain norms in biology, which methodology he also applied when*

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classifying diseases in medicine. Also, Linnaeus' life-long emphasis on the importance of dietetics is evident in the thesis. Finally, in the era when Linnaeus lived (Age of Liberty), Sweden focused greatly on improving the country's economy. Since trade and industry were prioritized by the state, it was reasonable to map the diseases workers were prone to.

Keywords: dietetics, Carl Linnaeus, occupational diseases, Bernardino Ramazzini

INTRODUCTION

The first comprehensive treatise on occupational diseases of workers was *De Morbis Artificum Diatriba* by Bernardino Ramazzini (1633-1714). The first edition of it was published in 1700 (Ramazzini, 1700) and the extended edition in 1713 (Ramazzini, 1713), both in Latin. In the expanded edition, Ramazzini describes numerous forms of employment and their associated occupational health disorders. A “syllabus of workers” lists 53 categories (of which 12 are new to the 1713 edition). However, the actual number of discrete occupations is even larger because various categories include multiple occupations, such as ‘learned men’, including medical doctors, lawyers, orators, and others.

In Ramazzini, in general, each chapter begins with a short description of the disorders related to the particular occupation. Then, the technical aspects of the work and the clinical symptoms and signs of the disorder are presented. Finally, suggestions for therapy and prevention are provided. Medical literature starting from the Hippocratic writings is reviewed in each chapter. Often also non-medical authors, like ancient poets and philosophers, are referred to (Riva et al., 2011).

During the 18th century, *De Morbis Artificum Diatriba* was translated into English, French, German, Italian, and Dutch (Anonymous, 2009). In the 20th century, a new English translation was published in 1940 (Ramazzini, 1964). Following Ramazzini's book, multiple academic dissertations on workers' occupational diseases were published. Professor Fransesco Carnevale has produced a list including 15 such theses (“tesi di laurea o di dottorato”) published until the early 19th century (Carnevale, 2010). They were mainly from France and Germany, but one of these was from Sweden. It was *Morbi artificum* by Nicholas Skragge, a pupil of Carl Linnaeus. The full English translation of Skragge's doctoral dissertation, which was originally published in Latin, is presented for the first time in the present paper¹.

¹ A brief summary of Skragge's doctoral dissertation was published in English already in the 18th century (Pultney, 1781, p. 347). Recently, a book in two volumes with more detailed English summaries of all Linnaean dissertations has been published in Sweden (Nynäs & Bergquist, 2016). Moreover, the database (Original Linnaean Dissertations) at the Hunt Botanical Institute

AGE OF FREEDOM AND UTILITAS IN 18TH CENTURY SWEDEN

The great Northern war (1700-1721) was fought between Sweden and an alliance led by Russia, including Denmark-Norway, Saxony, Poland-Lithuania, and from 1715 onwards also Hanover and Prussia (Koerner, 2001, p. 102). The war ended with the defeat of Sweden, which also meant the end of “the Era of Great Power”. The King of Sweden, Charles XII, died in 1718. Succeeding monarchism, Sweden was governed by “Riksdag of the Estates”, consisting of four estates (nobility, clergy, burghers, and land-owning peasants). After losing its status as a great European power, it was time for a new orientation.

Throughout the period from 1718 to 1772, which is called the Age of Liberty (or Freedom), the economy played an important role in society (Frängsmyr, 1974; Reid, 2009). Sweden was an agricultural country at the beginning of the 18th century, and for the restoration of the economy, the development of the industry was needed. The state provided financial support to those who wanted to start manufactures because it wanted to support the production of Swedish goods and reduce the volume of imports. Manufacture was a kind of “small factory”, technically not so advanced and on a smaller scale than factories during the Industrial Revolution which began in Sweden in the 19th century. With the help of hand tools or simple machines, manufacturers produced minor industrial products, like textile goods and smaller tools. They were associated especially with textile production. Agriculture was not forgotten, despite the concern for manufactures, and mining continued to be Sweden’s principal industrial undertaking. Iron and copper accounted for 80% of the total value of Sweden’s exports between the 1620s and the end of the 17th century (Geijerstam & Nisser, 2011, p. 55).

The prevailing ethos of the Age of Freedom was utility. It was also shared by Carl Linnaeus (after his ennoblement von Linné) (1707-1778), a professor of medicine and botany at the University of Uppsala. Nowadays, he is best remembered as the main initiator of the framework for biological taxonomy still in general use today, but in his scientific oeuvre are discernable contributions to many other disciplines, such as anthropology, ecology, ethnography, medicine, and paleontology (Reid, 2009).

To improve the country’s economy, the state looked for the help provided by science with its new instruments and methods. The Academy of Sciences

provides concise abstracts in English but includes PDFs in Latin of all Linnaean dissertations. All Linnaean dissertations in Latin were published in 1749-1790 (Linnaeus & von Schreber, 1749-1790).

was founded in 1739 to achieve this goal. Natural sciences flourished at the University of Uppsala, where the first professorship in economics was established in 1741. Linnaeus, who was among the founders of the Academy of Sciences, expressed his view of economics in the first volume of the transactions of the Academy in 1740. He wrote that “no science in the world is more elevated, more necessary, and more useful than Economics, since all people’s material well-being is based on it” (Koerner, 2001, p. 103). In a similar vein, the benefits of acquiring a profession are praised in the introduction of Nicholas Skragge’s thesis: “We must seriously urge young people to learn trades, for an honest trade is a treasure, which most certainly provides a livelihood to the one who masters it anywhere in the world, even though the rest of the people are suffering”.

Linnaeus is also famous in Sweden for the many journeys he undertook in his homeland. He explored both nature and culture, but the journeys also had a practical-economic purpose. Frängsmyr stated that Linnaeus would discover what was to be found in the natural resources in the country: “useful plants, valuable minerals, domesticated and wild animals, different types of soil and foodstuffs, but also the manufacturing of shoes and clothing.” (Frängsmyr, 2000, p. 190) During his travels, he also made observations about occupations and workers. From his Dalarna journey in 1734, he reported respiratory symptoms attributable to silicosis² in stone-cutters (Uggla, 1953, p. 25-26; Casson, 2007, p. 69-70).

CARL LINNAEUS AND DIETETICS

Today hygiene means mainly cleanliness and has a narrower scope than in Antiquity, where, according to Galen, medicine was divided into hygiene (the art of staying healthy) and therapeutics (the art of treating disease) (Wear, 1993; Bergdolt, 2008). Hygiene was concerned primarily with a person’s lifestyle and relationship to the environment. Categories that compose hygiene were called the “six non-naturals”: air, food and drink, sleep and waking, movement and rest, retention and evacuation (including sexual activity), and the emotions (passions) of the soul. The content of classical hygiene remained substantially the same through the Middle Ages and Renaissance. The six non-naturals were referred to in *Regimen Sanitatis Salernitanum*, a “guide to health” believed to have been written by authors linked to the famous medical school of Salerno around the 13th century which was very pop-

² See footnote 36 for silicosis.

ular and still read in the Early Modern Era. Specific groups and populations were only later taken into account by Ramazzini and Simon-André Tissot (1728-97), who drew attention to the health of the poor in the countryside of Switzerland. Tissot wrote (1770) also *Essai sur les maladies de gens du monde*, which is in the tradition of the diseases of the learned and/or sedentary men.

Linnaeus never wrote a work that would have summarized his thoughts on dietetics, but they are scattered among his manuscripts and writings. Based on the manuscripts, hand-written in Latin and Swedish (and frequently appearing mixed in the same sentence), two books have been published in Swedish after Linnaeus' death, *Linnés dietetik* in 1907 (Linnaeus, 1907a; Linnaeus, 1907b) and *Diaeta naturalis* in 1958 (Uggla, 1958).

Although published later, *Diaeta naturalis* was written earlier in Linnaeus' life, started in 1731 and finished after Linnaeus' return from the European continent in 1738, where he obtained his doctor's degree in Holland. It is a collection of rules (*regulae*), following an explanatory text (*scholion*). One of the 136 rules deals with occupations and their health hazards. The regula numbered as 116 is in Latin "Officia eligas saniora" ("You should choose healthier duties"). The scholion contains 16 occupations, 14 of which are mentioned in Skragge's thesis (Appendix, Table). The two occupations not mentioned are silversmiths (*argentarii*³) and innkeepers (*caupones*⁴). However, inauratores as goldsmiths and gilders are mentioned in both Skragge's thesis and Ramazzini's *De Morbis Artificum Diatriba*, respectively. Ramazzini does not mention innkeepers. In *Diaeta naturalis*, the health hazards are described briefly, and Linnaeus' observation on stone-cutters in Orsa is among them. Ramazzini is cited as one of the literary sources.

As a professor of medicine at the University of Uppsala, between the years 1742-1772, Linnaeus gave eight lectures on dietetics which were very popular among the students. The book Linnés dietetik, edited later by A.O. Lindfors, comprised Linnaeus' drafts for his lecturers on dietetics (*Lachesis naturalis quæ tradit diætam naturalem*) (Linnaeus, 1907a) and notes of his pupils concerning these lectures (*Collegium diæteticum*) (Linnaeus, 1907b). *Collegium diæteticum* includes a section on occupational diseases (*Morbi artificum*), which is a part of a broader chapter on Exercise and rest. This section includes 45 occupations or occupational groups, of which 43 are mentioned

³ They are exposed to smoke, but the associated health hazard is not described.

⁴ It is mentioned that some of them fraudulently prepare their wine with litharge, which is judged as worthy of capital punishment in Sweden.

in Skragge's thesis (Appendix, Table); Ramazzini is cited among the literary sources. The two occupations not mentioned are glass makers (*vitrarii*) and saltpeter collectors (*nitrarii*). Eye symptoms resulting from work are described in both of them. Ramazzini does not mention saltpeter collectors but mentions glass makers.

It should be stated concerning especially *Diaeta naturalis*, but also *Collegium dieteticum* that due to Linnaeus' writing style, it is difficult to assess which are his observations and which are based merely on literature.

In addition to manuscripts, printed dissertations play an important role in Linnaeus' dietetics. In total, there were 186 academic dissertations defended by students of Linnaeus (Antonovics & Kritzinger, 2016; Lindberg, 2016), either for intermediate-level degrees (*dissertatio pro exercitio*) or for medical degrees (*pro gradu doctoris*) (DeLacy & Cain, 1995; Lindberg, 2016). The range of their topics was large, from botany, zoology, and mineralogy to medicine. In general, respondents contributed less to the academic dissertations compared to our time. According to Bo Lindberg, Linnaeus produced dissertations by dictating the text in Swedish and Latin, leaving it to the respondent to put it in order and "clean" it. In accordance with the practice of the time, the respondent was allowed to speak of himself as the author, while giving credit to Linnaeus in phrases like "as shown by Linnaeus" or "our renowned praeses" (Lindberg, 2016; Broberg, 2005). It has been stated that over 50 of 186 Linnaeus' dissertations (approximately 30%) deal with matters associated with dietetics (Broberg & Lindell, 2007, p. 263-265). They included theses such as *Morbi ex hyeme* (on diseases associated with weather conditions in Sweden), *Aer habitabilis* (on the effects of the earth's atmosphere on health), *Panis dieteticus* (on bread), *Macellum olitorium* (on useful plants as culinary vegetables), *Potus coffeae* (on coffee), *Potus thaeae* (on tea) and *Motus polychrestus* (on physical exercise for preservation and restoration of good health). As can be seen from their titles, these dissertations fall well into classical categories of the "six non-naturals".

In-depth studies concerning Linnaeus' ideas on dietetics are lacking, especially in English. In an essay, which he himself calls "mainly inventory", Professor Gunnar Broberg has written on the subject in Swedish. According to Broberg (2005), in *Diaeta naturalis* Linnaeus focused on "the blessings of natural life he himself had experienced during his journey into Lapland", and in the texts, which have been published in *Linnés dietetik*, he developed his earlier ideas and showed "a growing, pragmatic attitude towards differ-

ent tendencies in Swedish society”. In general, Broberg (2005) divides the influences, which can be found in Linnaeus’ writings on dietetics, into five groups: classic literature, Christian culture, national ideas, the tradition of medicine and natural history, and the personal experience. Broberg (2005) concludes his essay by stating that “in his dietetics, Linnaeus expresses an individualistic perspective rather than a collectivistic and national, following the classical tradition rather than getting close to the hygienistic movement coming a century later”.

NICHOLAS SKRAGGE’S THESIS

Skragge’s dissertation on occupational diseases from 1765 was *pro gradu-doctoris*. In its introduction, it is clearly stated that the model for the thesis was Ramazzini’s *De Morbis Artificum Diatriba*. “But since this [Ramazzini’s] book is quite scarce and too difficult to be useful to the general public, I have not only selected the best parts from this work, but I have also added my own observations and those of others.”

Unlike Ramazzini, but much like Linnaeus as summarized in *Collegium Diaeteticum*, Skragge summarizes each occupation very briefly, often in no more than a single or a few sentences. Although the names of the diseases with clinical signs and/or symptoms are always mentioned, the technical aspects of the work are described only on lead workers, white lead workers, and assayers of metals. Preventive measures are stated only twice, for ointment healers and cleaners of cesspits. Previous medical literature is cited four times (Ramazzini twice, and Behrn and Kämpfer both once). As non-medical authors, Pliny the Elder and Martial are cited both once and in the same contexts as in Ramazzini’s *De Morbis Artificum Diatriba*. Horace and Virgil are each cited once, and so is Juvenal, who is wrongly referred to as Martial.

The number of occupations handled is more than 100 in Ramazzini and 60 in Skragge. Of these 60 occupations or occupational groups in Skragge, 50 can also be found in Ramazzini (Appendix, Table). The remaining ten occupations not found in Ramazzini include assayers of metals, lead calciners, white lead workers, steelsmiths, coal miners, cooks, wigmakers, charcoal burners, female dancers, and temple guards. On the other hand, occupations that are not mentioned in Ramazzini nor in Linnaeus (*Diaeta naturalis* or *Collegium diaeteticum*) include coal miners, cooks, female dancers and temple guards.

Introducing steel smiths, charcoal burners, and coal miners with their health hazards are the most noteworthy innovations of Skragge's thesis to occupational medicine. It should be kept in mind that both *Diaeta naturalis* and *Collegium diæticum* were not published until the 20th century, more than a hundred years after Linnaeus' death. In 1734, before his Dalarna journey, Linnaeus visited several steel-, copper- and brassworks south of Falun, which is located in the middle of Sweden. One of the places was Davidshyttan, where Linnaeus saw and described steelmaking⁵ ("ståhl-bränning" in Swedish) (Uggla, 1953, p. 367-419; Casson, 2007, p. 267-311). Coal mining was unknown in Italy, which may explain why Ramazzini did not mention it; he does, however, mention petroleum extraction (Ramazzini, 1964, p. 23). The works Linnaeus visited needed a lot of charcoal which was produced by burning wood. Although Ramazzini discusses charcoal burning at some length in his chapter on confectioners (Ramazzini, 1964, p. 427-429), he does not mention charcoal burners as an occupational group.

In addition, Skragge has addressed new occupational exposures. For example, Ramazzini notes metallic type use when discussing printers (1964, p. 415-419) but does not mention exposure to lead or antimony⁶. Ramazzini writes about lead and white lead in connection with potters (Ramazzini, 1964, p. 53-55) and painters (Ramazzini, 1964, p. 69), respectively, but technically not as an occupation devoted to lead as Skragge does when discussing lead calciners and white lead workers.

NICHOLAS SKRAGGE

Nils Skragge was born in Värmland in West Sweden in 1738 and enrolled in 1758 as a student at Uppsala University⁷. In 1762, he defended his first academic dissertation, which was probably a *dissertatio pro exercitio*, with the title *De cinnabaris in corpus humanum effectu* (About the effect of cinnabar on the human body), under Johan Gottschalk Wallerius (1709-1785). Wallerius was a professor of chemistry, medicine, and pharmacy at Uppsala University.

⁵ Linnaeus focuses on describing the work processes. However, there is an occupation "ståhlbrännare" (in Swedish) with blurred vision as a health hazard in *Diaeta naturalis* (Uggla, 1958, p. 183). The same health hazard is described in Skragge related to "chalybearii" (in Latin), which Haglund has translated as "stålsmeder" in Swedish, meaning steelsmiths (Haglund & Fredbärj, 1955, p. 8).

⁶ This exposure is mentioned in *Collegium diæticum* (Linnaeus, 1907b, p. 70).

⁷ Biographical information is mainly from Sacklén (1822, p. 387-8).

Beginning in 1763, Skragge was the royal court doctor in Stockholm, where his duties included caring for the sick of the poor. Two years later, he submitted his doctoral thesis. As he mentions at the beginning of it, many of his patients were craftsmen, which would explain his interest in the subject.

From 1773 onwards, he was a provincial medicus, first in Värmland and then in Bohuslän, who supervised the district's public health and medical services, the hospital staff, the hospitals, and the pharmacies. Skragge died in Uddevalla in 1787.

ON TRANSLATION

At the end of the 18th century, some Linnean dissertations were translated to English (Stillingleet, 1762; Brand, 1781). However, nowadays, we are only aware of three translations (DeLacy & Cain, 1995; Insulander & Müller-Wille, 2001; Antonovics & Kritzinger, 2016); they deal with the contagion of diseases and ornithology.

This translation of Skragge's work is based on: *Caroli v. Linné. Morbi Artificum, quos Praeside D.D. Car. v. Linné, Proposuit Nicolaus Skragge, Vermelandus, Upsaliae 1764*⁸. *Jun. 15 Amoenitates Academicæ seu Dissertationes Variæ Physicæ, Medicæ Botanicæ Antehac Seorsim Editæ nunc Collectæ et Auctæ cum Tabulis Aeneis. Volumen Septimum. Editio Secunda. 1789. Curante D. Io. Christiano Daniele Schrebero. Erlangæ: Io. Iacobi Palm. Morbi Artificum. pp. 84-93.* The first edition of this volume of the *Amoenitates* had an identical title but was published in 1769 by *Holmiæ: Laurentii Salvii.*

We have decided to provide a dynamic English translation which is still a fairly literal rendition of the original Latin. Footnotes are used to explain uncertainties or provide additional information. The capitalization and italics are used inconsistently in the Latin text, and we have decided to do away with unnecessary capitals and italics in the translation to provide a more readable English text. For the sake of clarity, we have typed the professions which have been dealt with in Skragge's thesis in bold. The names of specific diseases have been translated into English as much as possible. Where the Greek or Latin terms are also commonly used in English, the original terms are used.

⁸ Although the date of this edition is indicated as 15 June 1764, according to a number of reliable sources, the correct date is 15 June 1765.

Timo Hannu was responsible for the historical and occupational medicine background, while Jacobus Kritzinger primarily contributed to the translation.

TRANSLATION

Occupational diseases which NICOLAUS SKRAGGE from Värmland presented, with the learned lord Carolus von Linné presiding at Upsala on 15 June 1764⁹.

(Submitted) with the greatest devotion to the judgment of good men¹⁰.

§. I.

Those whom I have to obey recommended that I, who was about to publish a public testimony of my education in medicine, should treat occupational diseases¹¹ in a short dissertation; especially since in the duty, which I perform at the court of our most merciful king, a big crowd of people, also assigned to manual craftsmanship, are entrusted to my care and protection every day.

But this subject is so thoroughly discussed by the most learned Italian scholar, Ramazzini, in his book *De Morbis Artificum*, that this same book is regarded as extremely valuable by doctors.

But since this book is quite scarce and too difficult to be useful to the general public, I have not only selected the best parts from this work, but I have also added my own observations and those of others, which Ramazzini left untreated in this discussion, which is difficult and definitely demands the input of more people in order to reach the perfect end product.

For this discussion should not only point out to every worker the things in their profession they should be aware of, but it also uncovers more clearly than any other dietetic experiments the misconceptions resulting from this. Moreover, from this, we can search for the most direct causes of diseases that are so important in medical practice.

⁹ The correct date is 15 June 1765. See also footnote 8.

¹⁰ In Latin B.C.D. (bonorum censurae devotissime (submittit), lit. (He submits it) with the greatest devotion to the judgment of good men.

¹¹ Morbiartificum literally means “the diseases of artisans”. An artisan is a skilled craft worker who makes objects by hand. Because many other occupations than artisans were covered in Ramazzini’s *De Morbis Artificum Diatriba* and also Skragge’s doctoral thesis, we use the modern expression “occupational diseases” here.

§. II.

We must seriously urge young people to learn trades, for an honest trade is a treasure, which most certainly provides a livelihood to the one who masters it anywhere in the world, even though the rest of the people are suffering.

During the unfortunate war with the Russians¹², a trade learned during their youth greatly benefitted the captives from our country, who had been taken as prisoners to Siberia. However, most of those who had not learnt any trade died desperately. Those who were captured by barbarians, if they were trained in a certain trade, make so much money in a few years' time that they could pay the price themselves and buy their freedom, while the others without ransom money were left behind to become cattle herders. Even for the Turks, who cannot boast of hereditary nobility, it is not a shame to practice a trade.

And we see in our own country, to leave remote places aside, that bakers, cobblers, tailors, copper workers, brewers, butchers and other (craftsmen) get rich, even though their wives and children compete with their coaches with the wealthy business people; they (the craftsmen) built palaces for themselves to enhance their status, while others who have been educated in the academic sciences with a lot of sweat and hard work, despite many awards in the academic field, can scarcely sustain their living.

*Break the worthless pens and tear up the little books of Cicero,
if that shoe can provide for the cobbler.*¹³

And so, during the previous century all, our most noble countrymen generally ordered their sons to learn some or other trade together with their scientific studies. And the more noble English who transfer nobility and estates only to the oldest son send the others away to learn trades, as if to very secure asylum.

¹² The Great Northern War (1700–1721).

¹³ This is an adaptation from an epigram of Martial (IX.73.9-10) which reads “Frangere leves calamos et scinde, Thalia, libellos, / si dare sutori calceus ista potest.” (Martial, 1993, p. 292-293). (Literally translated: Break your light reed-pens and tear up your little books, o Muse, if a shoe can give those things to a cobbler). In Martial's epigram a contrast is made between someone whose 'foolish' parents sent him to be educated by the grammarians and rhetoricians and a cobbler who had 'fraudulently' obtained a large legacy from his patron. Skragge's adaptation, which replaces 'Thalia' (o Muse) with 'Tulli' (of Tullius, referring to the books of Marcus Tullius Cicero) and 'ista' (those things) with 'ille' (that, referring to the shoe), still retains the basic contrast between a 'seemingly useless' academic education with the profitable earnings of a craftsman.

§. III.

Since there are so many occupations, which are markedly diverse as far as the activities and the subject are concerned, and since the same work is done every day, it necessarily happens that, if you are not careful, many diseases may develop because of the wrong diet, in combination with the specific occupation; something which experiments prove clearly and thus the same motto is applicable to the workers, which applies to the silkworm:

*I am dying because of my skill, I am making a grave for myself.*¹⁴

Farmers will be mentioned first because their profession is the most important of all, and their products find buyers, while other products are often redundant.

This profession is the most natural, quite diverse, and at the same time pleasant. New discoveries, which are beneficial to the human race, offer themselves here every day to those who are very familiar with the laws of nature. He who invests money to buy a farm has very solid security, for even if the buildings burn down or are destroyed, the land still remains.

Very significant men, weary of their most distinguished positions, finally in old age sought refuge in the countryside, and there they found delight and made a living at the same time.

Similis, a prefect of Hadrian, famous for long service, finally reached this happiness, and he gave instructions for the following to be engraved on his tomb:

*Here lies Similis*¹⁵, *who had a long life, but who really lived only seven years.*

At last, one can come to rest here after many worries; here one can enjoy freer and healthier air than in the cities, meals which are simpler and don't have to be bought and which are far more suitable to maintain good health.

¹⁴ This line forms part of a riddle about the silkworm, and the author is the epigrammatist, John Owen. The full riddle reads as follows "Arte mea pereo; tumulum mihi fabricor ipse, / Fila mei fati duco, necemque neo." (II.186) (I am dying because of my own skill; I am making a grave for myself: / I draw the threads of my fate and spin my death). (Martyn, 1976, p. 71).

¹⁵ This quotation is from Cassius Dio, who devotes a paragraph in his Roman History to this Similis, who served for many years under Trajan and Hadrian and reluctantly became the Prefect of the Praetorian Guard. He mentions that Similis spent the last seven years of his life quietly in the country and that he requested an inscription on his tomb, which states that he existed for so many years but lived seven. (Cassius Dio Cocceianus, 1925, p. 459). Servius Sulpicius Similis was a centurion of the Praetorians early in the reign of Trajan, who promoted him to Prefect of the Provisions (till 107), Prefect of Egypt (107 – 112), and from 112 as Praetorian Prefect in which capacity he also served under Hadrian till 119. (Syme, 1980).

O countryside, when will I see you, when will I be allowed
to enjoy the pleasant oblivion of a troubled life,
now reading the books of the old authors, then sleeping and spending hours of
idleness?¹⁶

Countrymen, who must work every day and who have to sing “Sic vos non vobis”¹⁷ (“So you, not for yourselves”), since even the smallest fruits of their labour are kept for their own use, suffer from scurvy, erysipelas, and cacoëthes¹⁸, from the salty foods which they use to eat in our country. Sweat which dries out the workers and stiffens their fibres, together with the salty food, causes extreme pain¹⁹ in the bones and sciatic pain.

Melancholy is quite often caused by a lot of work that dehydrates you, associated with little sleep, drinking water and alcohol abuse. Those who drink water frequently and do not sleep enough become skinny.

Gardeners, exposed to the scourging sun during the whole summer, are dried out by sweating and the heat and become melancholic, just like the Indians.

The learned, like students, theologians, professors, and the like, are quite often consumptive due to the enclosed space (where they work); from the pressure on the stomach, they become hypochondriac and constipated. From white objects, such as paper, they become near-sighted; from the silence, they struggle with the loss of appetite (anorexia), weight loss, scabies, scurvy, and melancholy. And finally, they are affected by insomnia because of their meditations, and since this is an exercise of the brain itself when it is subject to extreme pressure, it, at last, hardens more, and so Pliny (VII.50) rightly says: *To die of wisdom is also a disease*²⁰.

¹⁶ This is a direct quotation from Horace’s Satires (II.6.60-62) (Horace, 1926, p. 214-215).

¹⁷ The words ‘Sic vos non vobis’ (lit. So you, not for yourselves) have a long history and broader context, which cannot be fully described here. It originates from Virgil, the famous author of the *Aeneid*, who formulated four lines starting with the same four words, which reads as follows in a direct translation: “So not for yourselves do you, birds, build your nests. / So not for yourselves do you, sheep, produce your wool. / So not for yourselves do you, bees, make honey. / So not for yourselves, oxen, do you endure the plow/ It is quoted here to emphasize the fact that the farmers do not produce the food for themselves in the first place, but provide food to the wider population. For more information on this motto, see “Sic Vos Non Vobis” in Guinach (1990, p. 262).

¹⁸ κάκοιήθης = “malignant (of disease)”, in: The Brill Dictionary of Ancient Greek. Cacoëthia = “ill-conditioned; malignant”, in: Dorland’s Illustrated Medical dictionary, 1965, p. 234.

¹⁹ Osteocope = a severe pain in a bone or the bones; generally, a symptom of syphilitic bone disease (Dorland’s Illustrated Medical dictionary, 1965, p. 1069).

²⁰ There are different readings for this passage from Pliny the Elder (*Naturalis Historia* 7:50), and the one closest to the quote by Skragge is “atque etiam morbus est aliquis per sapientiam mori”

Mathematicians and physicists, because of their deep meditations, finally become forgetful, lazy, drowsy, and as if they are living in another world.

Doctors, from their contact with sick people, get sick especially with raging epidemic diseases; often with pestilence, typhus²¹, dysentery, ague²², or a severe cough; from the offensive smell, while they sit at the beds of the sick and even from their reflections, they also become melancholic.

Soldiers contract dysentery and Hungarian fever²³ due to the filthiness and stench in the camp, from the salty food, and polluted water. From the cold, wet conditions in the field, they experience nostalgia, and from the salty food without exercise, they get scurvy.

Sailors, especially those who sail to India, contract diarrhoea and dysentery from the dirty water and scurvy from the humid elements and salty food accompanied by a lack of exercise. From the stench of the alkaline water of the ship, they suffer from exanthematous fevers²⁴. They suffer from dysentery and cholera because of eating too much of the Indian fruits, which they are not used to.

Assayers of metals²⁵ damage their eyes from cupellation²⁶, slagging, and smelting, from which they get blurred vision (*caligo*). The vapour of the burned bones causes headaches, and the testing of the iron by cooling it off in

which can be translated with “and to die of wisdom is also a disease”. Note also the following comment by Bostock and Riley: “Many conjectures have been formed respecting the meaning of this passage, which is obscure. Attempts have been made to amend the reading of the text, but; as it appears, without success ... It is pretty clear, however, that Pliny here refers to what, in the next chapter, he calls ‘sapientiaeaeplitudo’, the malady by the Greeks called ‘phrenesis’, and by us ‘frenzy’, which attacks the seat of wisdom, the understanding.” (Bostock & Riley, 1890, p. 208).

²¹ In Latin, the name of the disease is petechia. In Linné’s classification of the diseases (*Genera Morborum*), petechia refers to typhus (Bergman & Fredbärj, 1949, p. 6).

²² Ague = “Malarial fever, or any other severe recurrent symptom of malarial origin; or a chill.” (Dorland’s *Illustrated Medical dictionary*, 1965, p. 49). ἡμῆριπταιος = “half-tertian” (of fever). (*The Brill Dictionary of Ancient Greek*).

²³ According to Persson (2002), amphimerinae were so-called field diseases (diseases most clearly associated with war) in Linne’s time. One of these was Hungarian fever which was named after the fever suffered by the army of Emperor Maximilian II in 1566. Persson identifies it as typhus.

²⁴ In Linné’s classification of the diseases (*Genera Morborum*), one of the contagious exanthematous fevers was typhus which is probably referred to here (Bergman & Fredbärj, 1949, p. 6).

²⁵ According to *Oxford English Dictionary*, docimasy means “the art or practice of assaying metallic ores, i.e. of separating the metallic substance from foreign admixture, and determining the nature and quantity of constituent metal”. However, OED does not mention “the name of the worker” who does docimasy. We have translated docimastae as assayers of metals.

²⁶ Cupellation, slagging and smelting are technical terms used in metallurgy/mining. Cupellation is a process to separate silver from lead. The process has been used for over 2000 years (Hoover & Hoover, 1986, p. 464-466).

water leads to blindness. From lead vapour, which is inhaled carelessly during cupellation, they have lead colic (colica saturnina²⁷).

Chemists often experience coughs, lung inflammation, and dizziness from the fumes of mercury, vitriol, and similar things.²⁸

Miners, because of the mineral dust, suffer from chest diseases, seldom live long, and often have consumption (phthisis)²⁹.

Lead calciners³⁰ who purify silver by calcination of lead incur lead colic, accompanied by severe constipation and partial paralysis³¹.

White lead workers³², who dissolve lead coils with the acetic vapour trapped inside, are attacked by the contraction of fingers, hands, arms, and finally the whole body, with chronic arthritis that cannot be countered by any strategy. And that happens within a few years; therefore, double or triple the daily wages are paid to them because they can only endure it for a short period.

Tinsmiths quite often become short of breath, as Ramazzini³³ has noticed.

Coppersmiths' hair and teeth often get green as they get older. Beginners who are not yet accustomed to this work experience vomiting and diarrhoea, but they are generally hard of hearing from the hammering.

Blacksmiths likewise are hard of hearing from hammering; from lifting heavy weights, they become rigid, and from the intense and bright fire, they become bleary-eyed or blind.

Steelsmiths often suffer from blurred vision, from sitting at the furnace, especially when the iron is melted in the furnace.

²⁷ Lead poisoning has been known since Antiquity (Hernberg, 2000).

²⁸ It is mentioned in *Collegium diaeteticum* that "Ettmüller got cough which lasted four weeks" (Linnaeus, 1907b, p. 73). Michael Ettmüller (1644-83) was a German physician and professor of botany and surgery at Leipzig. Ramazzini has references to Ettmüller on several occasions.

²⁹ It is mentioned in *Collegium diaeteticum* that "The mercury mines are the most dangerous mines; no later than four years miner gets paralysis" (Linnaeus, 1907b, p. 74).

³⁰ In Latin, the word used by Skragge is plumbarii. We have translated it as lead calciners, not as plumbers, because the work described here (purification of silver by calcination of lead) is not referring to plumbing. Similarly, Haglund has translated plumbarii as blycalcinerare in Swedish (Haglund & Fredbärj, 1955, p. 7).

³¹ In *Collegium diaeteticum*, hematuria and contractio dorsi are also mentioned as symptoms of lead poisoning (Linnaeus, 1907b, p. 73).

³² Cerussarii in Latin. Ceruse as white lead is lead carbonate.

³³ According to Ramazzini (1964, p. 61), the chest was the chief site of shortness of breath (probably meaning here asthmatic symptom).

Mercury miners quite often suffer from loss of teeth (labarium). The vapour of mercury attacks the nerves, which causes tremors, paralyses and dizziness. And often, those who are attacked by these conditions within six months barely live longer than three years.

Ointment healers, from ancient times, used to feel a tremor in their hands, and therefore surgeons now instruct patients themselves to put on mercury ointment³⁴.

Mercury rising from the fire attacks the **gilders** during the amalgamation process by which they withdraw silver and often makes them senseless, paralysed, deaf, dumb, and asthmatic.

Typecasters become exposed to nerve disorders from the vapour of antimony, lead, and other things. They usually suffer from numbness of the hands, spasms, contractions, lead colic, and vomiting.

Painters often become colourless themselves by colouring others, perhaps because they often clean the brush, stained with copper, mercury, and other metals, with their mouth. They usually suffer from painter's colic³⁵, from the twisted body position, especially when they are busy painting ceilings.

Stone-cutters get tussis calculosa³⁶ from fine stone dust penetrating their lungs. A bladder suspended in their working places and neatly closed often contains a whole handful of dust, and from this, it is evident that the dust deeply penetrates. In Orsa of the Dalecarlia³⁷, where bigger grinding stones are cut, hardly anyone reaches the age of 40 since most people die before 30 from consumption.

Coal miners, who are from a young age used to cut coal deposits in very confined spaces, become deformed from the constant bending of the whole body to one side.

Plasterers and **lime-workers** experience terrible coughing from the fine dust powder and ulcerous lips when the limestone is extinguished, and their hands are wrinkled but hardly ever scabby³⁸.

³⁴ Mercurial ointment was used as a treatment for syphilis.

³⁵ Painter's colic refers to lead poisoning. Pigments of colours included lead (Montes-Santiago, 2013).

³⁶ Tussis calculosa means cough from stones in the lungs which refers to silicosis. On the history of silicosis see Baldasseroni & Carnevale, 2017.

³⁷ Silicosis was observed by Linnaeus already during his Dalarna journey in 1733 (Uggla, 1953, p. 25-26; Casson, 2007, p. 69-70).

³⁸ In *Collegium diaeteticum*, eye symptoms were also described (Linnaeus, 1907b, p. 71).

Bricklayers staying in a damp place, like those who dare to live too soon (sooner than the proper time) in a new vault, constructed with stones and limestone, fall ill with ague, which is often deadly.

Potters become cachectic and pale from the damp place with moistened clay; they suffer from rheumatism of the hands and feet from trampling upon the cold clay; they are afflicted with contraction of the hands from the calcination of lead for the manufacture of glass.

Salt workers get scurvy, as is observed in many places, and bleary-eyed as attested by Behrn³⁹.

Winemakers are sleepy and dizzy due to the intoxicating fume of the wine cellar. Those involved in the grape harvesting urinate a hundred times a day, a wee bit, which is unusual. They become gloomy and skinny from excessive urination.

Cooks eventually suffer from the dullness of vision due to the (hours at the) fireplace.

Cleaners of cesspits⁴⁰ easily become bleary-eyed and almost blind from the worst stench; due to eyesore, they can scarcely spend four hours a day working, and afterwards, they sit the whole day in a dark place, cleansing their eyes with lukewarm water, for the stench is so corrosive that silver and copper containers turn black from it and could scarcely be cleaned. And this observation offered the most learned Ramazzini⁴¹ the first opportunity to write the book, which was praised so highly earlier. Hence the Learned and all others who wish to protect their eyes should keep a clean smell in their rooms, and no filthy pot should spoil their eyes⁴².

Corps bearers⁴³ are all almost pale, cachectic, and exposed to acute fevers. They also die suddenly from a lack of oxygen (asphyxia) if they enter without caution tombs that have been closed for a long time.

³⁹ Fredbärj suggests that the author is German doctor G.H. Behr (1708-61); the source is unidentified (Haglund & Fredbärj, 1955, p. 17).

⁴⁰ Latrine workers.

⁴¹ When discussing the diseases of cleaners of privies and cesspits, Ramazzini (1964, p. 97) mentioned that the idea of writing *De Morbis Artificum Diatriba* was based on the incident when he saw workmen cleaning the sewers outside his house.

⁴² It is mentioned in *Collegium diaeteticum*: "In Holland, when man did the cleansing job outside the city, the smell was so repulsive that when it reached the outskirts of the city, the inhabitants were bleak and morbid" (Linnaeus, 1907b, p. 64).

⁴³ Vespilones are technically corpse bearers, but Ramazzini (1964, p. 151-157) also includes others who care for the dead.

Butchers, who inhale the warm vapours of slaughtered animals every day, become wild and belligerent and cruel, and because of this, no butcher is allowed to act as a jury member in London in a capital crime case.

Tanners are almost all lurid and also suffer from shortness of breath from the stench.

Laundresses get cachexia from the damaging smell of lye and oedema from standing in the water. Due to the cold water, they have dysmenorrhoea and paronychia from the soap and sores on their hands due to the fingers' alternate hot and cold conditions.

Bathmen become cachectic, pale, and lurid from the hot, humid place, and the lack of fresh air.

Oilmakers as well as those who use bad oil in their lamps or poor quality tallow candles, experience numbness, headaches, and dizziness. However, those who press oil from walnuts in Italy⁴⁴ suffer the most from ill-health.

Candle manufacturers suffer from headaches, nausea, and vomiting due to the very bad stench of the melted tallow.

Fullers get cachexia, dyspnoea, cough, and loss of appetite (anorexia) from the smell of the soap, urine,⁴⁵ and oil, with which they clean woollen garments.

Starch-makers soften wheat with water in stone vessels for germination, and the wheat is then trampled with bare feet, so that they can then collect a pressed mass with their hands and dry the wet product in the sun. From this comes a terrible stench, so that they are sometimes forced to take a break, lest they suffocate. These people are seized by headaches, coughing, and breathing problems.

Millers suffer from consumption (phthisis) due to the airborne flour, and due to the same flour entering the lungs, they suffer from asthma and hydrops and become deaf from the sound of the milling stones⁴⁶.

Similarly, **bakers** become hoarse, short of breath, and asthmatic. They usually have bigger hands, for exercise enlarges the body part.

⁴⁴ In *Collegium diæticum* other geographical places mentioned were Holland, Gotland, Spain and Terra Sancta (Linnaeus, 1907b, p. 71).

⁴⁵ The Romans used urine from men or animals when washing clothes (Flohr, 2013).

⁴⁶ It is mentioned in *Collegium diæticum* that "millers also often have lice" (Linnaeus, 1907b, p. 66).

Wigmakers equally become short of breath from flour and weak-sighted due to dust.

Sifters become asthmatic, short of breath, and dropsical from the dust, which rises when the grain is shaken, but they become lousy and scabby from mites.

Wool-, flax- and silk-workers become pale, short of breath, and asthmatic from the dust of flax or hemp; and bleary-eyed from tufts of wool.

Carders of bags of silk seldom get old, for the sharp larvae of the silkworm are corrosive, and therefore whole families often die from consumption and are infected with the cough.

Charcoal burners are pale, coughing, asthmatic, and consumptive from the indissoluble carbon dust, which settles inside the lungs.

Builders become bent from heavy duties, with a back broken by hard work, resulting in pain in the back and the thighs. They get sciatica with the increased blood pressure of the small vessels caused by heavy weights, and they get hernias from lifting very heavy loads.

Porters from carrying loads become bent from their bodies which are bent to enter a vault. From the heavy loads, they get hernias and become asthmatic from lungs distended from the carrying.

Cobblers are bent, hunch-backed; limping with their knock-knees due to the continuous bending. They have thick arms and strong chest muscles, for hard work strengthens the diaphragm.

Tailors walk with measured steps due to their feet being squeezed together while sitting, and they develop a crooked back. Our nobler girls, already at the small frame, are kept busy by doing embroidery work and become hump-backed from the tension of the shoulder blades. Therefore, those who are wise should be careful.

Weavers get constipation from the pressure on the abdomen, as well as cirrhosis of the spleen and liver.

Female weavers are more lustful from the pressure of blood against the uterus. They often suffer from bleeding of the uterus. Due to the pressure on the thighs, they get sciatic pain.

Female dancers often suffer from menstrual pains because of the hardening of the uterus, as attested by Ramazzini⁴⁷.

⁴⁷ Diseases of female dancers are not mentioned in Ramazzini's work.

Running messengers shake their intestines by their running, overstrain their hearts, and distend their lungs. They often experience pain in the left side due to a swollen spleen. They often get hernias from exultation, and they are asthmatic from enlarged lungs.

Horsemen suffer from kidney stones due to strained and drained kidneys. They are lustful from the shaking of the genitals. Haemorrhoids develop from the friction and shaking of the anus. They suffer from blood in the urine (haematuria) from the shaking of a stiff body.

Singers get hernias, like babies who are crying excessively and musicians playing the trumpet. They spit blood (haemoptysis) because of the blood pressure on the trachea. Their eyes are red from loud shouting; hoarseness and angina result from the strain of this part of the body, just as the fastest horses begin to limp first. They (also) suffer from tinnitus or the trembling of the temples and throbbing headache from dilated blood vessels.

Female singers suffer quite often from menstrual pains (dysmenorrhoea), perhaps because the blood is diverted to the upper body parts.

Temple guards in India, who cry out the hours in a very loud voice, usually become blind, as Kämpfer⁴⁸ has noticed.

§. IV.

Let me summarise it briefly.

Standing workers, who stand on their feet the whole day, like royal chamberlains and diviners of the ancient (Romans), have varicose and eventually swollen (oedematous) feet. As Martial⁴⁹ says, “The diviner will become varicose.”

Sedentary workers like the learned and distinguished counsellors often suffer from constipated bowels, for movement stimulates excretions, but rest slows it down. They get haemorrhoids from constipation, as also from the right-angled position of iliac vessels when sitting.

⁴⁸ Engelbert Kämpfer (1651-1716) was German doctor and explorer. According to Fredbärj, the quote is from “*Amoenitatum exoticarum ...* (Lemgo, 1712, p. 106)” (Haglund & Fredbärj, 1955, p. 18).

⁴⁹ Skragge here quotes Ramazzini, who incorrectly mentions Martial as the source. The expression “*Varicosus fiet haruspex*” (“The soothsayer will soon get varicose veins”), however, is not from Martial but Juvenal (Satire 6) (Juvenal, Persius, 2004, p. 272-3).

Those who are exposed to **dust**, almost without exception, become short of breath and cough.

Those who are located in a **stinking** place are all pale and cachectic and have eye problems.

Moderate **work** enlarges a body part; excessive work destroys it, and too little work weakens it.

The end.

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APPENDIX

Table

Occurrence of occupations or occupational groups in Skragge's doctoral thesis (*Morbi Artificum*) compared to Linnaeus' *Diaeta naturalis* and *Collegium diætetikum*, and Ramazzini's *De Morbis Artificum Diatriba*

<i>Morbi Artificum</i>	<i>Diaeta naturalis</i>	<i>Collegium diætetikum</i>	<i>De Morbis Artificum Diatriba</i>
Farmers			x
Countrymen		x	x
Gardeners		x	x
The learned	x	x	x
Mathematicians and physicists			x
Doctors			x
Soldiers			x
Sailors			x
Assayers of metals	x	x	
Chemists		x	x
Miners	x	x	x
Lead workers		x	
White lead workers		x	
Tinsmiths		x	x
Coppersmiths	x	x	x
Blacksmiths		x	x
Steelsmiths	x		
Mercury miners			x
Ointment healers		x	x
Gilders		x	x
Typecasters	x	x	x
Painters		x	x
Stone-cutters	x	x	x
Coal miners			
Plasterers and lime-workers	x	x	x
Bricklayers		x	x
Potters	x	x	x

Salt workers			x
Winemakers		x	x
Cooks			
Cleaners of cesspits		x	x
Grave diggers		x	x
Butchers			x
Tanners		x	x
Laundresses		x	x
Bathmen		x	x
Oilmakers		x	x
Candle manufacturers		x	x
Fullers			x
Starch-makers		x	x
Millers		x	x
Bakers		x	x
Wigmakers		x	
Sifters		x	x
Wool-, flax- and silk-workers, carders of bags of silk		x	x
Charcoal burners	x	x	
Builders		x	x
Porters		x	x
Cobblers	x	x	x
Tailors			x
Weavers		x	x
Female weavers			x
Female dancers			
Running messengers	x	x	x
Horsemen	x	x	x
Singers		x	x
Female singers			x
Temple guards			
Standing workers		x	x
Sedentary workers	x	x	x

Sources: Uggla, 1958; Linnaeus, 1907b; and Ramazzini, 1964.

SAŽETAK

Ova studija prvi je potpuni prijevod s latinskog na engleski jezik Linnaeusove disertacije *Morbi Artificum* ili Profesionalne bolesti koju je Nicholas Skrage podnio 1765. Sastoji se od eseja koji disertaciju smješta u povijesni i znanstveni kontekst te od prijevoda. Skrageova disertacija nije samo značajna za povijest medicine rada već pruža i perspektivu Linnaeusova razmišljanja o dijetetici. Skrageov doktorski rad jedan je od 186 akademskih disertacija koje su obranili studenti Carla Linnaeusa. Prije ove studije samo su tri disertacije od tih 186 prevedene s latinskog na engleski. Prvi opsežan zbornik o profesionalnim bolestima Bernardina Ramazzinija, *De Morbis Artificum Diatriba*, poslužio je kao nacrt za Skrageovu disertaciju. Pozadina Skrageove disertacije bilo je Linnaeusovo opće zanimanje za sistematizaciju objekata prema određenim biološkim normama te metodologija koju je i sam primjenjivao u klasifikaciji bolesti u medicini. U disertaciji je vidljiv i Linnaeusov cjeloživotni naglasak na važnosti dijetetike. Konačno, u doba kada je Linnaeus živio (Doba slobode), Švedska se intenzivno usredotočila na poboljšanje gospodarstva zemlje. Budući da je država dala prednost trgovini i industriji, bilo je vrlo razumno mapirati bolesti kojima su radnici bili skloni.

Ključne riječi: dijetetika, Carl Linnaeus, profesionalne bolest, Bernardino Ramazzini