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An ordinary malaria? Intermittent fever in Denmark, 1826–1886

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Abstract

Intermittent fever is a historical diagnosis with a contested meaning. Historians have associated it with both benign malaria and severe epidemics during the Early Modern Era and early nineteenth century. Where other older medical diagnoses perished under changing medical paradigms, intermittent fever ‘survived’ into the twentieth century. This article studies the development in how intermittent fever was framed in Denmark between 1826 and 1886 through terminology, clinical symptoms and aetiology. In the 1820s and 1830s, intermittent fever was a broad disease category, which the diagnosis ‘koldfeber’. Danish physicians were inspired by Hippocratic teachings in the early nineteenth century, and patients were seen as having unique constitutions. For that reason, intermittent fevers presented itself as both benign and severe with a broad spectrum of clinical symptoms. As the Parisian school gradually replaced humoral pathology in the mid-nineteenth century, intermittent fever and koldfeber became synonymous for one disease condition with a nosography that resembles modern malaria. The nosography of intermittent fever remained consistent throughout the second half of the nineteenth century. Although intermittent fever was conceptualized as caused by miasmas throughout most of the nineteenth century, the discovery of the Plasmodium parasite in 1880 led to a change in the conceptualization of what miasmas were. The article concludes that the development of how intermittent fever was framed follows the changing scientific paradigms that shaped Danish medicine in the nineteenth century.

Keywords: Malaria; intermittent fever; diagnosing; Denmark; Hippocrates; Parisian school

Introduction

Medical diagnoses are widely acknowledged as social constructs. Their meaning is shaped by the perceptions of disease aetiology, causality and nosography at different points in time.¹ In 1832, for example, diabetes was described by a British physician as ‘frequent discharge of urine’.² In medical history, complexities arise when the original meanings of words go lost or are replaced with new ones, and the meaning and use of diagnoses have previously sparked long debates. The perhaps most well-known example is that of whether ‘plague’ and ‘pestilence’ referred to bubonic plague caused by the *Yersinia pestis* bacterium. An alternative interpretation was that ‘plague’ was a general synonym for

¹Most relevant is Charles Rosenberg, ‘Framing disease: Illness, society, and history’, in Charles Rosenberg (ed.), *Explaining Epidemics and Other Studies in the History of Medicine* (Cambridge: Cambridge University Press, 1992). Other relevant articles discussing social constructivism in medical history include Andrew Cunningham, ‘Identifying Diseases in the Past: Cutting the Gordian Knot’, *Asclepio*, 54, 1 (2002), 15–20; Jon Arrizabalanga, ‘Problematizing Retrospective Diagnosis in the History of Disease’, *Asclepio*, 54, 1 (2002), 53–55; P.D. Mitchell, ‘Retrospective Diagnosis and the Use of Historical Texts for Investigating Disease in the Past’, *International Journal of Paleopathology*, 1 (2011); Philip Roberts, ‘Diagnosis as an Artefact: A Case Study to Determine the Meaning of ‘Ague’ and ‘Remittent Fever’ in Nineteenth Century Victoria’, *The Artefact*, 37 (2014), 3–4.

²K. Codell Carter, ‘Causes of disease and causes of death’, *Continuity and Change*, 12, 2 (1997), 190.

severe epidemics in medieval and Early Modern Europe.³ Similar debates have occurred in the cases of other medical diagnoses. This article focuses on the case of the intermittent fever diagnosis. The historical intermittent fever diagnosis is commonly associated with malaria and, in the context of Europe, specifically with an extinct species of *Plasmodium vivax*.⁴ Other interpretations of the meaning of this diagnosis, however, exist as well. The Danish historian Jens Christian Manniche stated that ‘the main categories [of fevers in the early nineteenth century, ed.] were periodic and continuous fever, and the periodic could be either intermittent (ie. coming and going) or remittent (ie. rising and falling)’.⁵ Intermittent fever was by this definition a catchall term for disease conditions, where fever fits came and went in intervals. In Early Modern England, intermittent fever was used to describe severe epidemics. In 1891, the doctor Charles Creighton argued that ‘ague’, a British diagnosis today associated with intermittent fever, was originally used as synonym for ‘sharp fevers’ or ‘febris acuta’.⁶ Creighton published his book just 11 years after the discovery of the *Plasmodium* parasite in 1880, and his medical understanding was considerably different from that of today. Nevertheless, the historian Christopher Hamlin has more recently shared Creighton’s sentiment, arguing that ‘ague’ originally simply meant fever, and was used about ‘serious fevers’.⁷ In Denmark, Manniche argued that intermittent fever and its Danish-language parallel ‘koldfeber’ first became synonymous with modern malaria in the second half of the nineteenth century.⁸ Despite changing meanings, ‘koldfeber’ and intermittent fever remained permanent diagnoses in Danish medical statistics into the twentieth century.⁹ Adding to complexity, intermittent fevers were typically also associated with other country-specific diagnoses. ‘Ague’ exemplifies this in the English case. In Sweden and Finland, it was associated with the diagnosis ‘frossan’,¹⁰ and the Danish and Norwegian sister diagnosis for intermittent fever was ‘koldfeber’. The purpose of this article was to study the how the intermittent fever diagnosis was framed in Denmark between 1826 and 1886. The analysis focuses on development in applied terminology, clinical symptoms and aetiology. These three aspects are studied through case examples of epidemics in 1826, 1831, 1847–1848 and 1856, and through medical literature from 1886.

Cause-of-death registration by pastors became mandatory in Copenhagen in 1709. Here, it was up to the individual pastor to determine the cause of death, which led to a large variety of diagnoses such as ‘annoyance’, ‘nosebleed’ and ‘hiccup’.¹¹ Disease classification became increasingly common in Denmark in the middle of the eighteenth century with inspiration from the biological tradition of naming and classifying organisms.¹² Listed causes of death in Copenhagen during this period included ‘acute fevers’ and ‘teething’.¹³ At the end of the century, the cause-of-death registration

³Samuel K. Cohn Jr. made this revisionist argument in his book *The Black Death Transformed* (London and New York: Arnold and Oxford University Press, 2002). The revisionist school of thought was later criticized by eg. Lars Walløe, ‘Medieval and Modern Bubonic Plague: Some Clinical Continuities’, *Medical History*, 52, 27 (2007), and paleomicrobiological studies have confirmed the existence of *Y. pestis* bacteria in victims of plague.

⁴Otto S. Knottnerus, ‘Malaria around the North Sea: A Survey’, in Gerold Wefer, Wolfgang H. Berger, Karl-Ernst Behre, Eystein Jansen (eds), *Climate Development and History of the North Atlantic Realm* (Berlin and Heidelberg: Springer-Verlag, 2002).

⁵Jens Christian Manniche, ‘En dansk malariaepidemi?’, *Dansk medicinhistorisk årbog* (1997), 172.

⁶Charles Creighton, *A History of Epidemics in Britain from A.D. 664 to the Extinction of Plague*, (Cambridge: The University Press, 1891), 410–11.

⁷Christopher Hamlin, *More than hot. A short history of fever* (Baltimore: John Hopkins University Press, 2014), 28–29, 215–216.

⁸Manniche, *op. cit.* (note 5), 172–174.

⁹Nick Nyland, *De praktiserende læger i Danmark 1800–1910* (Odense: Audit Projekt Odense, 2000), 235.

¹⁰Mary Dobson, ‘Marsh Fever – The Geography of Malaria in England’, *Journal of Historical Geography*, 6, 4 (1980), 357–389; F.A. Bergman, *Om Sveriges Folksjukdomar II. Frossan* (Upsala: Akademiska Boktryckeriet, 1877), 118; Knottnerus, *op. cit.* (note 4), 340–341.

¹¹Hans Christian Johansen, ‘The Development of Reporting Systems for Causes of Deaths in Denmark’, *Journal of the History of Medicine and Allied Sciences*, 54, 2 (1999), 154–156.

¹²Morten A. Skydsgaard, *Ole Bang og en brydningstid i dansk medicin* (Aarhus: Aarhus Universitetsforlag, 2006), 94–95.

¹³Heinrich Callisen, *Physisk Medizinske Betragtninger over Kiøbenhavn bind 2* (Copenhagen: Frederik Brummers Forlag, 1809), 656–659.

system in Copenhagen became criticised, and with the founding of the Danish Royal Board of Health in 1803, a new reporting system was established with a reduced and standardised list of causes of death.¹⁴ In addition to the revised causes of death, physicians were also required to submit annual medical reports, in which they summarized the state of health in their districts.¹⁵ Throughout the nineteenth century, the diagnostic categories of disease and death changed and became increasingly specific. In the early nineteenth century, humoral pathological diagnoses such as ‘bilious fever’, ‘remittent fever’ and ‘intermittent fever’ were most frequent among physicians. In 1855, a common international medical statistical nomenclature was established at a conference in Brussels. Despite Danish attendance at this conference, the Danish statisticians did not adopt this new nomenclature. Instead, they established their own system of diagnoses, which was implemented in 1860.¹⁶ In this system, some of the older diagnoses, including ‘newbornness’ and ‘convulsions’, were removed. This system was criticised by the physicians for being based on practicality for the statisticians and not on medical knowledge.¹⁷ This criticism led to a revision in 1876.¹⁸ The respiratory diagnoses ‘breast catarrh’ and ‘pneumonia’ in the 1860 medical reporting system were replaced with ‘pneumonia crouposa’, ‘tracheobronchitis’ and ‘bronchopneumonia’. The diarrhoeal diagnosis ‘gastric and typhoid fever’ from 1860 was separated into ‘gastric fever’ and ‘typhoid fever’. A third diagnosis simply named ‘diarrhoea’ was omitted.

From the beginning of Danish medical surveillance in 1803, ‘koldfeber’ and ‘febris intermittens’ were used as synonyms in the medical surveillance system. Until 1876, ‘koldfeber’ appeared in headings of the Royal Board of Health’s annual medical reports. In 1877, ‘koldfeber’ was replaced with ‘febris intermittens’ in the medical record headings. In 1908–1910, ‘koldfeber’ and ‘febris intermittens’ were placed side by side in the headings. Intermittent fever hence persisted in official statistics, despite the changing terminologies, suggesting a continuous relevance in Danish medicine.

Intermittent fever – a contested diagnosis

The earliest research into the history of intermittent fever in northern Europe is from the late nineteenth century and was conducted by physicians.¹⁹ The field is characterised by descriptive publications and limited debate, and the number of publications varies from country to country. One important theme is the question of whether intermittent fever and its associated diagnoses were indeed malaria by modern definition. Although malaria remained endemic in The Netherlands into the mid-twentieth century, it had disappeared in the rest of northern Europe at the start of the twentieth century.²⁰ This means that there are limited parasitological findings of *Plasmodium* parasites from most northern European countries.

Intermittent fever was associated with severe epidemics in the Early Modern Era. As previously mentioned, Creighton argued that ague meant ‘sharp fever’ and not ‘malarial or climatic fevers’,²¹ and Christopher Hamlin also argued that ‘ague’ referred to an acute disease or a ‘serious fever’ as opposed

¹⁴Johansen, *op. cit.* (note 11), 154–156.

¹⁵Gerda Bonderup, ‘Medicinalberetninger og deres kontekst ca. 1800–1870’, in Gerda Bonderup, Jørgen Mikkelsen and Lisbeth Skjernov (eds.), *af yderste Vigtighed for det hele Borgersamfunds Tryghed. Medicinalberetninger og deres anvendelsesmuligheder i historisk forskning* (Haderslev: Selskabet til Udgivelse af Kilder til Dansk Historie, 2005), 17–21.

¹⁶Johansen, *op. cit.* (note 11), 159.

¹⁷*Ibid.*, 160.

¹⁸*Ibid.*, 160–162.

¹⁹See eg. Carl Adam Hansen, *Epidemiologiske undersøgelser angaaende Koldfeberen i Danmark*, (Copenhagen: Wilhelm Priors Hof-Boghandel, 1886); Carl Wesenberg Lund, ‘Contributions to the Biology of the Danish Culicidæ’, *Det Kgl. Danske Videnskabernes Selskabs Skrifter, Naturvidenskab og Mathematisk Afdeling*, 8, 7, 1 (1921); Sidney Pryce James, ‘The Disappearance of Malaria from England’, *Proceedings of the Royal Society of Medicine*, 23, 1 (1929), 71–87; Lewis Wendell Hackett, *Malaria in Europe. An Ecological Study* (London: Oxford University Press, 1937).

²⁰Knottnerus, *op. cit.* (note 4).

²¹Creighton, *op. cit.* (note 6), 410–411.

to malaria.²² In 1929, the doctor Sydney Price James argued that although malaria may have been present in England, it was never endemic in the entire country. James based this on observations of returning British soldiers with malaria after World War I not causing a permanent re-introduction of the disease.²³ In The Netherlands in 1938, Nico Swellengrebel and Abraham de Buck argued that the meaning of the nineteenth century Dutch ‘malaria’ had changed too.²⁴ Although it is clear that the relationship between intermittent fever and malaria in the Early Modern Era was questionable, during the nineteenth century, the diagnosis became synonymous with modern malaria in Britain and The Netherlands.

Intermittent fever in Denmark – a popular disease with a confusion etymology

The historiography of intermittent fever in Denmark can be dated back to 1886, when the doctor Carl Adam Hansen wrote a thesis on its epidemiology. Hansen used the diagnoses *koldfeber*, intermittent fever and malaria and the geographical diagnosis ‘Lolland fever’ as synonyms for the same disease condition. In a later article from 1913, he wrote ‘It [Lolland fever, ed.] is nothing but an ordinary *Koldfeber*, *Febris intermittens*, *Malaria*’.²⁵ He stated that ‘during the end of the previous century [eighteenth century, ed.] and beginning of this century [*koldfeber* was, ed.] one of the most common diseases’.²⁶ In doing so, he framed intermittent fever as a common disease in the Early Modern Era. Hansen’s findings have since been a major influence in later historiography. In a volume about the social history of seventeenth century Denmark, Allan Hjorth Rasmussen stated that: ‘one of the most common diseases was *koldfeber* or the cold sickness. It appeared in epidemics with seizures every second, third or fourth day with chills, followed by heat flushes and sweating’.²⁷

In the subsequent volume, which covered the period 1720–1790, he again concluded that *koldfeber* was one of the most common diseases in Denmark.²⁸ Although Rasmussen did not synonymize *koldfeber* with intermittent fever or malaria by modern definition, he used Hansen’s framing of *koldfeber* as a common disease. He also synonymized *koldfeber* with ‘cold sickness’. This link is unclear, and very little is known about what ‘cold sickness’ was. It is not mentioned in Hansen’s scholarship but has also been linked with *koldfeber* in later publications. In 1989, Knud Riewerts Eriksen linked these two diagnoses, citing a poem by the Danish poet Ambrosius Stub in which ‘the cold sickness’ is mentioned.²⁹ Rasmussen was pre-occupied with the social history of seventeenth century Denmark, and Ambrosius Stub died in 1758. ‘Cold sickness’ thus seems to belong to the seventeenth and eighteenth centuries and is nowhere to be found in nineteenth-century Danish medical literature.

Another example of Hansen’s influence comes from a book about the history of Denmark from 1990. Here, historian Claus Bjørn stated that: ‘Even into the first half of the nineteenth century, the “Lolland fever” – a form of malaria – contributed to the life expectancy in the Lolland-Falster diocese being shorter than in other parts of the country’.³⁰

²²Hamlin, *op. cit.* (note 7), 28–29, 215–216.

²³James, *op. cit.* (note 19).

²⁴Nico Swellengrebel and Abraham de Buck, *Malaria in the Netherlands* (Amsterdam: Scheltema & Holkema Ltd., 1938), 9–10.

²⁵Carl Adam Hansen, Den ‘Iollandske feber’, *Lolland-Falsters historiske Samfunds Aarbog*, 1 (1913), 46.

²⁶Hansen, *op. cit.* (note 19), 148.

²⁷Allan Hjorth Rasmussen, ‘Lægedom’, in Axel Steenberg (ed.), *Dagligliv i Danmark 1620–1720: I fløj eller vadmel* (Copenhagen: Nyt Nordisk Forlag, 1969–1971), 248.

²⁸Allan Hjorth Rasmussen, ‘Lægedom’, in Axel Steenberg (ed.), *Dagligliv i Danmark 1720–1790: Nyttige kundskaber og honnet ambition* (Copenhagen: Nyt Nordisk Forlag, 1969–1971), 210.

²⁹Knud Riewerts Eriksen and Niels H. Riewerts Eriksen, ‘Malaria i Skandinavien’, *Bibliotek for Læger/Medicinske Forum*, 1989, 144.

³⁰Claus Bjørn, *Gyldendal og Politikens Danmarkshistorie – fra reaktion til grundlov. 1800–1850*, 10 (Copenhagen: Gyldendal, 1990), 14.

Bjørn used ‘Lolland fever’ as a synonym for malaria, in the same way Hansen did. Like Hansen and Rasmussen, Bjørn also framed this disease as common in the Early Modern Era, with profound demographic consequences for Lolland-Falster.

Hansen’s scholarship has also been influential in other ways. A severe epidemic in 1831 has been associated with koldfeber and modern malaria. In 1848, this epidemic was diagnosed as a ‘koldfeber’ epidemic.³¹ He repeated the use of koldfeber with respect to the epidemic. Hansen used koldfeber as a synonym for malaria, and by doing so, he popularised the idea that the 1831 epidemic was modern malaria. Most of the later literature, most of which has been popular history, has cited Hansen and his link between the epidemic and malaria.³² In 1997, however, historian Jens Christian Manniche questioned the relationship between the 1831 epidemic and modern malaria. He instead speculated that the epidemic may have been caused by mould infections in the grain, and he argued that koldfeber first became synonymous with malaria in the second half of the nineteenth century.³³

In summary, the historiography of koldfeber, intermittent fever and malaria in Denmark contrasts that of England. Whereas the English historiography has been driven by a critical approach to the meaning of ‘ague’, the Danish historiography is characterised with repetitions of Carl Adam Hansen’s conclusions from 1886. Thus, the understanding of how intermittent fever and koldfeber were used in Denmark is based on the opinions of one doctor 135 years ago.

Medical thinking in the nineteenth century

Medical diagnoses are framed through medical thinking. In the early decades of the nineteenth century, multiple medical systems co-existed in Denmark. European physicians had since antiquity based their practices on the teachings of Hippocrates. According to the Hippocratic texts, the body consisted of four biles – black, yellow, phlegm and blood – and disease occurred when an imbalance occurred between the biles. Imbalances could be provoked by six so-called non-natural categories. The weather, the constitution of air, the diet and the moral were among these categories.³⁴ During the Early Modern Era, new medical systems developed, and according to historian Morten Skydsgaard, most physicians had developed their own medical systems by the end of the eighteenth century.³⁵ These systems tried to explain the cause of disease in their own way, but many sought inspirations from the Hippocratic texts. The system that came to dominate Danish medicine in the late eighteenth century was developed by the physician Frederik Ludvig Bang in his book *Praxis Medica* from 1789.³⁶ In the 1820s, a new school of thought originating from Paris became increasingly popular in Denmark. The Parisian school dictated that medicine should be based on scientific and evidence-based principles rather than anecdotal meteorological observations.³⁷ Autopsies and the use of statistics became integral methods in studying and understanding diseases. Previously, each patient had been seen as having had a unique constitution. The use of statistics, however, required that diseases and patients be

³¹Hansen, *op. cit.* (note 19), 150–157.

³²See: Otto Andersen, ‘A malaria epidemic in Denmark’, in Hubert Charbonneau and Andre Larose (eds.), *The Great Mortalities: Methodological Studies of Demographic Crises in the Past* (1982), 33–49; Jens Larsen, ‘Myggestik’, *Skalk*, 3 (1977), 18–26; Leonard Bruce-Chwatt and Julian de Zulueta, *The Rise and Fall of Malaria in Europe. A Historico-epidemiological Study* (Oxford: Oxford University Press, 1980), 118–120; Jakob Eberhardt, *Verdenshistoriens største epidemier* (Copenhagen: FADLs Forlag, 2017), 225–227; Jeanette Varberg and Poul Duedahl, *Den fjerde rytter. 10.000 års epidemihistorie* (Copenhagen: Gads Forlag, 2020), 169–186.

³³Manniche, *op. cit.* (note 5), 172–175.

³⁴Frank Snowden, *Epidemics and Society: From the Black Death to the Present* (New Haven, CT: Yale University Press, 2019), 17–20.

³⁵Skydsgaard, *op. cit.* (note 12), 71–73.

³⁶Skydsgaard, *op. cit.* (note 12), 74.

³⁷Skydsgaard, *op. cit.* (note 12) 120, 139, 251–252.

perceived as groups instead of unique individuals.³⁸ Inspired by the work of Louis Pasteur and Joseph Lister, physicians in Europe became increasingly attentive to the field of bacteriology in the 1860s. It was first introduced in Denmark by the physician Carl Julius Salomonsen, who in 1873 infected a rabbit with streptococcal bacteria from a hospitalised patient, and from the 1880s, germ theory came to dominate Danish medicine with microscopy as a common method of diagnostics.³⁹ During the course of a century, physicians hence went from conducting inquiries about humoral balances in the individual at the patient's bedside to statistical analyses, autopsies and microbiological studies.

Before the breakthrough of the germ theory, intermittent fever was framed through the Hippocratic miasma theory.⁴⁰ The word 'malaria' itself means 'bad air' in Italian.⁴¹ According to miasma theory, disease was caused by pathogenic vapours. Miasmatic vapours were products of the physical environment and occurred when an imbalance took place in the environment. Physicians conducted what historian Morten Skydsgaard has called medico-meteorological reportages in the early decades of the nineteenth century. These were amateur meteorological observations, where unnatural and unexplainable weather phenomena were credited as the cause of epidemics.⁴²

An important category of diseases in Hippocratic medicine was the fevers. Hippocratic fever diagnoses were reflections of the physicians' syndromic observations, and fevers were both diagnoses and clinical manifestations.⁴³ They were fluid, and during an illness, a patient could go from having an 'intermittent fever' to having a 'typhoid fever'. Furthermore, the term 'fever' was, according to Manniche and Hamlin, based on the subjective feeling of illness, and the importance of body temperature as an objective criterion developed only in the 1860s, when medical thermometers were introduced.⁴⁴ A dramatic paradigm shift, however, took place in the 1870s, when germ theory began its gradual breakthrough. In 1880, the *Plasmodium* parasite causing malaria by its modern definition was discovered by the French surgeon Alphonse Charles Laveran, and in 1897–1898, the mode of transmission between humans and mosquitoes was discovered by the British physician Ronald Ross.⁴⁵ During the 1880s to 1890s, medical diagnosis through microscopy became common in Denmark.⁴⁶ This development meant that the miasma theory paradigm increasingly became challenged by microbe theory.

Sources and methods

The first Danish medical literature in which 'febris intermittens' was used is in Latin and is from the seventeenth century. The first Danish-language article with 'koldfeber' is from 1797.⁴⁷ In a medical topography of Copenhagen from 1809, physician Heinrich Callisen described koldfeber as a very common disease in the city.⁴⁸ The introduction of the word 'koldfeber' into medical literature at the turn of the century probably reflected medical literature increasingly being written in Danish. Source material for this article was selected using the bibliographic database *Bibliotheca Medica Danica* (BMD) that has indexed all Danish medical literature between 1479 and 1913. Between 1797 and 1913, there

³⁸Morten A. Skydsgaard, 'It's Probably in the Air: Medical Meteorology in Denmark, 1810–1875'. *Medical History* 54 (2010), 231.

³⁹Morten A. Skydsgaard, 'Medicin', in Peter C. Kjærgaard (ed.), *Dansk Naturvidenskabs Historie, bd. 3. Lys over landet 1850–1920* (Aarhus: Aarhus Universitetsforlag, 2006), 225–229; Edvard Gotfredsen, *Medicinens historie*, 3rd edn (Copenhagen: Nyt Nordisk Forlag, 1973), 456–457.

⁴⁰Dobson, *op. cit.* (note 8), 371; Knottnerus, *op. cit.* (note 4), 348.

⁴¹Mary Lindemann, *Medicine and Society in Early Modern Europe*. 2nd edn (Cambridge: Cambridge University Press, 2013), 81.

⁴²Skydsgaard, *op. cit.* (note 38), 218–220.

⁴³Lindemann, *op. cit.* (note 41), 12–13; Hamlin, *op. cit.* (note 7), 18.

⁴⁴Manniche, *op. cit.* (note 5), 171–172; Hamlin, *op. cit.* (note 7), 252–255.

⁴⁵Gordon C. Cook, *Tropical Medicine: An Illustrated History of the Pioneers* (London: Elsevier 2007), 70–76.

⁴⁶Gotfredsen, *op. cit.* (note 39), 456–457.

⁴⁷Claus Julius de Meza, 'Om en ikke med sædvanlige Tilfælde forekommende andendags Feber, og noget om forblummede Koldfebre i Almindelighed', *Physiolsk, oekonomisk og medicochirurgisk Bibliothek for Danmark og Norge*, 10 (1797), 121–132.

⁴⁸Callisen, *op. cit.* (note 13), 539–540.

were 54 articles about either koldfeber, malaria or intermittent fever. Fifteen articles described treatment and rarely provided clinical descriptions. Seventeen articles described clinical symptoms. Most of these described individual cases characterized as ‘curious’. Twelve articles described koldfeber, and ten of these described epidemics. Four articles listed in the BMD described the epidemic in 1831. Finally, six articles described the aetiology of koldfeber.

The selected source material is composed mostly of articles about epidemics and spans the period 1827–1886. This choice is because articles describing epidemics contain both clinical symptoms and the aetiology of outbreaks. Epidemics included took place in 1826, 1831, 1847–1848 and 1856. The physicians Andreas Frederik Bremer and Carl Emil Fenger dubbed the period 1825–1834 a ‘koldfeber period’ because of a common presence of intermittent fever with two notable epidemics in 1826 and 1831.⁴⁹

Articles about the 1826 and 1831 epidemics in medical journals were supplemented with annual medical reports to the Royal Board of Health by physicians that experienced the epidemics. The annual medical reports by the district physician for the Langeland medical district will be used as the source for the 1826 epidemic. For the 1831 epidemic, annual medical reports by local practitioners and district physicians will be used together with special reports written by physicians and medical students that were deployed to the areas affected by the epidemic.

Although the published articles were lengthy academic products with references to other literature, the annual and special reports were short and concise. In 1847–1848, a koldfeber epidemic was described in Lolland,⁵⁰ and in 1856, a koldfeber epidemic was recorded in Copenhagen and northern Zealand.⁵¹

As seen previously, Carl Adam Hansen published multiple academic texts on koldfeber in 1886. Contrary to the other selected literature, Hansen did not describe a specific epidemic. He nevertheless provided thorough descriptions of the terminology, clinical descriptions and aetiology of koldfeber, making his contribution vital to a period in which medicine was changing. Although they were the starting point for the Danish malaria historiography, Hansen’s publications are also considered sources in this article.

Terminology

As seen previously, the meaning of ‘fever’ has undergone changes. According to historian Nick Nyland, ‘fever’ itself was perceived as an ‘independent disease’ throughout most of the nineteenth century. There were multiple types of fevers, including continuous, remittent, catarrhal, putrid, intermittent and exanthematic fevers.⁵² Intermittent fever had three subtypes – quartan, quotidian and tertian fevers – all of which described the intervals between symptom exhibitions. Similar to the cases of other countries, other diagnoses were linked with intermittent fever in the case of Denmark, which created a complex of related diagnoses. Examples in this article include koldfeber, malaria, Lolland fever, Zealand fever, swamp fever and harvest fever. In both historical sources and subsequent literature, these diagnoses have been used as synonyms, while also having had somewhat unclear individual meanings. In this article, I use different diagnoses from this complex framework, all depending on when sources dictate it.

The terminology of intermittent fever

Bremer and Fenger argued that the previously described ‘koldfeber period’ began in 1825. Koldfeber had, according to them, been absent from Denmark since the eighteenth century but returned in epidemic

⁴⁹Andreas Frederik Bremer, ‘Om Koldfeber-Epidemierne i Danmark i Aarene 1825-34’, *Det kongelige medicinske Selskabs Skrifter*, ny række, 1. bind (1848), 125–138; Carl Emil Fenger, ‘Om Koldfeber-Epidemiernes Indvirkning paa Dødeligheds-og Befolknings-Forholdene i Danmark’, *Det kongelige medicinske Selskabs Skrifter*, ny række, 1. bind (1848), 139–171.

⁵⁰Ernst Julius Haderup, ‘Koldfeber-epidemi i Vesterborg og Omegn i 1847–48’, *Bibliothek for Læger*, 3 (1848), 336–361.

⁵¹Daniel Cold, ‘Beretning om Koldfeber-epidemien i Frederiksværk og Omegn 1856’, *Ugeskrift for Læger*, 2, 26 (1857), 109–114; Sophus Engelsted, ‘Koldfeberens Udbredelse over Kjöbenhavn i Semestret fra 1ste Marts til 31te August 1856’, *Ugeskrift for Læger*, 2, 25 (1857), 337–346.

⁵²Nyland, *op. cit.* (note 9), 234.

form after a storm surge on the night of February 5, 1825, that caused flooding in The Netherlands, northern Germany and the Danish west coast.⁵³ The connection between koldfeber and a storm surge reflects how miasma theory was used to explain the causes of epidemics in the early nineteenth century. Bremer and Fenger stated that in all of Denmark, epidemics of ‘quartan fevers’ took place in 1825 and 1826. He associated ‘quartan fever’ with ‘koldfeber’, thereby linking the Latin-language subtype of intermittent fever with the Danish koldfeber diagnosis.

A large koldfeber epidemic took place in 1826 on the island of Langeland in southeastern Denmark. In his report to the Royal Board of Health, the district physician in Langeland described it as a ‘bilious koldfeber’.⁵⁴ The humoral pathological term ‘bilious’ was used when patients exhibited either vomit or faeces.⁵⁵ In a description of this outbreak given by a pastor to a physician in Copenhagen, koldfeber and ‘third-day’ fever were used as synonyms for the same disease condition.⁵⁶ When the epidemic broke out, local authorities issued pamphlets with information about the disease. Here, the epidemic was also called koldfeber. In the pamphlets, ‘koldfeber’ was categorised by the number of days between fever paroxysms of rigors, heat and sweat.⁵⁷ In the Royal Board of Health’s printed medical report for 1826, the epidemic was named a ‘malignant koldfeber’.⁵⁸ Here, ‘benign’ forms of koldfeber were also described as having occurred in other parts of Denmark during the spring.⁵⁹ Although all the accounts of the 1826 epidemic seemed to agree that it was a koldfeber epidemic, the adjectives applied to describe it varied between the accounts.

Bremer and Fenger’s koldfeber period climaxed with a large epidemic in the fall of 1831. Contrary to the 1826 epidemic, physicians that attended during this epidemic used a wider array of fever diagnoses to describe it.⁶⁰ The most commonly used diagnoses were ‘febris biliosa’, ‘febris intermittens’, ‘febris remittens’, ‘typhus’ and ‘febris rheumatica’, and the diagnoses were often used together.⁶¹ One chief medical officer, for example, described how the epidemic was caused by ‘remittent bilious fevers (harvest fevers, swamp fevers)’ combined with ‘intermittent fevers’.⁶² The chief medical officer for the North Zealand medical region noted that the ‘epidemic fever [...] belongs to the intermittent fevers class’, but that its behavior differed between regions. He described the epidemic as an ‘intermittent fever’ and a ‘remittent gastric fever’ in one part of his district and as a ‘common koldfeber’ in the other part of his district, thereby distinguishing between the ‘epidemic fever’ and koldfeber.⁶³ Some physicians, however, used ‘intermittent fever’ and ‘koldfeber’ as

⁵³Bremer, *op. cit.* (note 49), 130.

⁵⁴Friedrich Christian Gebhard. *Medicinal Indberetning for Aaret 1826*. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1826, Øerne*.

⁵⁵Hamlin, *op. cit.* (note 7), 46–47.

⁵⁶Frederik Vilhelm Mansa, ‘Nogle Efterretninger om den for Tiden paa Langeland herskende Koldfeberepidemie’, *Hygæa*, 1 (1827), 168–174, 183–185.

⁵⁷*Ibid.*, 192–193.

⁵⁸*Bibliothek for Læger*, 1, 7 (1827), 298.

⁵⁹*Ibid.*, 277, 284–285.

⁶⁰Emil Hornemann, ‘Erindringer fra den sjællandske epidemi i 1831’, *Hygiejniske Meddelelser*, 2 (1884), 175–176; Ditzel, Christian Andreas. *No title*. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland, Indberetninger ang. Epidemien paa Sjælland 1831*.

⁶¹Accounts are found in the following reports of the same source collection: Jacob Vilhelm Jespersen. *No title, August 28, 1831*. Jensen. *No title, August 27, 1831*. Henrik Carl Bang Bendz. *No title, September 2, 1831*. Hans Olfert Christian Sommerfeldt. *No title, September 9 and November 7, 1831*. Christian Andreas Ditzel. *No title, Andreas Frederik Toft. No title, November 5, 1831*. Villiam Gotfred Jacob Kietz, *No title, November 7, 1831*. Thomas Jensen, *No title, November 24, 1831*. Carl Emil Schjørring Döllner. *Indberetning til det kongelige Sundheds-Collegium om den paa grevskabet Bregentved i Efteraaret 1831 herskende Epidemie*. Reports. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland, Indberetninger ang. Epidemien paa Sjælland 1831*.

⁶²Christian Leth, ‘Den epidemiske Feber i det søndre-sjællandske Landphysicat’, *Bibliothek for Læger*, 1, 17 (1832), 82–83.

⁶³Christopher Arends, ‘Den epidemiske Feber i det nordre-sjællandske Landphysicat’, *Bibliothek for Læger*, 1, 17 (1832), 73–75.

synonyms in their accounts of the epidemic.⁶⁴ One physician called it a ‘kind of the long-prevailing koldfeber’, and another noted how, during the course of the epidemic, the disease progressed into a ‘masked koldfeber’.⁶⁵ One physician observed how patients who had recovered from the epidemic in July and August were struck with koldfeber, which he dubbed the ‘prevailing plague’ of the spring and fall.⁶⁶

The epidemic itself was detached from the fever diagnoses, and as seen previously, some referred to the epidemic itself as ‘epidemic fever’. As noted previously, fevers could change during the course of an illness, and the physicians’ versatile diagnostic vocabulary likely reflected the patients’ experiencing changing clinical symptoms during their illness. This hence reflects how Danish medicine was influenced by Hippocratic thinking in the early nineteenth century. Moreover, the various applications of the ‘koldfeber’ diagnosis during the two epidemics illustrate a complex relationship. Some physicians used koldfeber and intermittent fever as synonyms, whereas others distinguished between the two diagnoses, perceiving instead ‘the common koldfeber’ as an independent disease condition. The physicians attending during the 1831 epidemic had read Frederik Ludvig Bang’s *Praxis Medica* in medical school.⁶⁷ Here, Bang used ‘febris intermittens’ as a synonym for ‘das kalte fieber’ or koldfeber.⁶⁸

Finally, some physicians used diagnoses during the 1831 epidemic that referred to geography or seasonality. The diagnoses ‘swamp fevers’ and ‘Zealand fevers’ were bound to specific geographical settings, and ‘harvest fevers’ referred to a specific seasonality.⁶⁹ Mapping fevers according to geography was, according to Christopher Hamlin, ‘a form of flag planting; it signified mastery over that place’.⁷⁰ By assigning such names as ‘Lolland fevers’, ‘Zealand fevers’ and ‘swamp fevers’, the physicians documented the disease conditions that were uniquely bound to a specific aetiology.

What characterizes both epidemics is that they were detached from the fever diagnoses. In 1826, the physicians used ‘koldfeber’ exclusively to describe the epidemic. With ‘koldfeber’, however, they describe both mild and severe disease conditions. The 1831 epidemic was described through a wide array of fevers. Here, the relationship between koldfeber and intermittent fever was noncoherent. Some physicians used ‘koldfeber’ and ‘intermittent fever’ as synonyms, whereas others did not. The wide array of fevers and different perceptions of koldfeber in relation to intermittent fever may have been a consequence of changing clinical symptoms. It may also have been a consequence of the epidemic’s scope, as many more physicians and surgeons were involved with the 1831 epidemic than the 1826 epidemic.

In the springs of 1847 and 1848, two koldfeber epidemics took place in western Lolland in southeastern Denmark. A practitioner in the area named Ernst Julius Haderup described the epidemics in an article published in the medical journal *Bibliothek for Læger*. Haderup used ‘koldfeber’ and ‘febris intermittens’ as synonyms for the same disease condition and applied the quartan, quotidian and tertian fever categories to describe the different subtypes of intermittent fever.⁷¹ This differed from the framing of ‘koldfeber’ in the 1826 and 1831 epidemics, where ‘koldfeber’ had been framed as one intermittent fever among several, which could take on both severe and mild manifestations. Haderup’s district had also been subject to the

⁶⁴Reports from Jacob Vilhelm Jespersen. *No title, August 28, 1831*. Carl Emil Schjørring Døllner. *Indberetning til det kongelige Sundheds-Collegium om den paa grevskabet Bregentved i Efteraaret 1831 herskende Epidemie*. Carl Frederik Hansen. *Underdanigst Indberetning i Aaret 1831*. Christian Skaarup Christopher. *Medicinal-Indberetning for den deel af Kjøge Distrikts-chirurgicat, som henhører under det søndre Landphysicat*, Reports. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland*.

⁶⁵Jacob Vilhelm Jespersen. *No title, August 28, 1831*, and Carl Emil Schjørring Døllner. *Indberetning til det kongelige Sundheds-Collegium om den paa grevskabet Bregentved i Efteraaret 1831 herskende Epidemie*. Reports. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland, Indberetninger ang. Epidemien paa Sjælland 1831*.

⁶⁶Eiler Kongsted, ‘Nogle Bemærkninger om Epidemien 1831, saaledes som den viste sig i Ods-Herred’, *Bibliothek for Læger*, 17 (1832), 282–283.

⁶⁷Skydsgaard, *op. cit.* (note 12) 74.

⁶⁸Friedrich Ludwig Bang, *Medicinsche Praxis, systematisch erklärt und mit ausgewählten Krankengeschichten, aus dem Tagebuche des Friedrichs-Hospitals erläutert* (Copenhagen: Christian Gottlob Probst, 1791), 64.

⁶⁹Hornemann, *op. cit.* (note 60), 197, 200.

⁷⁰Hamlin, *op. cit.* (note 7), 208.

⁷¹Haderup, *op. cit.* (note 50), 342–345.

1831 epidemic, and in his account, he referred to both the 1831 and 1847–1848 epidemics as ‘koldfeber’.⁷² He had opened practice in 1832 and, therefore, did not have first-hand experience with patients during the 1831 epidemic. Having graduated from medical school in 1831, Haderup nevertheless belonged to the same generation of physicians as those who attended during the 1831 epidemic. When Haderup’s framing of ‘koldfeber’ was less versatile than that of the 1826 and 1831 epidemics, it cannot be due to generational differences in training. The more likely explanation is that Haderup had since been inspired by the Parisian school, where diseases and patients were treated as groups rather than individuals with unique disease courses. This is seen through a frequent use of statistics in the article. In 1856, northern Zealand and Copenhagen experienced a koldfeber epidemic in the spring and early summer. Two accounts exist from this epidemic: a medical journal article about the epidemic in Copenhagen, written by the physician Sophus Engelsted, and a medical journal article about the epidemic in northern Zealand, written by Daniel Cold, who was a practitioner in the town of Frederiksværk. In Engelsted’s account, only ‘koldfeber’ was used.⁷³ Cold, however, described it as ‘koldfeber’, ‘tertian fever’ and ‘quotidian fever’. He also referred to Engelsted’s article, which indicates that he associated his epidemic with Engelsted’s.⁷⁴ Cold made a statistical analysis of the epidemic in Frederiksværk’s hinterlands, and Engelsted studied risk factors at the neighbourhood and household levels.⁷⁵ Both articles at the same time lacked substantial clinical descriptions of patients. Engelsted and Cold had both studied medicine in the 1840s, where the Parisian school had come to influence Danish medicine. Both articles were published in the medical journal *Ugeskrift for Læger*, which had been established in 1839 by a young generation of physicians inspired by the Parisian school.⁷⁶ The statistical methods and framing of ‘koldfeber’ as one disease condition rather than one fever among several, seen in the articles by Haderup, Cold and Engelsted, reflects how the Parisian school had changed the way diseases were studied.

In his thesis from 1886, Carl Adam Hansen used ‘koldfeber’, ‘febris intermittens’ and ‘the malaria disease’ synonymously. He also used geographical diagnoses such as ‘Lolland fever’, ‘Zealand fever’ and ‘Langeland fever’ as synonyms for intermittent fever.⁷⁷ Despite the differences in names, Hansen considered them as the same disease condition. He argued that while physicians of the early nineteenth century had an ambiguous definition of intermittent fever, physicians in the late nineteenth century perceived it as one disease that manifested in different ways. Hence, in Hansen’s account, there was no temporal development in the definition of koldfeber. He considered it to be a disease that had previously been very common, but now was gone. He described how the emergence of koldfeber in the Middle Ages caused migration and how it became common in the Early Modern Era. He also described how elderly people in the 1880s still talked about lying ill with koldfeber every spring and how they referred to 1831 as the ‘fever year’.⁷⁸ Finally, Hansen argued that koldfeber disappeared from Denmark after 1834, before re-appearing in another koldfeber period that began in 1861.⁷⁹

Throughout the period 1826–1886, there was great development in how and when ‘intermittent fever’ and ‘koldfeber’ were used. In 1826 and 1831, intermittent fever was a broad category of fevers, of which koldfeber was one. The diagnoses could manifest in both benign and severe forms and were applied together with a wide array of other Hippocratic fevers. Whether they were applied or not was furthermore also dependent on the physician making the diagnosis. From the mid-nineteenth century, where the Parisian school gained influence in Denmark, ‘koldfeber’ and ‘intermittent fever’ became synonyms for one disease condition. The definition of ‘koldfeber’ was similar in all accounts from this period, indicating that a common understanding had taken shape. This process occurred not only for

⁷²Haderup, *op. cit.* (note 50), 339.

⁷³Engelsted, *op. cit.* (note 51), 337–346.

⁷⁴Cold, *op. cit.* (note 51), 109–114.

⁷⁵Engelsted, *op. cit.* (note 51), 337–346.

⁷⁶Skydsgaard, *op. cit.* (note 12), 161.

⁷⁷Carl Adam Hansen, ‘Om Koldfeberens Typer og Former i Danmark’, *Hospitals-Tidende*, 3 (1886), 25–26, 64.

⁷⁸Hansen, *op. cit.* (note 11), 21–34, 152.

⁷⁹Hansen, *op. cit.* (note 11), 34, 161.

Table 1. Clinical and epidemiological features of intermittent fever in 1826, 1831, 1848 and 1886

1826	1831	1848	1886
Fever	Fever	Fever paroxysms of chills, heat and sweat	Fever paroxysms of chills, heat and sweat
Rheumatic pains	Rheumatic pains	Spleen enlargement	Spleen enlargement
Rash	Rash	Convulsions	Spring disease
Stomach aches	Fatigue	Neuralgia	
Headache	Headache	Pleurisy	
Diarrhoea	Diarrhoea	Spring disease	
Vomiting	Vomiting		
Oedema	Delirium and hallucinations		
Jaundice	Bloody stools		
'Black' vomit	'Black' vomit		
Pneumonia	'Dark'/'reddish' urine		
Delirium	Jaundice		
'Phantasies'	Oedema		
Long recovery	Gangrene		
Autumnal and winter disease	Long recovery		
	Autumnal disease		

The clinical and epidemiological features of intermittent fever in 1826, 1831, 1848 and 1886 are summarized in Table 1.

diagnoses at that time, but also retrospectively: Bremer and Fenger both retrospectively diagnosed the period 1825–1834 as a koldfeber period, and Haderup and Hansen used the koldfeber diagnosis about the 1831 epidemic.

The clinical characteristics of intermittent fever

With a changing use and framing of koldfeber came changing clinical manifestations of the disease. In Bremer's account of the 1826 epidemic, he described the symptoms of 'quartan fever' as:

[I]n all districts [...] the quartan fever is referred to as common and slightly recurring, although not yet this year, as the following with a clear inflammatory character, that manifested through brain-affections as delirium and phantasies during the paroxysm, less commonly with pneumonia....⁸⁰

In descriptions of 'koldfeber' in 1828 and 1829, Bremer associated it with vomiting, joint pains, diarrhoea and spleen enlargements, and in his descriptions from 1831, he associated 'koldfeber' with joint pains, fever, bloody vomiting, diarrhoea, fatigue and jaundice.⁸¹ The most important symptoms in the pastor's descriptions of the 1826 epidemic were irregular fever with joint pains, stomach aches, headaches, diarrhoea and vomiting, including cases of 'black' vomit. Patients were weak long after the epidemic ended, and both during the epidemic and afterwards, women lost their menstruation. He also noted dropsy and lung infections as sequelae to the epidemic.⁸² In the pamphlets distributed in 1826, koldfeber is described as:

[A] malaise [with, ed.] a period of more or less illness-free condition. The malaise that makes up the paroxysm, begins with shivers, followed by heat with headache, thirst, pain down the back and in all limbs, and is ended with sweat. After the sweat comes a nearly disease-free period called "the good period", in which the ill only complains about bitter taste, food aversion, exhaustion, etc.⁸³

⁸⁰Bremer, *op. cit.* (note 49), 130.

⁸¹Bremer, *op. cit.* (note 49), 131–133.

⁸²Mansa, *op. cit.* (note 56), 184–185.

⁸³*Ibid.*, 192–193.

‘Koldfeber’ was by this definition defined as a condition with intermittent paroxysms of rigors, heat and sweat followed by ‘the good period’. This description is very similar to that found in Bang’s influential *Praxis Medica* from 1791.⁸⁴ The descriptions of ‘koldfeber’ seen during the 1826 epidemic differ considerably from this definition. The district physician in Langeland associated koldfeber with jaundice, oedema and rashes,⁸⁵ and in the medical report from the Royal Board of Health, koldfeber was associated with ‘typhoid symptoms’.⁸⁶ In 1826, the term ‘typhoid’ described complications to a pre-existing course of illness and not enteric symptoms, as it would come to in the following decades.⁸⁷

All accounts of the epidemic mention fever as an important symptom. The account by Pastor Plesner placed a particular emphasis on rheumatic pains and diarrhoeal symptoms, whereas the local authorities’ pamphlets emphasised the rigors, heat and sweat stages. The pamphlets, however, differ from the other accounts in that these were not based on empirical observations from the epidemic, but instead on an assumed understanding of the disease condition. Furthermore, in Bremer’s and Pastor Plesner’s descriptions, mention was made of bloody vomiting, which did not occur in those of the local authorities’ the Royal Board of Health’s or the district physicians’ descriptions. The district physicians, on the other hand, mentioned rashes, which are not recognized in the other accounts.

Despite the broad medical vocabulary used in 1831, the medical reports from large parts of Zealand and Lolland-Falster described an epidemic with clinical symptoms with strong similarities. The epidemic began in August and lasted until the fall and winter in all reports. A common observation was the disease’s sudden onset. A chief medical officer from southern Zealand, for example, observed how people collapsed in the fields during harvest.⁸⁸ The most frequent symptoms were fever, headaches, joint and muscle pains, vomiting, diarrhoea, constipation and abdominal pains and a sour taste in the mouth. Two physicians also described rashes, and one physician observed cases of gangrene. In complicated cases, patients would become delirious, hallucinating or comatose.⁸⁹ Five physicians observed haemorrhagic symptoms.⁹⁰ In one account, bloody diarrhoea and black vomit were mentioned. One physician described a case of ‘dysentery’ in a patient.⁹¹ Finally two physicians described having observed urine that was ‘dark’ and ‘reddish’.⁹² Physicians also noted that recovery from the disease lasted months and that patients would suffer from chronic damage after recovery. Patients would experience oedema during the convalescence period, and both jaundice and fatigue were also noted as sequelae to the disease.⁹³

The epidemics in 1826 and 1831 both began in the summer and lasted into the winter. Whereas fever, diarrhoea and vomiting are common symptoms of many diseases, the combination of muscle and joint

⁸⁴Bang, *op. cit.* (note 68), 65–67.

⁸⁵Friedrich Christian Gebhard. *Medicinal = Indberetning for Rudkjøbings Distrikt*. Report. From Danish National Archives, Sundhedsstyrelsens arkiv, Medicinaberetninger, 1827, Øerne.

⁸⁶Bibliothek for Læger, *op. cit.* (note 58), 298.

⁸⁷Skydsgaard, *op. cit.* (note 12), 162–164.

⁸⁸Leth, *op. cit.* (note 62), 86.

⁸⁹Accounts are found in the following reports: Jacob Vilhelm Jespersen. *No title, August 28, 1831*. Thomas Jensen. *No title, August 27, 1831*. Henrik Carl Bang Bendz. *No title, September 2, 1831*. Hans Olfert Christian Sommerfeldt. *No title, September 9, 1831*. Christian Andreas Ditzel. *No title, Andreas Frederik Toft. No title, November 5, 1831*. Villiam Gotfred Jacob Kietz. *No title, November 7, 1831*. Thomas Jensen. *No title, November 24, 1831*. Balthasar Berg. *No title, September 12, 1831*. Victor Julius Florentin Hahn. *No title, October 31, 1831*. Adolf Christian Wiberg. *No title, September 12, 1831*. Carl Emil Schjørring Døllner. *Indberetning til det kongelige Sundheds-Collegium om den paa grevskabet Bregentved i Efteraaret 1831 herskende Epidemie*. Reports. From Danish National Archives, Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland. This combination of symptoms is also mentioned in Hornemann, *op. cit.* (note 60), 181–182; Arends, *op. cit.* (note 63), 70; Leth, *op. cit.* (note 62), 82, 86–89; Kongsted, *op. cit.* (note 66), 277–278.

⁹⁰Bremer, *op. cit.* (note 49), 133–134; Leth, *op. cit.* (note 62), 91; Carl Emil Schjørring Døllner. *Indberetning til det kongelige Sundheds-Collegium om den paa grevskabet Bregentved i Efteraaret 1831 herskende Epidemie*. Report. From Danish National Archives, Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland.

⁹¹Hornemann, *op. cit.* (note 60), 181–182; “Dysentery” is described in the report from Jensen. *No title, August 27, 1831*. Report. From Danish National Archives, Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland.

⁹²Leth, *op. cit.* (note 62), 87; Toft, Andreas Frederik. *No title, November 5, 1831*. Report. From Danish National Archives, Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland.

⁹³Leth, *op. cit.* (note 62), 91; Arends, *op. cit.* (note 63), 72.

pains and rashes seen during both epidemics are not. ‘Black vomit’ also occurred during both epidemics. These clinical similarities suggest that the epidemics could have been related. However, although Bremer noted pneumonia as a rare symptom in 1826, it was not observed in 1831. With a larger group of physicians documenting the 1831 epidemic, it is notable that not one described pneumonia. Bremer, however, was not present during the 1826 epidemic, and his account was based on conversations and reports by the attending physicians. Moreover, the bloody stools and ‘dark’ and ‘reddish’ urine seen in 1831 were not observed in 1826. This, on the other hand, could be due to the few physicians documenting the 1826 epidemic. Despite the similarities between the two epidemics, the exact relationship remains unclear.

The clinical symptoms that were associated with the ‘koldfeber’ diagnosis changed in the mid-nineteenth century. The descriptions of severe symptoms in 1826 and 1831 are contrasted by mild clinical descriptions from then on. During the 1847–1848 epidemic, Haderup described the rigors, heat and sweat stages as the most common symptoms. Haderup did not record any deaths during the epidemic, indicating that it was mild. He also noted that spleen enlargements, convulsions – especially during the rigors – with neuralgia and pleurisy were symptoms of ‘koldfeber’.⁹⁴ In the two articles on the 1856 epidemic, there are, as mentioned previously, no clinical descriptions. During these epidemics, no deaths occurred either. Hansen described the symptoms of koldfeber in 1886. According to him, koldfeber differed from other diseases in that the course of illness was longer than, for example, pneumonia, but instead occurred in intervals.⁹⁵ He argued that ‘the regular koldfeber’, which was the most common, manifested itself with fever paroxysms of rigors, heat and sweat and spleen enlargements, similar to those described by Haderup. He argued that the three subtypes of koldfeber had different seasonal patterns: while tertian koldfeber, which according to Hansen was the most frequent, broke out during the spring in mild form; quotidian koldfeber broke out during the summer; and the quartan koldfeber always broke out during fall.⁹⁶ Apart from the ‘regular’ koldfeber, there were more severe ‘intermittent forms’, which he associated with tropical parts of the world.⁹⁷ Finally, he described a ‘chronic’ type of koldfeber, which however did not exist in Denmark. He described it as having both physical and mental consequences for the people affected:

In exquisite swamp areas, the population has a peculiar mark of being dispirited, both mentally and physically [...] The children are not set to play, the youth not cheerful, the recruits are undersized and even animals go about with spleen tumours.⁹⁸

Finally, Hansen argued that a successful quinine treatment was a criterion to diagnosing koldfeber.⁹⁹ Quinine had been a successful malaria treatment in Europe since the seventeenth century, when it was introduced from South America.¹⁰⁰ The practice of diagnosing patients based on their response to therapeutics, also known as *diagnosis ex juvantibus*, was also conducted in the early nineteenth century.¹⁰¹ Hansen’s practice of *diagnosis ex juvantibus* illustrates how diagnosis of koldfeber was still challenging in the 1880s, despite a nosography that had been consistent since the mid-nineteenth century.

Apart from the epidemics in 1826 and 1831, the nosography of the koldfeber diagnosis was relatively consistent throughout the nineteenth century. The most important clinical symptoms were fever paroxysms with rigors, heat and sweat. In addition to the fever paroxysms, spleen enlargement was

⁹⁴*Ibid.*, 337, 356–361.

⁹⁵Hansen, *op. cit.* (note 77), 25–27.

⁹⁶Hansen, *op. cit.* (note 77), 28–35.

⁹⁷*Ibid.*, 71–79.

⁹⁸*Ibid.*, 79–80.

⁹⁹Hansen, *op. cit.* (note 77), 68, 75.

¹⁰⁰J. Achan, A.O. Talisuna, A. Erhart, A. Yeka, J.K. Tibenderana, F.B. Baliraine, P.J. Rosenthal, U. D’Alessandro, ‘Quinine, an old anti-malarial drug in a modern world: role in the treatment of malaria’, *Malaria Journal*, 10 (2011), 144.

¹⁰¹Skydsgaard, *op. cit.* (note 12), 170–171.

also associated with koldfeber from the mid-nineteenth century. The most important clinical symptoms of modern malaria are fever paroxysms with rigors, heat and sweat, diarrhoea, vomiting, rheumatic pains and spleen and liver enlargement. In the twentieth century, malaria in northern Europe was known to have a spring seasonality caused by parasites relapsing from previous summer infections.¹⁰² The epidemics in 1847–1848 and 1856 also took place during the spring, and Hansen also attributed the tertian form of koldfeber a spring seasonality. The clinical symptoms and seasonality were hence consistent with modern malaria, indicating that the milder ‘koldfeber’ diagnosis might in fact have been malaria. Despite overlaps in the terminology, the clinical symptoms observed during the 1826 and 1831 epidemics contrasted both the benign ‘koldfeber’ and malaria by its modern definition. Although the diarrhoea, vomiting and rheumatic pains seen during these epidemics also occur with malaria, the intermittent fever paroxysms are absent. More importantly, the haemorrhagic symptoms, rashes and gangrene are not consistent with malaria either. It is therefore improbable that malaria caused the epidemics, and the causes of the epidemics remain unknown.

The aetiology of intermittent fever

The 1826 epidemic hit the southern part of Langeland the hardest. In his account of the epidemic, Pastor Plesner stated that the ‘air condition’ and ‘way of life’ in the northern part of Langeland were different from those in the southern part, which explained why the southern part was worst hit. He also argued that the very warm summer of 1826 caused peat bogs on the island’s southern tip to dry out, which led to the release of miasmatic vapours.¹⁰³ The district physician in Langeland also claimed that the warm summer was the reason for the epidemic.¹⁰⁴ In the pamphlets, the ‘peculiar infectious nature of the air’ was seen as the most important cause of koldfeber. In addition to this, tainted drinking water, ‘struggling work’, ‘greed’ and too much consumption of ‘milk, flour-based food, fat, pork, garden fruits, bad beer, etc.’ could also induce the humoral imbalance that caused koldfeber. Examples included moist bedrooms, old bedstraw and bed linen, and the pamphlets recommended people not keep food items in the living rooms and bedrooms.¹⁰⁵ The Royal Board of Health’s published medical report stated that the peasants’ ‘untidy diet and untidy treatment, chronic infections and constipations in the abdominal organs’ were the cause of the epidemic.¹⁰⁶ These explanations – miasmatic vapours, work, food, hygiene and lifestyle – all reflect the Hippocratic framework of disease aetiology.

This Hippocratic aetiological framework also explained the 1831 epidemic. One physician noted that, although the disease travelled from house to house, it was difficult to answer whether the disease was infectious or not.¹⁰⁷ He later described that a thick fog had occurred in the middle of August, and he argued that this was the cause of the epidemic. He however also pointed to hard labour related to the harvest and a bad diet among the peasants.¹⁰⁸ The fog was also observed by two other physicians in their special reports to the Royal Board of Health. One of them described it as a ‘brown-yellow fog with a peculiar unpleasant odour that caused drowsiness’ and associated it with previously flooded fields, which had produced miasmatic vapours.¹⁰⁹ According to the other physician, the epidemic was caused

¹⁰²Swellengrebel and de Buck, *op. cit.* (note 24), 40–43.

¹⁰³Mansa, *op. cit.* (note 56), 174–180.

¹⁰⁴Friedrich Christian Gebhard. *Medicinal = Indberetning for Rudkjøbings Distrikt*. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1827, Øerne*.

¹⁰⁵Mansa, *op. cit.* (note 56), 193–194.

¹⁰⁶*Bibliothek for Læger*, 7 (1827), 298.

¹⁰⁷Hans Olfert Christian Sommerfeldt. *No title, September 9, 1831*. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland*.

¹⁰⁸Hans Olfert Christian Sommerfeldt. *No title, November 7, 1831*. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland*.

¹⁰⁹Carl Emil Schjørring Døllner. *Indberetning til det kongelige Sundheds-Collegium om den paa grevskabet Bregentved i Efteraaret 1831 herskende Epidemie*. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland*.

by a warm summer air and ‘the fog that nearly in 2 to 3 weeks came every evening over the land’.¹¹⁰ The chief medical officer for the South Zealand medical region, however, disagreed with the fog theory, and he instead pointed to summer warmth in July and August.¹¹¹

Haderup’s mode of explanation was slightly similar to those of the 1826 and 1831 epidemics. He saw humidity from clay soil, low elevation and forests as the reason for the 1847–1848 epidemics. A mild winter followed by intensive rain had created miasmatic vapours from the humid soil. In a meteorological reportage, he pointed to a ‘thick, white opaque fog’ as the cause of the epidemic.¹¹² This observation of a visible, miasmatic fog was similar to that of the ‘brown-yellow’ fog from 1831. In his account of the 1856 epidemic, Daniel Cold from Frederiksværk argued that low sea tides that exposed a muddy seabed, old houses of poor building materials and high wooded hills to the north and east of Frederiksværk were the causes of the epidemic.¹¹³ In Copenhagen, Sophus Engelsted at the same time observed that the residents living in the quarters outside the city’s old ramparts were most exposed to the disease, and illness was highest among people living in the stories rather than in basement apartments. Engelsted argued that poor hygienic conditions and high population density were the causes of the epidemic in these neighbourhoods.¹¹⁴

Miasma theory played a crucial role in all epidemics. The different accounts nevertheless illustrate that the physicians’ own time and space influenced their medical thinking. During the 1826 and 1831 epidemics, the peasants’ morale, lifestyle and work practices were seen as additional reasons for the epidemics. This mode of explanation had disappeared by the mid-nineteenth century, when miasmatic vapours alone explained the epidemics. In addition, the epidemics in 1826, 1831 and 1847–1848 took place in rural areas. Although Cold lived in a province town, Frederiksværk had a population of only 708 in 1856. During these epidemics, miasmatic vapours from the environment itself were the cause of illness. The primary focus lay in exogenous conditions such as air humidity, weather and geography. On the other hand, in his account of the 1856 epidemic in Copenhagen, Sophus Engelsted argued that poor hygiene and population density were the causes. Copenhagen had been hit by a devastating cholera epidemic just 3 years before the 1856 epidemic, and debates regarding sanitation and public health were at their highest. This may explain why Engelsted’s perceptions of disease aetiology were so different from those of the rural physicians.

Hansen wrote his scholarship in a period of transition. The *Plasmodium* parasite was discovered in 1880, and its relationship with mosquitoes was established in 1897–1898. Hansen saw a relationship between low-lying areas with clay soil and bogs, summer warmth and the presence of koldfeber.¹¹⁵ Although Hansen, like his predecessors, believed that koldfeber was caused by miasmas, his description of miasmas was different:

Miasma was previously understood as any known or presumed airborne substances capable of causing diseases [...] Today the word is used specifically in opposition to a contagium as a disease carrier that can be created outside or independent of an ill organism....¹¹⁶

Whereas miasma theory had roots in antiquity, contagion theory was established in the Middle Ages.¹¹⁷ The perception of a miasma as aetiological opposite to a contagium had come to dominate European medicine during the nineteenth century.¹¹⁸ Because of low mortality from ‘koldfeber’, Hansen claimed

¹¹⁰Andreas Frederik Toft. *No title*, November 5, 1831. Report. From Danish National Archives, *Sundhedsstyrelsens arkiv, Medicinaberetninger, 1831, Sjælland*.

¹¹¹Leth, *op. cit.* (note 62), 93–94.

¹¹²Haderup, *op. cit.* (note 50), 339–341.

¹¹³Cold, *op. cit.* (note 51), 113.

¹¹⁴Engelsted, *op. cit.* (note 51), 344–345.

¹¹⁵Hansen, *op. cit.* (note 19), 14–20.

¹¹⁶*Ibid.*, 2.

¹¹⁷Erwin H. Ackerknecht, ‘Anticontagionism between 1821 and 1867’, *International Journal of Epidemiology* 38 (2009), 7–21.

¹¹⁸This debate is further discussed in Ackerknecht, *op. cit.* (note 117), and Christopher Hamlin, *Cholera – The Biography* (Oxford: Oxford University Press, 2009), 158–162.

that Denmark was a ‘malaria territory, in which a relatively weak miasma is operative’.¹¹⁹ Despite associating ‘koldfeber’ with miasma theory, Hansen however also discussed the, to him, ‘modern theories’ of microbes.¹²⁰ He ended his discussion of the aetiology of ‘koldfeber’ by stating that ‘There is no doubt that the pathogenic cause of koldfeber is a microorganism; but whether it belongs to the animal kingdom or the plant kingdom, remains uncertain...’¹²¹

In all previous accounts, miasmas were described as either visible or invisible vapours produced by the environment. Hansen’s framing of miasmas as ‘microorganisms’ indicates that germ theory nevertheless influenced his understanding of miasma theory.

Intermittent fever in Denmark

The purpose of this article was to study the development in the intermittent fever diagnosis between 1826 and 1886, with focus on terminology, clinical symptoms and aetiology. In the first decades of the nineteenth century, intermittent fever was framed as a broad category of disease conditions, where ‘koldfeber’ was one subtype among several. In this framework, the ‘common’ koldfeber was a mild and recognizable condition. At the same time, severe koldfeber epidemics took place, as seen in 1826 and 1831. Here, the koldfeber diagnosis was applied together with other types of fevers, and an intermittent fever could transition into another fever diagnosis during the course of an illness. By this understanding, the epidemic was detached from the fevers used to describe it. This reflects the Hippocratic thinking that dominated Danish medicine in that period. When the Parisian school gained influence in the 1840s, disease came to be seen as a group phenomenon and was studied via statistics. In this period, ‘koldfeber’ and intermittent fever came to be framed as synonyms for one disease condition with a specific nosography separate from those of other diseases, and this framing continued into the 1880s. The nosography and seasonality of intermittent fever from the mid-nineteenth century also resemble those of modern malaria, which explains how the ‘koldfeber’ diagnosis has come to be associated with modern malaria in recent literature.

Germ theory broke through in the 1880s and 1890s. Although diagnosis increasingly took place by microscopy, physicians like Carl Adam Hansen still conducted the challenging observational and therapeutic diagnostics. Intermittent fever was until this period explained by miasma theory. Nevertheless, the definition of a miasma was not static. The role of the environment in relation to hygiene and sanitation appears to have been contingent on the physician’s own physical environment, as seen in the example of Engelsted in 1856. Germ theory later came to influence the understanding of what miasmas were. This hybrid perception of a microbe-like miasma is not unique for the case of intermittent fever. The Bavarian doctor Max von Pettenkofer struggled late into the twentieth century with the germ theory, arguing instead that cholera transmission took place via miasma-like poisons that were regulated by environmental factors such as soil conditions and moisture.¹²²

The case of intermittent fever exemplifies the development Danish medicine underwent in the nineteenth century. It illustrates how the framing of medical diagnoses changed with the emergence of new paradigms. New paradigms not only changed the physicians’ ideas of aetiology, but also the way they talked about the disease in relation to other diseases and how they diagnosed it. Finally, this article illustrates that the transition from miasma theory to germ theory was not a confrontational clash, but rather a gradual transition. When historians have debated the meaning of intermittent fever and its association with malaria, it might be because they have studied the diagnosis in different points in time.

¹¹⁹Hansen, *op. cit.* (note 77), 32.

¹²⁰Hansen, *op. cit.* (note 19), 6–10.

¹²¹*Ibid.*, 10–11.

¹²²Hamlin, *op. cit.* (note 118), 199–201.

Intermittent fever was certainly a broad category of disease conditions in the Early Modern Era and the first decades of the nineteenth century, but it became something similar to malaria in the second half of the nineteenth century.

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