

# Jacob Aall's illness and death

**SUMMARY** Jacob Aall (1773–1844) was one of Norway's most notable nation-builders at the beginning of the 19th century. He owned and operated a large ironworks, participated in political life and was an historian, writer and translator of sagas. In the last 15 years of his life, he suffered greatly from pain attacks. After his death, an autopsy was performed and the doctors found a stone the size of a hen's egg, which weighed more than 90 g. The stone was variously described as a kidney stone and a bladder stone.

Aall had travelled to Copenhagen in 1837 and consulted the Danish doctor Ludvig Levin Jacobson (1783–1843), known for his instrument for crushing bladder stones, a new and revolutionary treatment method. But some disagreement appears to have arisen between them about the treatment. A year later Aall consulted Christen Heiberg (1799–1872), a professor of surgery in Christiania (now Oslo). Heiberg also examined Aall's bladder and found «no cause for alarm».

Aall adhered to a strict diet, including drinking an Italian «spa water» daily which he obtained in bottles from Trieste. However, he showed no great improvement. To all appearances, it was kidney stones that afflicted him in his last years and which finally ended his life. This article gives a full portrayal of the course of his illness with an authentic description from an age when there were no treatment possibilities for kidney stones.

Jacob Aall (Fig. 1) was from a well-to-do shipping and merchant family in Porsgrunn. He graduated with a degree in theology in 1795, but in 1799 used the money he had inherited from his late father to buy an ironworks; Nes Ironworks at Holt near Tvedestrand became his home and workplace

for the rest of his life. He had a happy family life there with his wife and seven children.

The war of 1807–1814 brought with it a kind of «political awakening». Aall realised the need for Norway to have its own institutions, and he became the largest private contributor to a Norwegian univer-

**Erlend Hem**

*erlend.hem@medisin.uio.no*

The Journal of the Norwegian Medical Association

**Arild Stubhaug**

Department of Mathematics

University of Oslo



**Figure 1** Jacob Aall (1773–1844). Painting by Johan Gørbitz, 1839, private collection



**Figure 2** Ludvig Levin Jacobson (1783–1843), famous Danish doctor and anatomist. Photo: Medical Museion, Copenhagen



**Figure 3** Christen Heiberg (1799–1872), Professor of surgery 1836–1872, painted by Johan Gørbitz (1782–1853) in 1850. The painting hangs in the Department of Ophthalmology, Oslo University Hospital – Ullevål. Photo: Svein Ivar Plukkerud, Oslo University Hospital

sity. At Eidsvoll in the spring of 1814 he spoke in favour of a union between Sweden and Norway, but he would have preferred to re-establish the relationship with Denmark.

Up until 1830 Aall was a representative in most of the Storting parliamentary assemblies and made a great impact in a number of areas, especially in the drafting of a new Mining Act and the operation of the Kongsberg silver mines. He was respected and liked for his businesslike commitment. In the 1830s much of his work was devoted to translating the sagas, which culminated in the publication of Snorre's «Sagas of the Norse Kings» in 1838–1839. When municipal self-government was introduced in Norway in 1837, Aall was elected as the first mayor of Holt parish. During these years he also wrote his great work *Reminiscences as a Contribution to the History of Norway from 1800 to 1815*, a historical work that has been a source for historians' assessment of what led up to the events of 1814, and of what occurred in that portentous year.

In the years after 1830 Aall suffered from pain attacks and blood in the urine, symptoms which increased in strength and frequency. These symptoms have traditionally been cited as the cause of his withdrawal from public life after 1830. Although it is

true that he last served as a parliamentary representative in 1830, he continued to be active on committees, in local politics, and in particular as a writer. Aall died at Nes Verk in 1844 and is buried in a beautiful family grave in Holt churchyard.

As part of the work on a biography of Jacob Aall, publication of which is planned in connection with the 200th anniversary of the Norwegian Constitution, everything that Aall committed to paper about his illness has been reviewed, as it appears in copious letters to his friends and children. A selection of these letters has been published in two volumes (1, 2), but most of them remain unprinted material in the Aall family archive at Nes and in the Telemark Museum in Ulefos (code number UA-A-100). The letters about his illness are primarily to his Danish friend, Niels Hofman-Bang (1776–1855), and to his sons Hans Jørgen Christian Aall (1806–1894) and Nils Hofman Aall (1812–1902).

The illness overshadowed the final years of Jacob Aall's life. A collective presentation of the course of illness may be of some interest, since it is an authentic description from a time when there was, in practice, no possibility to detect or treat kidney stones, but when there was real progress taking place in the treatment of bladder stones.

### The history of Jacob Aall's illness

It was in 1830 – when Aall was aged 57 – that his health began to falter. At Eidsvoll in 1814 he was constantly troubled by stomach pains, diarrhoea and the like, and had to stay at home one day. He often mentioned similar stomach problems as well as colds and other forms of «indisposition» such as headache.

A short time after the opening of the Storting in February 1830, he contracted nephritis with severe pain. It is unclear who made the diagnosis. The attack lasted for three consecutive days, and neither warm baths, blood-letting nor drugs (he does not state which) relieved the pain. He did not receive the doctor's certificate necessary to relieve him of duties at the Storting, and which he himself wished for. The doctor (whose name we do not know) was of the opinion that a particular diet and exercise would enable him to attend to his work at the Storting and that the medicine should prevent further attacks.

Aall missed not a single parliamentary or committee meeting. He followed the diet prescribed and took the recommended medicine in the form of pills; it was only the necessary exercise that he found difficult to observe. Now and again, he thought he could feel some kidney stones dislodge, but he felt no pain.



1844. Mandag den 18. D. Begravede og						Dødsfødte. 44		a Folio. 193.	
No.	Den døde Døds- dag.	Begrav- etsted: Datum.	Den Begravedes fulde Navn og Erand.	Alder.	Opholdsst.	Om døds af naturligt Egenkom, og da hoi- ten, eller ved uigstelig Hændelse.	Den døde og Døds- dag.	Den Dødsfødtes Forældre.	Naar og af hvem Angivelser er givet.
28	4. Aug.	1844	Jacob Aall, Mand i Hus, og Holt, Mand i Hus, og	71	Margareta Aall	af Hønsens Sten, som blev fundet ved Autopsien, og som vejede over seks Lod.			
29	4. Aug.	1844	Peter Aall, Mand i Hus, og Holt, Mand i Hus, og	25	Peter Aall				

**Figure 4** Jacob Aall died on 4 August 1844 «Of pain from stones, since at the autopsy a stone was found of the shape and size of a hen's egg, which weighed over six lod. His sufferings were long and burdensome.» Excerpt from Holt parish register, 1844 [3]

Through the summer of 1830 he felt constant renal pain; the infection would not abate despite diet and medicine. Ongoing nephritis and severe attacks meant that at his doctors' recommendation he put himself on a strict diet and was cautious with regard to physical exertion. Blood in the urine gave him a hint of when he had been careless or walked too far.

The walks he took in his home countryside around Nes were easily seven to eight kilometres, often combined with an inspection of one of the work's mines. He walked in all kinds of weather and was careful to change into dry clothes when he got wet. He took soda pills and drank at least a half litre daily of a spa mineral water from Germany. He tried sodium powder and nettle tea, and never ate after nine o'clock at night. Apart from his kidney condition, «the stone pains» as he called them, he believed his health to be better than it had been for a long time. The headaches which had troubled him for the past few years had disappeared.

In November 1830 Aall was diagnosed with gout in one foot. He was unable to understand how he – who lived so cautiously – could be afflicted by an illness which was generally referred to as «the patrician malady». It was commonly supposed even in the writings of Hippocrates that gout could be triggered by consumption of alcohol.

In mid-October 1833 Aall found himself in a critical situation which almost cost him his life. At least, that is how he portrayed it in letters to his sons. Outside the summerhouse in Lunden (next to the main house) he fell into the water while trying to retrieve some oars that were floating in a half-submerged barge. As he leaned out, the rope attached to a nail in the summerhouse broke. Aall ended up beneath the boat and after a great struggle he emerged far enough out of the water to catch the end of the rope still hanging from the nail. However, the water was deep and his clothes and boots were so heavy that he was unable to haul himself up into the barge. For several min-

utes he remained lying with water up to his neck, shouting for help, and both his strength and his voice were about to give out when a female servant happened to come by and managed to help him back onto land. According to his letter he felt very badly knocked about afterwards, with a temporary sensation of fever, but he did not catch a cold. On the contrary, his struggles had led to the loss of a few large kidney stones, and he hoped «to rid myself of this affliction for a time».

In the years that followed, Aall described regular pain attacks which easily lasted for a week and then turned to tiredness and fatigue, or anxiety about further attacks. In the spring of 1835, for example, he was afraid to change his «daily diet and schedule» and thereby bring on new attacks of renal pain. He was constantly in doubt as to whether diet and exercise really helped, and was inclined to think that «this cumulation of pain» might perhaps originate in his own imagination. However, he could not refrain from interpreting them as a signal of the realities of life, and the fact that they were increasing in intensity gave him the feeling that something «fearful» lay ahead of him.

He felt best when he could sit at his desk. If he was more physically active than usual, blood appeared in his urine. This in itself was undesirable, but on the other hand he thought it prevented more severe attacks. He was resistant to trying to prevent blood in his urine by taking medicines and using other artificial means, as he termed them. Nevertheless, he was occasionally overcome by pain which rendered him incapable of work for several days. He therefore decided to have his symptoms investigated by the best doctors in Denmark. He determined to travel to Copenhagen as soon as he felt strong enough, and for a long time he was in doubt about what he would be able to tolerate best: the rocking motion of a steamship crossing the sea or the jolting of a carriage along the roads over land.

In May–June 1837 Aall took the sea route from Fredriksvern to Copenhagen. He lived and ate well among his friends

and family in Copenhagen, that is to say, he kept to a completely different diet and rhythm than at home in Nes. He scarcely noticed his usual symptoms and was completely free of pain. He consulted the renowned doctor Professor Ludvig Levin Jacobson (Fig. 2) and described his consultation in a letter to his friend Hofman-Bang, dated 17 June 1837, Copenhagen: «I cannot quite reach an agreement with Jacobsen about the Cure Method. He talks constantly about exploration, which all my brothers in pain here in the city advise against. It is in particular the blood, which any strong movement causes to enter my urine, that appears to him somewhat suspicious, albeit already at the first examination he believes himself to have arrived at the knowledge that these are not bladder stones of any significance. I myself have very little desire for this probing, which will certainly do little for my wretched nerves.»

Perhaps his good health in Copenhagen was part of the reason why Aall disagreed with Levin Jacobson about further treatment and cure. As soon as he was back in Norway, the pain and attacks resumed. He again mentioned feeling the stone moving through the kidneys to the bladder, and finally how it worked its way through in smaller pieces to leave the body. In this way he assured himself that he had made the right decision in Copenhagen.

In May to June of the following year (1838), Aall was in Christiania in connection with his work on the Mining Act Commission. There he consulted Professor Christen Heiberg (Fig. 3). On 13 June 1838 he wrote to his friend Hofman-Bang: «While I was in Christiania, however, I underwent an operation, which convinced me that it is only kidney stones and not bladder stones from which I suffer. Professor Heiberg succeeded in probing my bladder with his instrument and in this respect he found nothing suspicious, only a tumescence [author's note: bloating] on one side, which indicated a tendency to haemorrhoids. Since my difficulty in moving without inconvenience and also in passing urine has recently increased, I sub-

mitted myself to this operation, and I now think that I suffer less from these inconveniences.» Heiberg therefore came to the same conclusion as Jacobson: Aall was suffering from kidney stones, not bladder stones.

When Aall returned home to Nes, he began a strict course of treatment which included drinking large quantities of bottled Italian spa water, which he obtained from Hamburg. During the autumn of 1838 his health became so fragile that he doubted whether he was capable of undertaking any more journeys. He had more frequent but less severe attacks, which he attributed to the Italian spa water drawing the morbid substance from his body before stones could form. He exercised carefully and kept to a strict diet, but he had toothache and lost his teeth, and was for a time troubled by a boil on his neck, or *furuncle* as the local doctor Alexander Chr. Møller (1762–1847) called it.

Aall kept the renal pain in check with a strict diet in the summer and autumn of 1839. He wrote little about what this diet consisted of, except that every morning he drank a cup of coffee instead of tea. The most important element appears to have been regular consumption of the Italian spa water, in which he had great faith. When for periods he had to make do with a German spa water, he became uneasy and had his son Jørgen order 200 bottles of the Italian water, sent directly from Trieste via Hamburg.

Over the next few years, at more or less regular intervals in line with the seasons, he experienced severe pain. However, the attacks were of shorter duration, and he hoped that the illness had reached its peak. He still kept to the diet, «a strict regime», as he called it, but otherwise believed that a tranquil mind and a sedentary life were the best cure.

The spring and early summer of 1842 were worse than previous years. Severe attacks could last for days, and from having believed that his kidneys had finally ceased to form these stones, his only recourse now was to send his «old song of praise to Providence which saves the soul, while the body is cast down». He continued to drink the Italian spa water. He believed it relieved the pain, but often expressed a wish to know what foods led to the formation of stones.

In the spring of 1843 Aall suffered from a persistent cold, and wore cat fur next to his skin to maintain an even warmth over the kidneys. He had considerable but stable pain on urinating, and according to dr. Møller it was not a cause for concern.

Throughout the winter of 1843–1844, at three-weekly intervals, Aall was treated with leeches, but the good effect he mainly experienced on the first occasion, shortly

before Christmas 1843, quite soon disappeared. In addition to the usual pain on urinating, the gout had returned. During the spring of 1844 he felt that the illness was beginning to gain the upper hand in earnest. The pain attacks made it impossible for him to sleep. He was given medicines (he does not write which), but according to him, they had no effect.

In one of his last letters, written in June 1844, he says that the attacks were milder, that he was almost free of pain at night, but that he had to get out of bed five or six times a night to urinate.

On 4 August 1844 Aall died, a few days after his seventy-first birthday. An autopsy was conducted on his body in Nes, and the following was inscribed in the parish register regarding the cause of death: «Of pain from stones, since at the autopsy a stone was found of the shape and size of a hen's egg, which weighed over six lod. His sufferings were long and burdensome» (3) (Fig. 4). Unfortunately there is no description of the autopsy, only these words from the parish register. It says that the stone weighed «over six lod», which is more than 90g. We do not know whether an autopsy report was written, or whether it has since been lost. It is somewhat surprising that he was the subject of an autopsy at all. And who performed this autopsy? Aall himself must have given permission for it – perhaps simply to gain certainty of what had so afflicted him.

Someone who may have performed the autopsy is Alexander Chr. Møller, who had been a doctor in Arendal since as far back as 1792 and had also been the regular doctor for the Nes Ironworks. Møller and Aall were well acquainted, and had both been delegates to the national assembly at Eidsvoll in 1814. But Møller was old, aged 82 when Aall died, and the previous year he had ceased working as the district medical officer in Arendal (4). Another possibility is the first district medical officer in Kragerø, Christian Homann (1782–1860). Like Møller, he had worked as a doctor for an unusually long time in one place, all of 50 years from 1810 (4). Or it might have been the works' new, young doctor, Peter Martin Nerdrum (1815–1878). He had graduated from medical school in 1840, and having worked for a few years at the National Hospital (Rikshospitalet), in January 1843 he was «employed by Jacob Aall as doctor to his household and to Nes Ironworks» (4).

### What was the diagnosis?

The stone found at the autopsy was described then, and later, in some instances as a kidney stone and in others as a bladder stone. However, these descriptions have



**Figure 5** «Jacobson's Lithoclast». Photo: Medical Museion, Copenhagen

come down to us by word of mouth, to all appearances based on Aall's own narratives from his medical consultations with Levin Jacobson and Heiberg. On the basis of the medical history, the indications are that it was a case of kidney stones: blood in the urine and continual attacks are typical. The pain is generally such that the patient can find no peace. The fact that Aall was incapable of working for several days at a time is consistent with this. In addition he had gout, which also makes one suspect kidney stones, probably in the form of uric acid stones which wine can dispose towards. Kidney stones are also commensurate with Aall's mention of «the surgical descriptions» of Heiberg and Levin Jacobson.

Even though the medical history clearly speaks in favour of kidney stones, a degree of doubt has prevailed down through the years. And of course it is impossible to be completely certain so many years later.

### Treatment for bladder stones

There was little to be done about kidney stones in Jacob Aall's time; but when Aall consulted Heiberg and Levin Jacobson, the doctors had begun a new and modern treatment for stones in the bladder. While ever since antiquity attempts had been made to perform more or less hazardous operations to remove bladder stones (lithotomy) (5), since the mid-1820s a new treatment method had been introduced (6). At that time instruments had been constructed that could be inserted in through the urethra to crush the stones into small pieces, which

could then be flushed out through the urine (transurethral lithotripsy). The French surgeon Jean Civiale (1792–1867) was the first to succeed in performing this type of stone-crushing on living subjects in 1824 (7, 8). This was a great advance, but until well into the 1900s stone-crushing was a method that had to be carried out blindly and with quite rudimentary instruments (9).

Civiale collected statistics on stone disease in more than 20 countries between 1820 and 1830 and reported large series of cases from France, England and other European countries. But at the National Hospital (Rikshospitalet) in Christiania there was not a single case among 3 200 patients treated over a four-year period (quoted from 10).

The first account of a stone operation in Norway emanates from Bergen and was published in *Eyr*, our first Norwegian medical journal (11, 12). In 1825 the young doctor Christian Wisbech (1801–1869) had performed a «stone operation undertaken according to Langenbeck's Method» (13). In 1802 in Göttingen, Konrad Johann Martin Langenbeck (1776–1851) had described «a simple and safe method of lithotomy» (14), an operation in the form of «the lower abdominal incision», perineal lithotomy. Wisbech may have seen the operation performed during a 15-month foreign trip which he embarked on with his friend Christen Heiberg, in 1823–24 (4, 11, 15).

When Wisbech performed the operation, it was after the fairly recent introduction of a new method of treatment. After Civiale had succeeded with his new instrument in 1824, many doctors attempted to improve both the instrument and the technique. One of the most successful was Ludvig Levin Jacobson (Fig. 5). He eventually managed to make an instrument that could both crush stones in the bladder and then extract the stone fragments – *methodus lithoclasticus*, as he termed it (16, 17).

The practical application of stone crushing underwent rapid development in the 1830s, especially in France (17). «Jacobson's lithoclast» is described as an ingenious device, which brought its inventor international renown (16). The foremost advantage of this instrument was that it was relatively harmless in unpractised hands, in contrast to the others at that time (17). However, the problem was its «poor strength», and strength was certainly needed to crush the stones (17). Soon Jacobson's lithoclast (18) was outcompeted. In the 1830s a French surgeon, Baron Charles Heurteloup (1793–1864), developed a more powerful and effective instrument (19), and it was only then «that stone-crushing increased apace» (20). With this technique «innumerable people are indeed helped for one of the cruellest and

most dangerous conditions that can torment a person» (21).

From the mid-1830s the new principles of treatment for stones were established, and so they remained for almost one hundred years (8, p. 55). Nevertheless a bitter argument developed between the French doctors Civiale and Leroy d'Etiolles (1798–1860) about who had been in the forefront. Shelley concludes that Leroy made the first practical instrument, that Civiale performed the first operation and that Heurteloup made the first practical stone crusher. Civiale's clinical skills (22) and his good results contributed greatly to the spread of this surgical method (8).

### Jacobson versus Heiberg

Aall consulted the foremost expertise in the region when he travelled to Copenhagen in 1837. But based on what Jacobson himself writes, he had fairly limited practical experience with his own instrument (19).

We have attempted to find Aall's patient records from his visit to Professor Heiberg at the National Hospital (Rikshospitalet) in 1838, but without success (23). Aall was possibly a polyclinic patient, not admitted to the department, and therefore no record was kept. Another possibility is that he was Professor Heiberg's private patient.

Two years earlier, in 1836, Christen Heiberg had been appointed professor of surgery. He is described as «spontaneous, energetic, loquacious» (24), and as a «practical man, who always had to be busying himself» (4). He was one of the founders of surgery in Norway, developed the surgical clinic at the National Hospital (Rikshospitalet) laid the basis for ophthalmology in this country, and «combined with this tireless clinical activity great surgical skill» (4).

In 1836 Heiberg took part in a debate at the Medical Association in Christiania on «Lithotritry, undertaken at the Rikshospitalet». Here he describes – at all of six meetings – a case of «stone crushing in the bladder» (25). At the first meeting in this series he mentions the name of the instrument, «the Heurteloup-Leroy device». This refers to the French inventors Heurteloup and Leroy d'Etiolles. Many years later Heiberg mentioned that since 1835 he had used «the same instrument» and «undertaken several stone crushings» (26). So Heiberg had begun using the instrument in 1835 – shortly after Heurteloup himself had presented it. Heiberg undoubtedly kept well abreast of developments.

### Conclusion

From having been an operation that was resorted to in desperate cases, in the form of risky open surgical interventions, from the

mid-1820s there was a radical development in the treatment for bladder stones (27). At that time it became possible to perform transurethral lithotripsy, in which the instruments were inserted blindly, opened inside the bladder and an attempt was made to grasp and crush the stone. After no more than about ten years' development work, from the mid-1830s fairly effective instruments were available, and treatment for stones entered a new era. When Jacob Aall sought medical help in 1837–1838, there was therefore a new and safer treatment available. However, the problem was that Aall's health problems were probably not due to bladder stones, but kidney stones. And at the time there was as yet no possibility of either detecting or treating the condition.

*We wish to thank Bernt Kvarstein for his valuable information and interpretation of the medical history, and Knut Benjamin Aall, Gunnar Molden and Knut Holt Sandbløst for procuring the letters.*

### Erlend Hem (born 1970)

is an MD, PhD, and Deputy Editor of the Journal of the Norwegian Medical Association.

The author has completed the ICMJE form and declares no conflicts of interest.

### Arild Stubhaug (born 1948)

is an author and his writings include biographies of the mathematicians Niels Henrik Abel and Sophus Lie. In 2014 he plans to publish a biography of Jacob Aall.

The author has completed the ICMJE form and declares no conflicts of interest.

### References

1. Breve fra slekten Aalls arkiver. Oslo: Dreyer, 1948. [www.nb.no/nbsok/nb/b2427443faeac71702e5cd800cee48ab.nbdigital?lang=no#0](http://www.nb.no/nbsok/nb/b2427443faeac71702e5cd800cee48ab.nbdigital?lang=no#0) [28.8.2013].
2. Breve fra slekten Aalls arkiver. Anden Samling. Ulefos, 1956.
3. Aust-Agder fylke, Holt, Ministerialbok nr. A 7 [1836–1848], Døde og begravede 1844, side 293. [www.arkiverket.no/URN:NBN:no-a1450-kb20060131040866.jpg](http://www.arkiverket.no/URN:NBN:no-a1450-kb20060131040866.jpg) [28.7.2013].
4. Larsen Ø, red. Norges leger. Oslo: Den norske lægeförening, 1996.
5. Lindeklev H, Skjaerpe PA, Due J. Blæresteinskirurgi i antikken. Tidsskr Nor Lægeforen 2007; 127: 3244–8.
6. Ellis H. A history of bladder stone. Oxford: Blackwell, 1969.
7. Civiale J. I: Salmonsens konversationsleksikon. 2. utg. Bind V: Cikorie-Demersale. København: J. H. Schultz, 1916: 26. <http://runeberg.org/salmonsens/2/5/0034.html> [24.7.2013].
8. Shelley HS. Intravesical destruction of bladder stones. J Hist Med Allied Sci 1964; 19: 46–60.
9. Andersson L, Kinn AC. Njursten och blåssten – en medicinhistorisk översikt. Nord Medicinhist Arsb 1982: 76–85.
10. Andersen DA. A survey of the incidence of urolithiasis in Norway from 1853 to 1960. J Oslo City Hosp 1966; 16: 101–47.

>>>



11. Nicolaysen J. Kirurgien i Norge i det 19de århundre. Oslo: Centraltrykkeriet, 1933: 118. [www.nb.no/nbsok/nb/75033d045e395e3dab4c96e63c7addaf?index=0#135](http://www.nb.no/nbsok/nb/75033d045e395e3dab4c96e63c7addaf?index=0#135) [24.7.2013].
12. Karlsen S. Stensykdommen. I: Otnes B, Karlsen S, Seland P. Fra urologiens historie i Norge. Oslo: Norsk urologisk forening, 1987: 46–56.
13. Wisbech C. En Steenoperation foretagen efter Langenbecks Methode. Eyr 1827; 2: 116–20.
14. Hirsch A, red. Biographisches Lexikon der hervorragenden Ärzte aller Zeiten und Völker. Bd. 3: Haaff-Lysons. 2. utg. Berlin: Urban & Schwarzenberg, 1931: 667–8.
15. Bertelsen TI. Regimentskirurgen: Wilhelm Johannes Schwindt 1766–1826 og hans læringer. Bergen: Forlaget Regius, 2003: 170–91.
16. Dahl-Iversen E. Vor kirurgiske arv: kirurgien i Danmark i det 19. århundrede. Festskrift udgivet af Københavns Universitet i Anledning af Universitetets Aarsfest. København: Universitetet, 1960: 41–7.
17. Meyerson Å. Studier i Serafimerlasarettets instrumentsamling: utgivna med anledning av lasarettets 200-års jubileum. Stockholm: Karolinska institutets kirurgiska klinik vid Serafimerlasarettet, 1952: 101–26.
18. Petersen J, Boas JEV. Jacobson, Ludwig Lewin. I: Dansk biografisk Lexikon. Bd. 8: Holst-Juul. København: Gyldendalske Boghandels Forlag (F. Hegel & Søn), 1894: 371–5. <http://runeberg.org/dbl/8/0373.html> [28.7.2013].
19. Østergaard AH. Den rædsomme Steensmerte – og Jacobsons lithoklastik; en 150-årig dansk indsats i urinvejskirurgien. Dan Medicinhist Arbog 1976: 109–21.
20. Tscherning EA. Heurteloup, Charles. I: Salmonsens konversationsleksikon. 2. utg. Bd XI: Hasselmus-Hven. København: J. H. Schultz, 1921: 422. <http://runeberg.org/salmonsens/2/11/0430.html> [24.7.2013].
21. Stenkrossning. I: Westrin T, red. Nordisk familjebok: Uggleupplagan. Bd. 26. Slöke – Stockholm. Stockholm: Nordisk familjeboks förlags aktiebolag, 1917: 1256–7. <http://runeberg.org/nfcl/0670.html> [24.7.2013].
22. Christoffersen JC. Nogle blærestensoperationer – lithotripsier – foretaget på fyrstelige personer i det 19. århundrede. Dan Medicinhist Arbog 1987; 16: 93–114.
23. Riksarkivet. S-3734 Rikshospitalet, Kirurgisk afdeling, 1827–1872. Serie F, Journaler og protokoller. Eske 7: Sykejournaler, 04.1838–09.1839.
24. Laache S. Norsk medicin i hundrede aar. Kristiania: Steenske Bogtrykkeri, 1911: 83. [www.nb.no/nbsok/nb/b352f3b116c03eea97fddb73ddf19324?index=0#91](http://www.nb.no/nbsok/nb/b352f3b116c03eea97fddb73ddf19324?index=0#91) [24.8.2013].
25. Heiberg C. Lithotriti, foretagen paa Rigshospitalet. Eyr 1836; 11: 102, 105, 193–4, 198–9.
26. Heiberg C. I: Forhandlinger i det medicinske Selskab i Christiania i 1849. Norsk Magazin for Lægevidenskaben 1849, Anden række, Tredie Bind: 812.
27. Wulff O. Træk af stenknusningens historie. Særlig tryk af festskrift til Thorkild Røvsing 26. april 1922. København: Levin & Munksgaards forlag, 1922.

*Received 23 September 2013 and approved 25 October 2013. One of the authors is editor of the Journal of the Norwegian Medical Association. The manuscript has therefore been processed externally by an independent editor. Editor: Magne Nylenna.*