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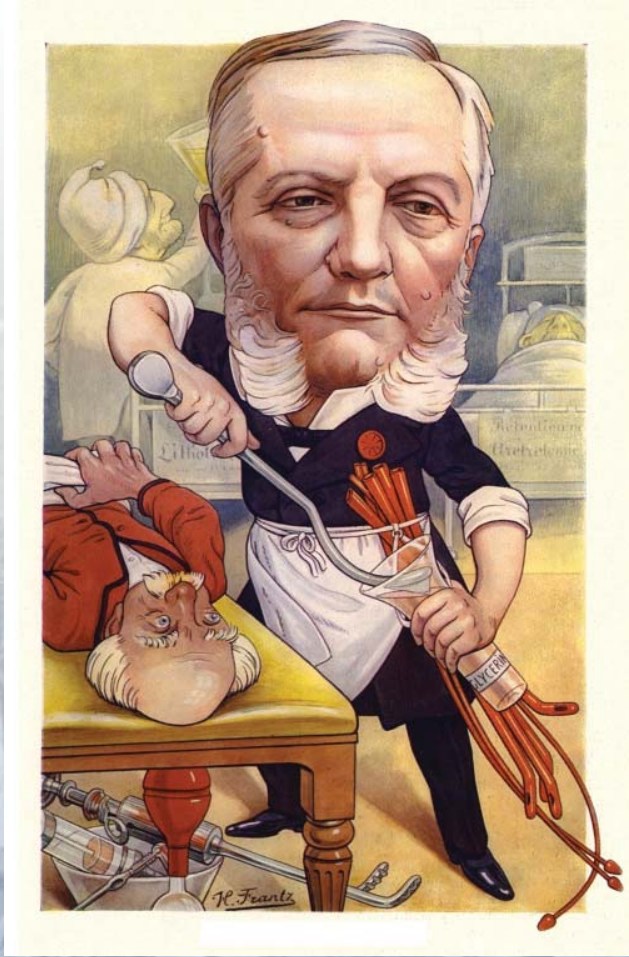

- Innovation, failure, and success: The first two cystectomies
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Praeterito Docet

The past teaches

About the Cover

Jean Casimir Felix Guyon (1831-1920) pioneered the established of genitourinary surgery and teaching during fin de siècle Paris. He was the first surgeon to hold a chair in urology thus making him to many as the 'father of urology'. His clinics at the Hôpital Necker were a beacon of education and innovation known throughout the world. One of his earliest American visitors was Hugh Hampton Young who, in 1896, was greatly impressed with not only the instruction at the clinics but a museum at Hôpital Necker that Guyon himself had established for urologic history. A contemporary wrote that it was from Guyon's clinics, that "a whole army has marched forth like Minerva for beneficent work."* He spearheaded the establishment of the Association of French Urology (AFU) in 1896 (President 1896-1918) which provided the model for the American Urological Association. Guyon also founded the International Society of Urology in 1907 where he intended annual meetings to be polylingual, conducted in French, English, German, and Italian. The fanciful caricature of Guyon, by H Frantz in 1908 (inset), depicts the Professor with common tools of the era, including male metal and flexible sounds, a hand-held lithotrite, and olive-tip ureteral catheters while the somewhat apprehensive patient awaits. Today, the Felix Guyon medal of the AFU is awarded to that person in any country who has made substantial contributions to urology. We can think of no better individual than Professor Guyon to grace this, the first cover of an international journal to explore the history of urology. The background of our cover depicts Guyon's indispensible nurses in the Cystoscopy Suite at the Hôpital Necker as found on a popular postcard of the era.

*Emile Jeanbreau, MD "The part played by France in the genesis and the progress of urology" In: The Urologic and Cutaneous Review, St Louis, 1923, p 377

Image Source: Bibliothèque interuniversitaire de Santé (BIU Santé) reference medchanteclx1911x06x0027

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The International Journal of Urologic History

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Foreward

History is about the future. Some of the most innovative urologists in the past three centuries have been equally dedicated to the preservation of urologic history for perspective, for preservation, and for inspiration. Felix Guyon, who graces this journal's first cover as the father of 'modern' urology, also built the first museum dedicated to urologic surgery. Ramon Guiteras was the founder and 1st President of the American Urologic Association (AUA) in 1902 but his 7,700 word Presidential address, the AUA's 1st (and longest) Presidential speech, was devoted to a summary of the previous 3,000 years of urology. And Hugh Young, the founder of *The Journal of Urology*, had hoped that *The Journal* would be dedicated as a "meeting place" for the "archives of Urology", placing "historical" subjects first in his list.(1)

These days, the urologic reader is overwhelmed, not just in time management, and finding the time for reading, but in the shear number of issues, newsletters, and social platforms to do so. In 2020, Scopus listed 164 peer-reviewed and open access journals within the category of urology alone (www.scopus.com). None of these journals is wholly dedicated to urologic history and thus the new generation of urologists, our future caregivers, may have little knowledge, or access to the knowledge, of how urology came to be, what it is, and where it is going. We believe that this new journal may go a long way to achieve that end, not only by providing the reader with scholarly papers that are both edifying and enjoyable, but in providing access to new writers or explorers who have discovered something about the past that may impact the present and the future of our craft.

We are excited to include in this first issue of the *International Journal of Urologic History* (IJUH) nine articles which provide unique aspects of urologic history writing and which may also serve as a template and inspiration for prospective authors. S Patel, of Chicago, provides compelling data demonstrating the knowledge gap that inspired the inception of our history journal in the first place.(2) Ng et al., from New York, discovered a medieval text in that city's JP Morgan library that depicts the convergence of the art of uroscopy with rabbit anthropomorphism.(3) Rempelakos et al., from Greece, present their work on how the scourge of syphilis directly affected some of Europe's most brilliant composers.(4) Wong et al., from New York, analyze whether President Andrew Jackson was appropriately billed for urologic care in the 1830s.(5) Saji et al., also from New York, present an analysis of the annual addresses of the AUA Presidents from 1902-2019.(6)

H Lohse, from Germany, and Matluck et al., from New York, present what are called 'oral history' projects in which interviews with persons from urologic history, or their descendants, were used as the primary dataset. (7,8) H Herr, from New York, presents the heroic and pioneering efforts required for the two first cystectomies in the world.(9) Moreland et al., from South Carolina, write on the dark history of wartime trophy taking.(10) Lastly, we provide a section termed 'Locations' in which a writer is invited to share a photodocumentary essay about a place in the world that has particular significance in the history of our field (p 54).

John L. Phillips, Editor

REFERENCES

1. Young HH: Foreward. J Urol 1917; **1**:1
2. Patel S: A tale of two journals: An analysis of of history articles published from 1973-2017. Int J Urol Hist 2021; **1:**3
3. Ng C, Vaughan ED, Meyerhoff E: Rabbit Uroscopy and the Virgin Mary with Christ Child. Int J Urol Hist 2021; **1:**6
4. Rempelakos L, Poulakou-Rebealakou E, Tsiamis C, et al.: The impact of syphilis on late works of classical music composers. Int j Urol Hist 2021; **1:** 29
5. Wong VJ, Dixon A, Fullerton S et al.: Was President Andrew Jackson overcharged? Int J Urol Hist 2021; **1**:19
6. Saji AA, Passarelli R, Dixon A et al.: Sentiment analysis and predictors of optimism: The AUA Presidential addresses, 1902-2019. Int J. Urol Hist 2021; **1**: 47
7. Lohse H: The BCG disaster, Lűbeck, 1930: An oral history project of the 'Calmette Children' and their survivorship. Int J Urol Hist 2021; **1**: 12
8. Matluck N, Zhang B, Richstone L: It's pronounced 'EE-lick": Milo Ellik, veteran, urologist, and inventor of the evacuator that bears his name. Int J Urol Hist 2021; **1**:37
9. Herr H: The first two cystectomies. Int J Urol Hist 2021; **1**:25
10. Moreland H, Moran M: The (not-so) ancient practice of anatomical trophy taking: an emphasis on penile dismembership. Int J Urol Hist 2021; **1**: 42

Why a Journal for a History of Urology?

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Why is history so important? History and historical writing is considered by many a scholar to be the ultimate type of investigative literature, because it involves not just a mastery of modern thought and epistemological awareness of issues in the field, but also an appreciation of those concepts from the past. Kurt Polycarp Joachim Sprengel (1766-1833) iterated in his monumental five volume "Essay on a Pragmatic History of Medicine" (1792-1799) that the history of medicine revealed the development of the human mind, promoting a better understanding of medical knowledge and a sense of civic responsibility. The History of Medicine taught students to find value in ideas that might seem foreign or archaic on a path towards intellectual modesty and tolerance.(1)

Our more contemporary conservator of urologic history, Professor David A. Bloom, articulated well that "details of our past matter. It is ironic that our era of electronic communication, that allows so much information accessible to our beck and call, may prove far less durable and secure than the paper record of the past still available in archives and libraries. If the salient details of the urologic narrative available today are not investigated, examined, and held up to peer review they are likely to be lost forever and urological literacy will be diminished."(2)

A knowledge of history and culture is a critical component of the learned surgeon. The great Seymour Schwartz, whose lifetime contributions to the science of surgery, have influenced generations wrote that "the artistry of surgery requires a mastery of science, an assimilation of experience, and a perfection of technical skills for the proper assessment and management of a clinical problem. But because that clinical problem is only one focused element of a complex human being, surgeons must relate to patients holistically. In constant dialogue with patients concerning issues of suffering, life, and death, the surgeon benefits from an appreciation of literature and art, images of the past and present."(3)

The immortal Rudolf Virchow who literally invented the modern scientific journal was also dubious of our modern penchant for focusing so strictly upon science that our humanistic side should be lost. He said, "It is one of the worst aspects of our present developmental stage in medicine that the historical knowledge of things diminishes with each generation of students. Even independent young research workers can normally be assumed to have a historical knowledge of no more than three to five years maximum. Anything published more than five years ago does not exist." (4)

Urology may be one of the oldest fields in all of medicine as the debilities of aging and infection are often manifested in the urinary tract. Indeed, the earliest medical treatise, the Ebers papyrus, describes the method to catheterize the distended bladder as early as 2500 BCE. Disease and suffering are the common denominator of the human condition in every corner of the globe. Those who receive the solemn call to treat a patient apply the methods of the present that must be put into proper context by the lessons learned of the past. A journal devoted to the history, art, and culture of urology will show how the past has shaped and molded the present, and ultimately position us for progress in the future. Clio was significant among the nine, classic Greek muses as she was gifted by her mother, Mnemosyne with memory and shared lyric skill who was inspired to sing and tell stories about the past. But what if there was no Clio, what would today and tomorrow look like without a shared and vibrant celebration of the past? WH Auden, in his "Homage to Clio" contemplated that loss.

"You had nothing to say and did not, one could see,
Observe where you were, Muse of the unique
Historical fact, defending with silence
Some world of your beholding
Clio, with your silence. After that
Nothing is easy"(5)

We mortals are capable of comprehending of what we were, all that we failed to be, and what we hope to become. Perhaps these tenets are most direct meaning for the importance of history. Urology deserves such a journal expressly for those interested in the humanity of the specialty, from all corners of the world, consider all aspects of the history of medicine and science, under the broad cloak of Clio.

REFERENCES

1. Sprengel K: Versuch einer pragmatischen Geschichte der Arzneikunde. Theil, Halle 1821.
2. DAB to MM, personal communication.
3. Schwartz S, Wilder J: Surgical Reflections: Images in Paint and Prose. Taylor and Francis, New York 1993.
4. Welch WH: Rudolf Virchow, Pathologist. Bost Med Sur J 1891; **283**:1.
5. Auden WH: Homage to Clio. Faber and Faber, London 1960.

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A Tale of Two Journals: An Analysis of History Articles Published from 1973 to 2017

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Introduction: *The Journal of Urology (JU)* and *Urology* have different policies regarding the publication of articles devoted to urologic history. *JU* stopped publishing full length historical articles in 2009. We wished to assess the pattern and frequency of historical article publishing in the two of the largest urologic journals.

Methods: We used a PubMed and manually based search of all articles from JU and *Urology* and categorized each article by subject, especially whether they were wholly and/or subtantially devoted to a historical subject.

Results: From 1973-2000, *JU* and *Urology* published 73 and 91 articles on the history of urology respectively. From 1997-2008, *JU* experienced an increase in historical articles at a time when the History Forum was begun at the AUA Annual Meeting. Therafter, *JU* stopped publishing historical articles but *Urology* has published 35 from 2009-2017 at an average rate of 3.9 articles/year.

Conclusions: The journal *Urology*, but not *JU*, publishes a history of urology article about every 3 months. The study revealed the need for a journal wholly dedicated to the history of urology.

Key Words: history of urology; journal publications

It was the best of times, it was the worst of times. In 2009, *The Journal of Urology* made the decision to halt the publication of history articles. Hugh Hampton Young, the journal's founding father, mentioned that historical papers should be published in the journal during his forward in the first issue of *The Journal of Urology* in 1917. Dr. Young stated "it is therefore evident that some common meeting place is extremely desirable — some medium in which all types of papers upon the field of common interest may appear — archives of Urology — historical, embryological, anatomical, biochemical, pharmacological, pathological, bacteriological, surgical and medical, experimental and clinical."(1) In 1973, *Urology* was founded. In its first issue, Pablo Morales, its founding editor, wrote that "the success of the journal will depend not only on its appeal to the authors… but also to the audience that reads most of what is published" further stating that "other features will include essays on the history of urology."(2) As two of the most widely read journals of urology, we wished to measure trends in their publication of articles devoted to the history of urology.

METHODS

PubMed was used to search for publictions on the history of urology in *The Journal of Urology* and *Urology* from 1973-2017. A manual review of the table of contents from both journals of historical articles in the time period (1973-2017) was carried out in order to identify papers missed by search engine capture. Each article was then reviewed to determine its historical subject matter and scope.

RESULTS

From 1973 to 2017, a total of 164 articles on the history of urology were published including 73/164 (44.5%) in *The Journal of Urology* and 91/164 (55.5%) in *Urology*. From 1997 to 2008, *The Journal of Urology* saw an increased publication of history articles which may have been due to the increased success of the History Exhibit

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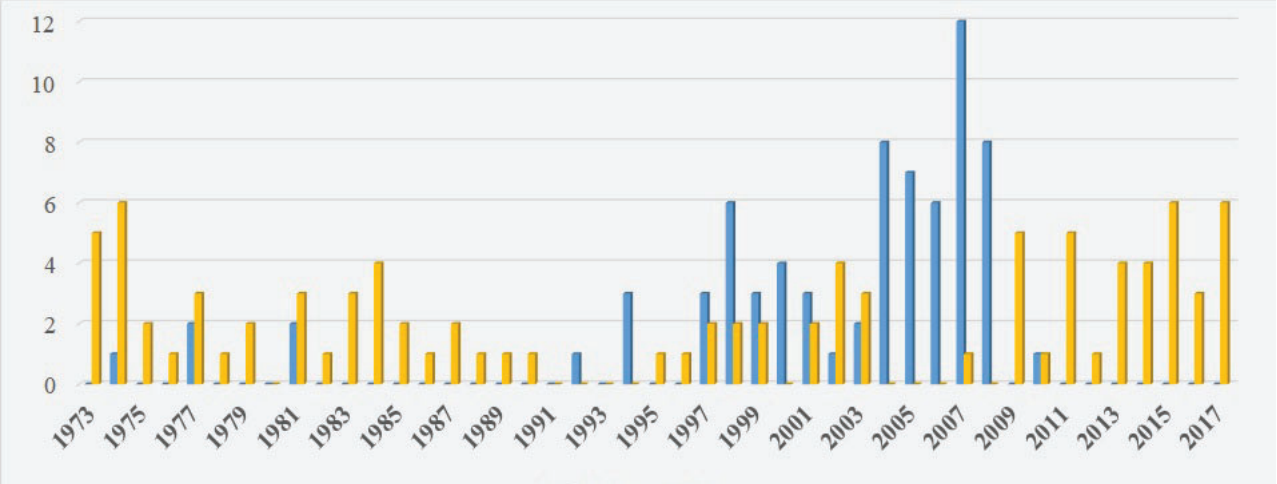

Figure 1. History Articles Published in *The Journal of Urology* (Blue Bars) and *Urology* (Gold Bars) from 1973 to 2017

and Forum at the AUA Annual Meeting and the further growth and development of the William P. Didusch Museum in Linthicum, Maryland (www.urologichistory.museum). However, recently both journals have taken a divergent approach to publishing history manuscripts. After *The Journal of Urology* no longer accepted history articles in 2009, *Urology* increased the frequency rate of history article publications from 1.3 manuscripts/year (1996-2008) to 3.9 manuscripts/year (2009-2017) when a total of 35 articles were published. (Figure 1)

Querying the topics published in *Urology* from 2009 to 2017, historical biography was the most common subject and included 15/35 (42%) works. Urology in ancient history (9%), urologic instruments (including the catheter and the cystoscope)(8%) and the history of urology institutes & departments (7%) make up the next most common tier of article topics. When looking at article topics pertaining to a specific urologic organ (generally relating to oncology or surgery involving that organ), the prostate (7%) and the kidney (5%) were the most common topics. Female urology, infertility, women urologists and historical topics related to bladder and penis were among the least common topics published (1% each)(Figure 2).

We found that 21% of the history articles published included either Drs. David A. Bloom or Harry W. Herr as authors, both of whom have been recognized for their contributions with the AUA's William P. Didusch Art and History Award.

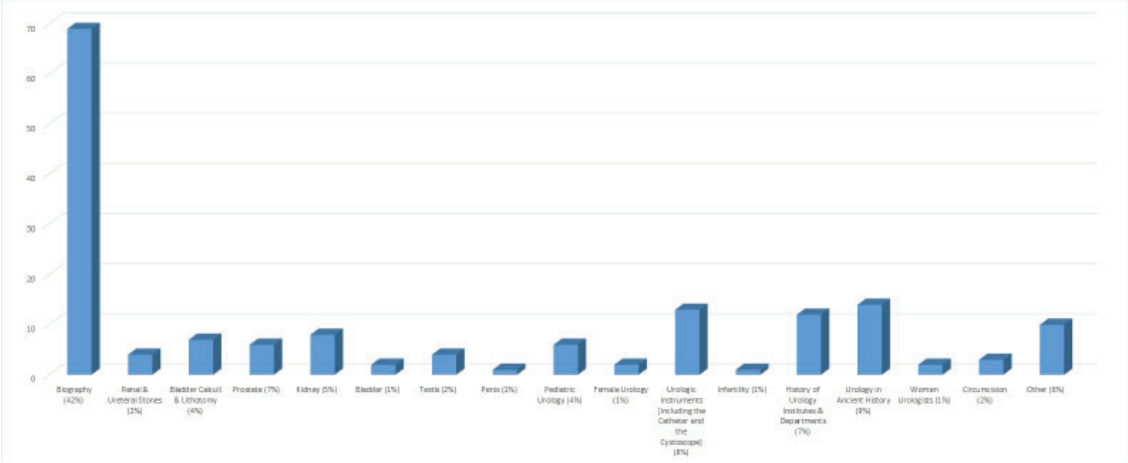

Figure 2. Subjects of historical articles published in the *Journal of Urology* and *Urology*, 1973-2017. The largest proportion of manuscripts, about 70%, were "biography" while only 1% of historical papers were on "female urology", "women in urology", and infertility.

DISCUSSION

The field of urology has a rich history which has been preserved at the William P. Didusch Museum and can reach urologists through the medical journals in the field. The journal founders of both *The Journal of Urology* and *Urology* discussed the importance of publishing historical articles. However with the halt in historical paper submissions to *The Journal of Urology* in 2009, we found that *Urology* has appeared to fill part of the vacuum created to allow for the publication of historical urology papers.

Other urology journals that have published history papers include the *Canadian Journal of Urology*, *Journal of Endourology*, *BJU International*, and *The Journal of Pediatric Urology*. The C*anadian Journal of Urology* has uniquely preserved the autobiographical history of giants in our field through its "Legends in Urology" series. In 2008, Gabriel P. Haas, the Editor-in-Chief of the *Canadian Journal of Urology* announced that a "new section entitled 'Legends in Urology' is introduced with the sole purpose of reviewing major developments in our field and to hear from those responsible for making these advances using their own words to describe their achievements."(3) The journal has produced a "Legend of Urology" article for each issue (6 issues per year) since its inception in 2008. These unique articles have given us a personal view into each of the legend's lives and preserved a first-person account of their career. It should also be noted that the *Canadian Journal of Urology* has also published papers on the history of urology separate from its Legends in Urology series.

Relatively recently, the *Journal of Pediatric Urology* in 2019, created a history section for their journal. Dr. Anthony Caldamone, one of the journal's editors, wrote "pediatric urology is a relatively young specialty. However, if you look [at] any abnormality that we currently care for and trace back how we arrived at where we are today, an appreciation of the historic perspective is inevitable… This is the reason why the Editor Board of the Journal of Pediatric Urology has endorsed launching a history section and encourages all of you to take the time to read history and even to document history by contributing articles." (4) Since the creation of its history section, the *Journal of Pediatric Urology* has published two historical papers, which is already equal to the number of history papers published from its founding in 2005 to 2019.

CONCLUSION

With the decision to stop accepting historical articles by *The Journal of Urology* in 2009, *Urology* has filled the gap and seen a significant rise in the publication of history articles. Though other urological journals have published historical articles, it is clear that there is a need for the formation of a journal dedicated to helping preserve the history of urology. Our review of the articles published illustrates the rise and fall of history publications in *The Journal of Urology* and the consistent commitment of *Urology* to history articles. An analysis of the topics covered in these two journals further illuminates what has been written of the past and what still remains to be explored

REFERENCES

1. Young HH: Forward. J Urol 1917;**1**:1.
2. Morales PA: Why This Journal? Urology 1973;**1**:81.
3. Haas GP: Editorial. Can J Urol 2008;**15**:3950.
4. Koyle MA, Hurwitz RS, Caldamone AA: Editorial. J Pediatr Urol 2019;**15**:3-4.

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Rabbit Uroscopy and the Virgin Mary with Christ Child

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Introduction: The depiction of a rabbit with a urinary matula on the same page with the Virgin Mary and the Christ child in a medieval text, the *Book of Hours,* has raised interests among art and medical historians. We will describe the complex interplay between the rabbit, the matula, and the Virgin Mary.

Sources: We studied the original illuminated texts from the medieval (ca. 1475) *Book of Hours* archived in the Morgan Library, New York. We reviewed articles and historical publications from art history and medical literature.

Results: The *Book of Hours* was composed for use by lay people who wished to incorporate elements of monasticism into their devotional life. There was often an amalgamation of religious and secular themes within these illustrated texts. The use of uroscopy to diagnose ailments was prevalent and popular during the Middle Ages and the depiction of a matula was not uncommon in medieval manuscripts. As a result, the urine flask came to be identified with and used as a symbol of the physician, much like the caduceus is today. From the fourth century to modernity, the rabbit has been an averter of evil and bringer of good luck. Rabbits functioned as motifs in many medieval manuscripts. The physician rabbit in the *Book of Hours* depicted charity, healing, and scholarship.

Conclusions: The bespectacled rabbit holding a 'matula' is utilized in this Christian religious text as a symbol of the healing properties and resurrection attributed to Jesus, potentially contributing to the reader's religious experience.

Keywords: matula; uroscopy; Book of Hours, medieval medical history

Medieval prayer traditions included breviaries, psalters, and devotionals for daily life known as a Book of Hours. These highly personalized texts ranged in length and cost, and were prized by some of the 15th century's richest patrons who could commission a Book of Hours to be hand painted or 'illuminated', with religious portraits, depictions of daily life, symbolism, and family heraldry. Before the invention of mechanical printing, books were handmade objects treasured as works of art. Scribes copied the texts from an established edition. Then, artists might have embellished them with illustrations, decorated initials, and ornaments in the margins.(1)

One such Book of Hours from late 15th century France, now in the collection of Medieval Manuscripts at New York's Morgan Library, was illuminated by Barthelemy d'Eyck (died ca. 1476), painter to King René d'Anjou, and Enguerrand Quarton (ca. 1410-ca. 1466). The book contains, among its 400 pages, a painted image of the "Virgin Mary with Christ Child". A closer inspection of the page margins, where artists often placed additional and allegorical drawings, is a rabbit, holding up for an inspection, a flask used to examine urine, known as a 'matula'. Uroscopy has played a role in medicine for centuries and the uroscopic evaluation of urine has been noted in Galenic texts and as part of the cover art of the Journal of Urology. The significance of a rabbit holding a matula in a 15th century devotional text, however, is unknown and what inspired the artists who illuminated the text has not been previously evaluated. We researched the history of the manuscript, its art, and the potential importance of 'rabbit uroscopy' in medieval Europe and contend that the rabbit enhances the religious narrative of the manuscript, thereby enriching the viewer's devotional experience (Figure 1).

SOURCES

The Book of Hours was originally commissioned by an unknown patron about 1440-1450 in Provence, France who hired the then famous illuminators of the Tournai-Ghent School, Barthélemy d'Eyck and Enguerrand Quarton, to personalize the text. Centuries later, the

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Book of Hours was sold to the 4th Earl of Ashburnham in 1849 and changed hands over the decades until it was purchased in 1909 by the famed American banker and bibliophile J. P. Morgan (1867-1943) who had extensive holdings in medieval art and manuscripts, all of which are now archived in the Morgan Library & Museum, New York, NY, where it received its formal curatorial designation of MS M. 358. We also used curatorial notes from the Morgan Library, personal communications from historians, and secondary sources as cited.

Figure 1. "Virgin Mary with the Christ Child", Book of Hours (MS M.358 fol. 20v, ca. 1440-50) probably illuminated by Barthélemy d'Eyck (d. ca. 1476). (Courtesy Morgan Library & Museum, New York)

RESULTS AND DISCUSSION

The Book of Hours (MS M. 358)

The manuscript measures 9 ¾ x 6 ¾ inches, is written on 15th century vellum, and has been bound in red velvet since 1910. The book is only partially illuminated and some pages are in various stages of incompletion. Some blank pages contain instructions to the illustrators which were not carried out. Still, the book contains 24 pages with so-called 'calendar' medallions depicting a representative activity of a month and its corresponding zodiac sign. The decoration about the text is of the highest quality, with brilliant clear colors across the spectrum in naturalistic backgrounds. There are also 10 illustrations and miniatures, including one of John the Baptist, Saint Mark, and the evangelists, and pages dedicated to prayers for the Penitential Psalms, to the Trinity, and a Mass for the Dead. Pages 20v-28v are devoted to prayers to the Virgin Mary entitled "Obsecro te" ("I beseech thee") and "O intemerata" ("Oh, immaculate one"). The miniature of the Virgin Mary and the illuminated page devoted to her form the basis of our study and which is generally credited to d'Eyck .

Virgin Mary and Jesus

The back of the 20th vellum of the Book of Hours depicts a miniature of the Virgin Mary behind whom are three angels holding up a curtain. Held in Mary's arms is the Christ Child. This specific page stood apart from other pages within the book for its details and original design. Unlike others in the book, images on this page were not transcribed from the previous page suggesting that careful attention was paid here.

When first viewing the Virgin Mary and Christ Child manuscript, one is drawn to the vibrant colors on this gilded manuscript. The Virgin Mary with Christ Child is surrounded by elaborate floral patterns, intertwined with various figures bordering on the edges. The figures within the arch frame are surrounded by a velvet drape held by three angels. Morgan Library notes suggest that a similar motif is seen in tomb bas-reliefs of 14th century Tournai strongly suggesting the artists origins. Though still influenced by gothic style, one could see the artists' attempt at creating depth and perspectives using the tiles on the floor. Influences from the Italian Renaissance are also seen in this manuscript; instead of being highly stylized, the figures' contoured bodies create a sculptural presence. Outside of the arch, the upper margin depicts a man carrying two objects, possibly stones, using a yoke balanced on shoulders and a hybrid animal facing him. In the left margin, a figure using a distaff and spindle is facing away. The bottom margin contains two dogs walking on crutches, one with a

Figure 2. Enlarged lower margin of Figure 1 showing two injured dogs, now on crutches, walking towards the rabbit, wearing spectacles, and inspecting a 'matula', or a glass flask used to perform uroscopy.

bandaged paw approaching a rabbit wearing eyeglasses. The rabbit is standing on hind legs while holding up a 'matula', a flask that held the urine for examination (Figure 2) and intended by the artist to be performing that role. (2) Unlike the hybrid animal in the top margin, the dogs and the rabbit are anthropomorphized. Not only do they stand as bipeds, these animals are using distinctly human instruments.

Depictions of the Virgin and Child were among the most popular images for private devotion, and they frequently emphasized the tender relationship between a mother and her child. Images included on the page margins assisted in these religious activities by creating tangible devotional objects.(3,4)

The corresponding text for this manuscript reflects such devotion:

"I beseech you, Mary, holy lady, mother of God, most full of piety, daughter of the greatest king, most glorious mother, mother of orphans, consolation of the desolate, the way for those who stray, salvation for those who hope in you, virgin before giving birth, virgin while giving birth, virgin after giving birth, fountain of pity, fountain of salvation and grace, fountain of piety and joy...and through that holy, great compassion and that most bitter sorrow in your heart that you had when you saw your Son, Our Lord Jesus Jesus, nude and lifted up on the cross, hanging, crucified, wounded, thirsty but served gall and vinegar and you heard him cry 'Eli' and you saw him dying ...Come and hasten to my and counsel, in all my prayers and requests, in all my difficulties and needs, and in all those things that I will do, that I will say, that I will think, in every day, night, hour and moment of my life...."(5)

The Rabbit and Uroscopy

As early as 4000 BC, Sumerian and Babylonian physicians had inspected urine for diagnosing disease. Hippocrates used uroscopy in conjunction with a thorough physical exam, including inspection, palpation and auscultation to assist in the diagnosis.(6) Over the next 1000 years, the use of uroscopy became more prominent. By the Middle Ages, the use of uroscopy alone for diagnosis was the norm. The practice was so popular that the matula became the symbol of a physician, much like the caduceus of today.' One of the most influential uroscopists at the time, Gilles de Corbeil, distinguished twenty different colors of urine from which he drew conclusions. The urinal itself was divided into thirds; he considered it significant where the different colors or contents of the urine appeared in the flask because he believed that each region of the flask corresponded to a part of the body.(7,8)

The bespectacled rabbit of 20v MS.358 performing uroscopy suggests the animal's anthropomorphic role as a physician. Glasses associated the wearer with an

Figure 3. The more typical relationship of predator dog and prey rabbit, now reversed in the Morgan 35 Book of Hours (Source: The Bodleian Digital Archive. University of Oxford, Laud Misc. Fol 1r, p7 by Philippus, de Montecalerio, ca. 1336/44)

academic life and an elite social class. Spectacles were regarded as a symbol of scholarship and educational superiority, even in an age when medicine was based on very little science.(9)

Role Reversal

The rabbit's role as a physician is further reinforced by the presence of the injured dogs. Dogs would usually chase and hunt for rabbits (Figure 3). Role reversal was a tool that had been used when depicting physicians. In the Smithfield Decretals (British Museum, Royal MS. 10 E. N), the fox is depicted in multiple illustrations as a physician caring for a lion (Figure 4).(10) The traditional role of the hounds as pursuers of rabbits in the natural world has here in the religious texts been reversed, and the dogs are now dependent upon the hare for their physical health. This inverted relationship reiterates the fact that physicians would take care of the sick and the ill even when the injured were their enemy. The illustrators used the rabbit and the dog to reveal a deeper message. The artist may be drawing a parallel between the rabbit as the physician and Jesus as a healer, caring for the sick even those who were his enemies.

Figure 4. Allegorical role reversal, here showing fox as the physician, caring for the injured lion, like the physician rabbit in the Book of Hours, may depict a ministry whereby charity sees no distinction in friend or foe (Smithfield Decretals, Royal MS. 10 E. N, Courtesy British Museum)

The Rabbit and Providence

The use of animals to teach a moral may be taken directly from the Bible: "But ask the animals, and they will teach you, or the birds of the air, and they will tell you; or speak to the earth, and it will teach you, or let the fish of the sea inform you. Which of all these does not know that the hand of the Lord has done this? In his hand is the life of every creature and the breath of all mankind." (Job 12:7-10)

Historically, the rabbit has also been a symbol of good luck. The rabbit's foot as an emblem of good fortune dates back to the fourth century. In a Latin medical text, Marcellus of Bordeaux proclaims "cut off the foot of a live rabbit and take airs from under its belly and let it go. Of those hairs or wool make a strong thread and with it bind the rabbit's foot to the body the patient and you will find a marvelous remedy."(11)

CONCLUSIONS

The artist's intent to bring a rabbit and uroscopy together illustrates a complex narrative within this manuscript. The amalgamation of religious and sectarian motifs is consistent with the nature of the Book of Hours since it was a religious devotional text intended to be used in one's home on a daily basis. The matula is used to create an anthropomorphized rabbit physician. The interplay between the rabbit and the dogs expands on the idea that both physicians and Jesus took care of the sick and Enguerrand Quarton attempted to facilitate the concept of Jesus as a healer, potentially in an attempt to provide the reader with a more profound religious experience the weak even when they were adversaries. By depicting the rabbit in the Book of Hours, Barthelemy d'Eyck and Enguerrand Quarton attempted to facilitate the concept of Jesus as a healer, potentially in an attempt to provide the reader with a more profound religious experience.

REFERENCES

1 Alexander, JG: Medieval Illuminators and Their Methods of Work. New Haven: Yale University Press, 1992.

2 William V, Curator, Medieval and Renaissance Manuscripts, The Pierpont Morgan Library. Personal Communication, February, 2007.

3 Van Os, HW: The Art of Devotion in the Late Middle Ages in Europe, 1300-1500. London: Merrell Holberton, 1994.

4 Department of Medieval Art and The Cloisters. "Private Devotion in Medieval Christianity", in: Timeline of Art History. New York: The Metropolitan Museum of Art, 2000.

5 Lindsay KC: Album Amicorum, (Eds) Stein, SA and George DM, Binghamton, State University of New York, 1990.

6 Harold S: Obstetrics and Gynecology: A History and Iconography - Iconographia Gyniatrica, 2nd Ed.. London: The Parthenon Publishing Group, 1994.

7 Connor, H: Medieval uroscopy and its representation on misericords - Part 1: Uroscopy. Clin Medicine 2001; **1**: 507.

8 Haber, MH: Pisse Prophecy - A brief history of urinanalysis. Clin Lab Med 1988; **8**: 415.

9 Flores, NC: Animals in the Middle Ages: A Book of Essays. New York: Garland Publishing, 1996.

10 Varty K: Reynard the Fox and the Smithfield Decretals, J Warburg Courtauld Inst 1963; **26**: 347.

11. Wilson GP: Some Southern Folk Remedies, Georgia Review 1964; **18**: 157.

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The BCG disaster, Lübeck, 1930: An Oral History Project of the 'Calmette Children' and their Survivorship

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Introduction: Today Bacillus Calmette Guérin (BCG) is the most common agent used in the intravesical treatment of non-muscle invasive (NMIBC) bladder cancer but originally was used as a vaccine against the widespread scourge of tuberculosis. The public acceptance of this vaccination was, at least in Germany, delayed by an infamous 1930 medical event in which 251 infants were accidentally inoculated with a batch of BCG vaccine contaminated with live mycobacterial cultures. The accident itself was comprehensively investigated but those affected were forgotten. For this oral history project, adult survivors of the 1930 BCG disaster were interviewed in order to document their biographical outcomes and personal perspectives.

Sources and Methods: We conducted personal, recorded interviews with identified survivors of the 1930 BCG accident and relatives. We analyzed contemporary news articles and accounts and secondary sources from German medical and popular literature.

Results: Of the survivors, a total of 8 patients and 8 family members of patients were interviewed. In addition, two interviews were also conducted with relatives of the presiding judge from the 1931/2 trial and of an involved physician. The 18 biographies make up the dataset for this study. Interviewed survivors, the so called 'Calmette Kinder' (Ger."Kinder": Children), recounted years of illness and chronic health impairments. The supportive measures taken after the accident by the town of Lübeck were extensive and ranged from medical care and health promoting measures such as additional food for the vaccinated infants to the establishment of an arbitration court for the compensation of the 'Calmette Kinder'.

Conclusions: The Lübeck Disaster was a landmark event in the history of biomedical safety, ethics and informed consent. The decades-long consequences of a failed vaccination effort for infants still urges a cautious, measured approach to medical progress today. Lessons learned were critical for the establishment of the modern approach to public vaccination efforts so well-illustrated in the fight against CoVid 19 and other microbiological threats.

Keywords: BCG, ethics, vaccine safety, Lübeck, oral history

On Sunday morning, the 6th of July, our beloved little Günther died after eight weeks of severe illness at the age of 16 weeks of the horrific effects of the Calmette vaccination. With greatest pain we mourn the death of our promising child, on whom doctors performed a dangerous experiment without our knowledge."(1)

Thus write the devastated parents of a child, lost in the summer of 1930 a few weeks after receiving an oral dose of BCG accidentally contaminated with virulent mycobacterium tuberculosis in Lübeck, Germany. Lübeck, a coastal town on the Baltic Sea, was supposed to become a pioneer in the fight against the widespread disease of tuberculosis. Instead, the city became the scene of the greatest vaccination disaster in the 20th century, the so-called „Lübecker Impfunglück" (Ger.: "Impf.", vaccination; "unglück", accident). The oral vaccine was composed of the so-called "bacillus Calmette-Guérin": After 15 years of work, and wholly stopped by World War I, Albert Calmette (1863-1933) and Camille Guérin (1872-1961) finally produced an attenuated strain of mycobacterium bovis that was effective as an oral vaccine against mycobacterium tuberculosis and was first used in France in 1924 (figure 1).(2) Five years later, two Lübeck physicians, who had long been dedicated to fighting tuberculosis, planned the first introduction of BCG in Germany. In 1929, a

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culture of BCG was sent from the Pasteur Institute in Paris to a local Lübeck laboratory where the BCG was further cultivated.(3) The lab was headed by a Professor F.G.B. Deycke, Director of the local General Hospital. In the Deycke laboratory, different analyses were also carried out, among which were tests with virulent tuberculosis bacteria. After the approval of the medical staff and local government officials, a public vaccination campaign officially started on February 24, 1930. In total, 251 infants (over 60% of all newborns in Lübeck) were inoculated.(4) By March 1930, some of the infants presented with nonspecific symptoms like vomiting or tiredness. A month later, infants developed severe illnesses including protracted vomiting, rashes, swollen lymph nodes, pneumonia, failure to thrive, and cachexia. Hospitalizations increased to a daily occurrence at which point some parents and their pediatricians suspected a connection between the 'vaccination' event and the child illnesses.

By the end of April, 1930, three infants had succumbed to their diseases. At the autopsy of the third child on April 26th, 1930, gastrointestinal tuberculosis was detected and the connection between the vaccinations and the previously inexplicable illnesses was finally discovered. The production of any further vaccines in the Deycke laboratory was stopped and remains were destroyed. Vaccines that had already been distributed, however, were not reclaimed, and some children received the second and third vaccine doses until April 30th. Initial presumptions were that the toxic doses were limited to a single day's vaccinations but this was disproved in the following days by illnesses of children vaccinated with different productions. On May 14th, or nearly three months after the vaccination effort had begun, the public was finally informed about the disaster. Following this announcement Lübeck became the focus of international public attention. Even major journals such as *The Lancet* and the *Journal of the American Medical Association* reported on the Lübeck disaster and the subsequent trials of the medical staff involved with the vaccine production.(5-7) Albert Calmette himself took the news badly. While the BCG vaccine and the Pasteur Institute were exonerated early in the discovery process, Calmette's health precipitously declined and he was dead by 1933.(8) Regardless of the exoneration, BCG vaccination was not used again in Germany until after the Second World War.(9)

After a long, internal investigation, the so-called 'Calmette trial' was held for nearly four months from October 1931 to February 1932 in a local gymnasium

Figure 1. (Left) Albert Calmette (lefT), co-developer of BCG, in a staged photo, showing the then recommended practice of oral inoculation of the newborn to protect against TB (National Library of France). **Figure 2**. (Right) Gravestone of the infant of the Pangels family in a Lübeck, Germany cemetery (photography: H. Lohse)

because courtrooms proved to be too small. Numerous experts on bacteriology and tuberculosis were called to testify. Possible causes of the accident were proposed included a reversion of the attenuated BCG back to its original virulence. It was quickly concluded, however, that the BCG vaccine cultures were accidentally mixed with a strain of human tuberculosis bacteria stored in the same rooms at the Deycke laboratory. The two Lübeck physicians who had organized the vaccination campaign were convicted to prison sentences for offenses of involuntary manslaughter and involuntary bodily injury. Professor Deycke received a two year sentence and Dr. Altstaedt, medical head of the Health Department, one year and three months. The laboratory nurse, Anna Schütze, was acquitted for lack of evidence. It was never concluded exactly how the BCG vaccine became contaminated by the infectious mycobacterial cultures.

While the verdicts ended the legal aspects of the disaster, the clinical and sociological aspects continued in the survivors and their families for 80 years. There has been no study of their outcomes and the long-term impact of the Lübeck disaster on the so-called 'Calmette Kinder' (Ger. "Kinder": children). Therefore, an oral history project ,"Contemporary witnesses of the Lübeck disaster", was established to close the knowledge gap and provide a human portrait of the effects of a public health campaign gone wrong.

SOURCES AND METHODS

Interviews with vaccinated persons or those related to them built the basis for this oral history project. After a search for witnesses, via a local newspaper article and other outreach efforts, eight interviews with survivors, eight with relatives of survivors, and two with relatives of Dr. Altstaedt and the chief judge of the trial, Heinrich Wibel, were conducted between 2011 and 2012. During the interviews, the author was also provided with various personal documents related to the disaster. The 18 interviews were semi-structured. Following an open beginning, a pre-developed interview guideline was used to allow comparability between sets and ensure a standard coverage of topics.(10,11) The interviews were recorded and then transcribed verbatim. Their evaluation was based on previously published methodologies to summarize qualitative content analysis. In this way, 18 datasets were created, in which the life stories of the sufferers were presented along a timeline. The repeated analysis of all transcripts, biographs, and personal and generally accessible archival documents established overarching themes. For background information, contemporary literature, newspaper articles, and secondary resources were used.

RESULTS

Damage Control

No anti-mycobacterial chemotherapeutic agents were known or available in 1930 to treat children acutely infected with m. tuberculosis. The prevailing wisdom was to treat tubercular symptoms and strengthen the natural defenses. Medical experts from Hamburg were called to Lübeck and a panel with local physicians was arranged in May 1930.(12) An immediate evaluation and overview of all vaccinated children including serial examinations and radiographs were started. After the announcement of the disaster in May 1930, new victims were reported almost daily in the local newspapers. There was great concern in Lübeck that all 'Calmette Kinder' would eventually suffer the fate of contracting tuberculosis. In the first serial examinations of July 1930, it was concluded, however, that not all vaccinated infants became critically ill and that some children even showed no or few symptoms. In a subsequent investigation of the disaster, it was found that the productions of vaccine from different days had contained different amounts of BCG and virulent tuberculosis bacteria thus accounting for the variation in acquired illness severity. The findings helped to disprove the fear that eventually all vaccinated children would succumb to infection. Still, most of the 72 infants who died, did so at the ages of between three and four months old, between May and July 1930, and the last death occurred in April 1931. The 174 survivors were subsequently x-rayed in a serial exam fashion in 1932 and 1933. A total of 126/174 (72.4%) showed calcified abdominal lymph nodes which was a marker of active tuberculosis infection.(4) Among the surviving children, clinical tuberculosis remained active in some cases until the age of three or four and in some cases caused permanent damages like (mostly unilateral) deafness, as follows.(13)

Lifelong health impairments

One of the Project interviewees was nine years old when her brother fell ill with tuberculosis from the contaminated BCG vaccine at the age northof five weeks. She noted that his right ear had started suppurating and various lymph nodes on the neck "swelled up". In the following months, the nodes spontaneously drained or required surgical incision and drainage. His sister recalled:

"Later, my father [played], as one does with small children, ‚Listen to the clock ticking' with him and he found that (my brother) couldn't hear. And then, of

Figure 3. Views of 'Calmette Kinder' at a summer sanatorium on the North Sea in hopes of mitigating effects of tuberculosis contracted from contaminated BCG inoculation. (photography privately owned)

course, [the ear] was examined by the doctor. It was completely eroded, the ear. It was broken."

Middle ear tuberculosis as a focus of infection occurred in 21 cases of the vaccinated infants, of whom 12 survived. This rather unique focus of infection was due to either the vomiting of infectious stomach contents after the vaccination or by holding the child's nose closed during the feeding of the vaccine to force the newborn to swallow.(14) Middle ear tuberculosis led to a life-long deafness and health impairment. Another of the interviewees with similar symptoms was, like many other 'Calmette Kinder', relegated to a sanatorium in the fresh air of the North Sea near St. Peter the following summer of 1931 (Figures 3 and 5). While the otic discharge eventually stopped, he recalled the need to clean the ear daily and seal the canal with an absorbent cotton to protect against malodor. An operation became necessary when the inflammation returned in the early 1970s followed by regular cleaning by ENT specialists. One of the most severely damaged surviving children suffered from double-sided middle ear tuberculosis. In addition to complete deafness, the infection also caused left permanent facial nerve palsy and stigmatised her for life. As an infant she could not learn to speak properly and had to attend a school for the hearing impaired far away from Lübeck. Finishing school, she was initially unable to find a job. After a court action by her mother, she finally received a guaranteed job for life in the sewing room at the Lübeck General Hospital and a pension.

Compensation

Beside the medical treatment the Lübeck government also provided comprehensive support for recovery. This included the provision of additional fat- and energy-rich foodstuffs such as milk, butter and eggs, rent subsidies and arrangement of new apartments or household support. In the difficult economic times of the early 1930s, these grants were very welcome and partly continued over several years. Funeral expenses were also covered and a portion of a Lübeck cemetery was created especially for the victims of the disaster. The partly weathered graves serve as a reminder of the devastating losses these families sustained (Figure 3).(15)

For their suffering, the 'Calmette Kinder' were meant to receive direct monetary compensation which was decided by the Lübeck government before the trial, irrespective of the verdict or the question of guilt. For this purpose, an arbitration court was established and an agreement was concluded with the majority of the parents in 1931. Children were medically examined and the severity of their illnesses was classified. Based on these medical estimates the compensation sums between 300 and 1,500 Reichsmark were considered. The money was held in 'blocked' savings books until the child reached the age of 21. One of the consequences of the Second World War was, however, the currency reform in West Germany and, therefore, Lübeck, in 1948. All West German money, and with it, the savings books, was converted from Reichsmarks to Deutsche Marks at

a ratio of 10:1. Reduced to 1/10th of their original value, the revaluation meant an almost complete loss of the compensation. One interviewee remembers:

"We were all somewhat cheated, the Calmette Kinder, who got compensation. My parents got 1,000 Reichsmark for me, that was at a time when the money was still Reichsmark. [It was] on a savings book, but a blocked one, I can still see [the letters] today, red: ‚blocked'. My parents were only allowed to use the interest for themselves or for me, but I didn't get the money paid out until I was 21. Well, by then, it was June 20, 1948, and there was the currency [reform]. I got married eight days before [the change in] currency when I was just 18, and then I [thought]: 'Yes, now I'm married, now I get my money'. And at that point, my parents had not taken a penny from [the account], so there were supposed to be 1,390 Reichsmark in it. Afterwards, [with the reform], it was now just 139 Deutsche Marks."

Parental commitment and the 'ICG'

Aside from government support, the parents of the 'Calmette Kinder' were by no means passive but established a support group a mere five days after the announcement of the disaster. Convened by Richard Pangels, who was to lose his own child a month later (figure 2), a parents' committee was formed to jointly represent the parental interests. Members of the committee also participated in the investigation committee of the Lübeck city parliament. In 1931 a community of interest, the "Interessengemeinschaft der Calmette-Geschädigten" (Ger. "Geschädigte": injured), or ICG, was founded. Among other things, the ICG supported parents in applying for welfare benefits, organized wreath ceremonies at the cemetery, and celebrations for the surviving children and their families. One contemporary witness owned pictures of a summer party (Figure 4) and one interviewee still vividly remembered the Christmas parties of the ICG:

"Well, it started in the early afternoon. The children recited poems there and (sang) Christmas carols, we had coffee and cake, St Nicholas came, everyone got a present and so on. And then in the late afternoon, the parents came over. There was a small dance afterwards, and then, in the course of the evening, we said our hearty goodbyes. The last time was probably in 1938."

The ICG presumably dissolved during the Second World War.

DISCUSSION

By 2021, most of the interviewed former 'Calemette Kinder' have died. The oral history project was therefore the last chance to collect their memories. The interviews revealed that the Lübeck disaster and the fact of being a 'Calmette Kind' continue to have a life-long effect, even beyond the turmoil of the war, the 1942 air raids on Lübeck, and the economic devastation of the post-war period. The study revealed previously unknown details about the compensation proceedings of the arbitration court and the parental work. The fact that the compensation was devalued in 1948 first became known through the interviews, as the official documentation

Figure 4. Summer party of the ICG, a parent-organized support group for Lübeck Disaster survivors which was active throughout the 1930s until the onset of the Second World War. (photography privately owned)

of the city of Lübeck ended with the beginning of the Second World War.

The interviewees, at their advanced ages, offered the contemporary witness a comprehensive retrospective especially regarding diseases and lifelong health impairments and their disaster daily burden. Other survivors showed disappointment at the loss of compensation and for still others the disaster was an important aspect of their biography. This multi-layered aftermath of the 'Lübecker Impfunglück' shows how a single catastrophic event shaped the lives of not only those affected, but their relatives, their caregivers, and the convicted physicians.

The Lübeck disaster became known through the medical world and has been continued in textbooks and curricula regarding biosafety and medical ethics. Some aspects, such as that parents were never told that live, albeit attenuated, tuberculosis bacteria would be administered to their children, are inconceivable from today's perspective in the era of Informed Consent. Also, vaccine production under the conditions of that time would never be allowed today. It is precisely from such terrible mistakes like the 'Lübecker Impfunglück' that we learn and better prepare for the future. Research, in general, leads to progress with the establishment, testing, and disproval of hypotheses and pre-conceived assumptions. BCG itself, which was at once a celebrated vaccine, later turned out to have a much reduced efficacy against tuberculosis than was originally hoped. Observations by Berton Zbar and Ernesto Morales, however, demonstrated the efficacy of BCG in the fight against NIMBC, for which intravesical BCG therapy has become a standard of care in urology world-wide.(16) Calmette and Guérin could never have guessed this new-found success of their research. The COVID 19 pandemic accelerated vaccine development to an unprecedented pace, and its long-term effects and possibly side effects, as well as those of the infection itself, cannot be surveyed at this time. Without studying and learning from uncertainty, however, medical progress is not possible. The Lübeck disaster is such a reminder that despite the lack of absolute certainty in medicine, careful, assiduous, and meticulous methods are critical for the safety and benefit of patients of times to come.

CONCLUSIONS

The risks and benefits of public vaccination programs was illustrated by the so-called BCG disaster in Lubeck, 1930. Lessons learned from the medical accident, and the private and public efforts to compensate and prevent further catastrophes lie at the basis for modern efforts to combat microbiological threats.

REFERENCES

1. Jonas HE: Das Lübecker Impfunglück 1930 in der Wahrnehmung von Zeitzeuginnen und Zeitzeugen. Inauguraldissertation zur Erlangung der Doktorwürde der Universität zu Lübeck [The Lübeck vaccination accident in 1930 as perceived by contemporary witnesses. Inaugural dissertation to obtain a doctorate from the University of Lübeck], Lübeck, 2017.

2. Calmette A, Guerin C, Weill-Halle B: Essai d'immunisation contre l'infection tuberculeuse [Essay on the immunization against tuberculosis]. Bull Acad Med 1924; **91**: 787.

3. Urteil gegen Prof. Dr. F. G. B. Deycke: Calmette-Prozess, Eigenverlag, Lübeck 1932.

4. Moegling A: Die Epidemiologie der Lübecker Säuglingstuberkulose [The Epidemiology of the infantile tuberculosis in Lübeck]. In: Die Säuglingstuberkulose in Lübeck. Zusammenfassung der anlässlich der Lübecker Säuglingserkrankungen auf Veranlassung und mit Unterstuztung des Reichsministeriums des Innern durghgefuehrten Untersuchungen. Arbeitem aus dem Reichsgesundheit, [Summary of the investigations carried out on the occasion of the Lübeck infant diseases at the request and with the support of the Reich Ministry of the Interior. Work from the Reich Health Office] Berlin: Springer 1935; **69**.

5. From our Berlin Correspondent: The Lübeck Trial. Lancet 1931; **218**: 927.

6. From our Berlin Correspondent: The LübeckTrial. Lancet 1932; **219**: 102.

7. Report on the Infant Deaths in Lübeck. JAMA - Journal of the American Medical Association 1931; **96**: 283.

8. Scherpereel P: Albert Calmette: Jusqu'à ce que mes yeux se ferment [Until my eyes are closed]. Paris: L'Harmattan 2016.

9. Lindner U: Gesundheitspolitik in der Nachkriegszeit [Post-War Politics of Health]: Großbritannien und die Bundesrepublik Deutschland im Vergleich. Munich: Oldenbourg 2004.

10. Portelli A: What makes oral history different?. In: The oral history reader, 2nd ed. Edited by R Perks, A Thomson. London: Routledge 2006.
11. Ritchie DA: Doing oral history. Oxford: Oxford University Press, 2003.
12. Kleinschmidt H: Einfluß therapeutischer Maßnahmen auf den Ablauf der Lübecker Säuglingstuberkuloseerkrankungen. In: Die Säuglingstuberkulose in Lübeck. Zusammenfassung der anlässlich der Lübecker Säuglingserkrankungen auf Veranlassung und mit Unterstützung des Reichsministeriums des Innern durchgeführten Untersuchungen. Arbeiten aus dem Reichsgesundheitsamt [See Ref. 4, above], Berlin: Springer 1935; **69**.
13. Kleinschmidt H: Untersuchungen der als Neugeborene tuberkuloseinfizierten Lübecker Kinder im Alter von 12 Jahren. Beiträge zur Klinik der Tuberkulose und spezifischen Tuberkulose-Forschung 1943; **99**: 291.
14. Schürmann P, Kleinschmidt H: Pathologie und Klinik der Lübecker Säuglingstuberkuloseerkrankungen. In: Die Säuglingstuberkulose in Lübeck. Zusammenfassung der anlässlich der Lübecker Säuglingserkrankungen auf Veranlassung und mit Unterstützung des Reichsministeriums des Innern durchgeführten Untersuchungen. Arbeiten aus dem Reichsgesundheitsamt [See Ref. 4 above] Berlin: Springer 1935; **69**.
15. Fick W: Lübecker Friedhöfe: Vorwerker Friedhof. 100 Jahre von 1907-2007, Hansestadt Lübeck
[Lübeck's Cemetaries: Vorwerker Cemetary. 100 Years from 1907-2007, the Hanseatic City of Lübeck] Lübeck: Fachbereich Planen und Bauen 2006.
16. Herr HW: History of Bacillus Calmette-Guerin and Bladder Cancer: An Immunotherapy Success Story. Journal of Urology 2008; **179**: 53.

Figure 5. Calmette Kinder recovering by the North Sea, summer 1931 (photography privately owned)

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Was President Andrew Jackson Overcharged? An Economic Evaluation of 19th Century Surgical Charges for Urologic Procedures and their Comparison to the Modern, RVU Era

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Introduction: Surgical billing is as old as the profession of surgery but there is no published data that has characterized changes in surgical fees over history. Surgical remuneration has been better studied in the Medicare era of relative value units (RVUs)-based payment but what surgeons charged in the American 18th and 19th centuries is unknown. President Andrew Jackson underwent surgery by Dr. James Hall for a hydrocele in 1832 and was billed, and then paid, $30. Our initial objective was to determine the appropriateness of Dr. Hall's surgical billing for that era. We then wished to determine historical trends in physician billing for similar urologic procedures in the 18th-19th centuries compared to the current RVU era, correcting for inflation.

Sources and Methods: Published fee tables from 18th and 19th century regional medical societies, prevailing charge data from the Center for Medicare Services (CMS) from 1967-1985, and published RVU values and conversion numbers from 1992-2020 (CMS) were used for analysis. To correct for inflation, we used a published consumer price index (CPI) for 1774-2020 indexed to 2020 US dollars. Mann-Whitney U-tests were used to compare unpaired differences without parametric assumptions.

Results: A total of 43 fee tables from 18 states from 1818-1898 were identified. The $30 charge to President Jackson for hydrocele surgery was similar to other states' medical society recommendations of the early 1830s. Over the 19th century, there was an insignificant increase in the low-end fee pricing for hydrocele surgery of $18.4 +/- 17.9 in 1818-1840 versus $28.70 +/- 36.83 from 1880-1890 ($p > .05$), adjusting for inflation. Similarly, for initial male urinary catheterization, the mean surgical fee of $4.28 +/- 1.25 in 1818-1850 was similar to the $4.75 +/- 5.62 mean surgical fee in 1851-1900 ($p>.05$). Adjusting to 2020 dollars, however, reimbursement for urinary catheterization in 1818-1850, 1850-1900, 1975-1984, and 1992-2020 was $113.04 +/- 38.06, $131.20 +/- 169.53, $73.87 +/- 2.38, and $23.05 +/- 4.69, respectively ($p<.01$). of 11%.

Conclusions: Dr. James Hall, physician to 10 US Presidents, appropriately billed the 7th President for what would be now described as a hydrocele drainage and scarification. Fees for that procedure remained stable or decreased throughout the 19th century. Surgical fees for male urinary catheterization, however, decreased 82% from the 1840s to the 2020s, correcting for inflation.

Keywords: Surgical Fees; Hydrocele; Historical Trends; Andrew Jackson; James C. Hall

Contemporary methods to reimburse surgical care are derived from the 1985 model of relative value units (RVUs) by Hsiao et al. in which final physician payment is based on a measurement of relative work, expense, and risk of any particular procedure.(1) Hsiao's RVU system was enacted by CMS in 1992 in an attempt to reign in medical costs at a time when physician reimbursement was largely derived from physicians' self-stated "usual, customary, and reasonable" fee.(2) Such fees were, in turn, derived from regional and national medical society guidelines and discretionary surgical billing, a practice which had been in place since the dawn of the American republic.(3) There has been no published data, however, on the exact pricing of specific procedures in the pre-Medicare era, or from any era, which may illustrate differences in society guided surgical pricing and modern RVU based payments.

The Library of Congress has preserved the medical bills of Dr. James C. Hall of Washington D.C. for services rendered to the 7th US President Andrew Jackson (Figure

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1), for the care and treatment of a hydrocele in the 1830s (Figure 2)(4). Additional care rendered to Jackson, included a second hydrocele operation September 4th, 1833, and subsequent consultations from 1834-1836, and were all billed and reimbursed at similar rates (data not shown). These fragments demonstrate an early 19th century fiduciary relationship between physician and patient. It is unknown, however, if those charges reflect prevailing contemporary billing practices or an inflated, discretionary charge. Dr. Hall's medical billing may serve as more than just a curious memento of Presidential history by acting as a data point in a fuller analysis of similar urologic procedures during the 19th century and beyond. We wished, therefore, to document prevalent billing practices and their costs during the dawn of American surgery for specific urologic procedures. We then aimed to use economic models to compare those 19th century surgical prices with more contemporary data of the RVU era to determine the net change in physician reimbursement over the 200 year period of the Republic.

SOURCES AND METHODS

Surgical Fee Tables. Surgical fee tables were accessed from 1800-1930 from publicly available digital resources of the University of Missouri Libraries Prices and Wages project. Medicare era charges were obtained from the Resource Library of the Center for Medicare Services (www.cms.gov), WorldCat.org, and HathiTrust Digital Library (Ann Arbor, MI).

Consumer Price Index (CPI). CPI conversion factors for dollars for 1774 to estimated 2028 were derived from the tables published by Sahr RC et al., School of Public Policy, Oregon State University (Corvallis).

Relative Value Units (RVU) and Conversion Factor calculations. We obtained RVUs from 1992-2020 from the Center for Medicare Services, and Conversion Factors from the American Academy of Pediatrics5,6. Physician reimbursement for specific procedures was calculated as the product of the RVUs x the conversion factor for each specific year(5-7). We used the CMS CPT code 51701 for urinary catheterization.

Statistical Considerations. Mann-Whitney U-tests were used to compare unpaired data with non-parametric assumptions using an alpha of 0.05.

RESULTS

19th century definitions of "radical cure" for hydrocele. We found that there were two methods

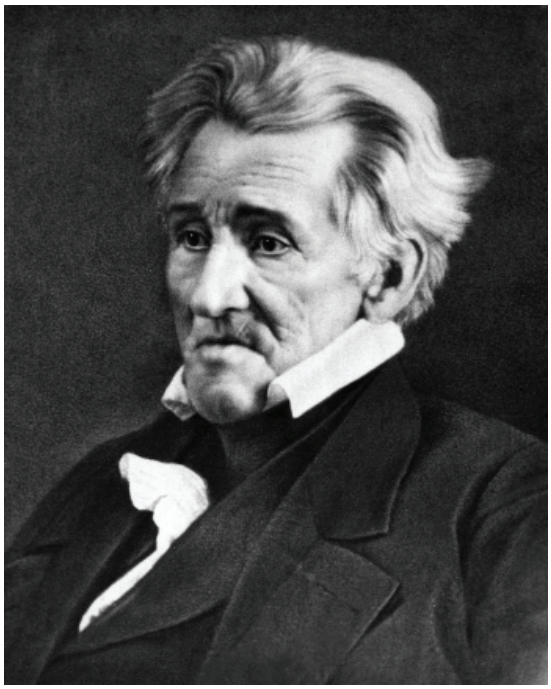

Figure 1. (Left) James Crowdhill Hall, MD (1805-1880), President Andrew Jackson's physician (National Archives, Washington DC); (Right) Daguerrotype of Jackson, April 1845, age 78, by Matthew Brady (WikiMedia Commons, Public Domain)

for the treatment of a hydrocele in the 19th century and these methods varied vastly from what is commonly referred to now as a "hydrocelectomy". The British surgeon Percivall Potts (1714-1788) appears to have been one of the earliest writers to note that mere drainage of a hydrocele was associated with recurrence and that stringent or sclerosing agents were required to induce the necessary scar formation within planes termed the 'serosal' and 'parietal' layers of the tunica vaginalis. Potts termed the method of induced scarification as a "radical cure".(8) For this reason, there were two types of surgical procedures incorporated into the lexicon as the basis for medical fees: a simple hydrocele drainage or 'puncture' procedure versus hydrocele drainage with the addition of scarifying agents, surgical placement of a through-and-through wick, or placement of a scarifying drain which Pott's termed a "seton". The procedure with these surgical steps appears to have been termed an "operation for hydrocele", "radical cure for hydrocele", "injection of hydrocele", or "radical operation" throughout the 19th century. It was not until the work of Ernst Van

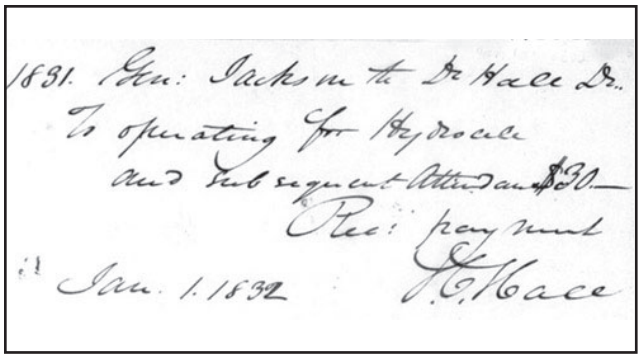
1831. Gen: Jackson to Dr Hall Dr.
To operating for Hydrocele
and Subsequent Attendance $30—
Rec: payment
Jan. 1. 1832 J.C. Hall

Figure 2. Medical receipt, 1832, "Gen. Jackson to Dr. (JC) Hall for "operating for Hydrocele and Subsequent Attendance, $30" (Library of Congress, Andrew Jackson Papers)

Bergmann (in the mid 1860s that led to the technique that the modern urologist would recognize as a true "hydrocelectomy", the operation whereby the excess tunica vaginalis is surgically resected and the edges oversewn (coined the 'Van Bergmann's' procedure at that time). The exact date or time when the Van Bergmann hydrocelectomy became standard of care is unknown but is referenced in the American surgical literature as early as 1891.(9) We therefore were required to limit our cost analyses to the decades preceding 1890 when there may have be less ambiguity as to what was performed when a surgeon billed for a "simple" versus "radical cure" of a hydrocele.

Fee Tables and Specified urologic procedures: A total of 43 Fee Tables were identified that enumerated surgical fees for specific procedures that were performed in 18 states between 1818-1889. A total of 38/43 (88.4%) fee tables described the fees for treatment of a hydrocele with curative intent. Over the 70 year study period, the description of the procedure appears to have remained largely unchanged and was limited to three (3) terms: "operation for hydrocele", "radical cure of hydrocele", or "injection of hydrocele". We found that urinary catheterization was listed in 33/43 (72.1%) of fee tables and specified catheterization in the male versus female, for simple drainage versus dilation, and "initial" versus "subsequent". A total of 41/43 (95.3%) fee bills were published by a state's or county's medical society and 2/43 (4.7%) published by non-society journals.

Surgical Fees for Hydrocele "radical cure": A total of 29/38 (76.3%) fee tables listed a low and high range for the recommended fee for the surgical care of the hydrocele and 9/38 (23.7%) listed a 'flat' fee (data not shown). We analyzed the trend in the lower versus higher range prices over time and chose to include the 'flat' fee price with the lower range data. We found that over the 70 year study period there was an insignificant increase in the low end fee pricing for hydrocele. The average low end fee in contemporary, inflation-non-corrected US dollars for the treatment hydrocele from 1818-1840 was $18.4 +/- 17.94 versus $28.70 +/- 36.83 from 1880-1890 ($p > .05$).

The case of Dr. J.C. Hall and President Andrew Jackson. James Crowdhill Hall was a revered physician and medical leader of mid-19th century Washington D.C. Dr. Hall first evaluated and treated President Jackson for a "hydrocele" in 1831 and twice charged the 7th President $30.00 for the "operation for the hydrocele". Fee tables from the Washington Medical Society of 1833 and 1837 do not specify the fees for 'simple' or "radical" hydrocele operations, though they did specify the fees for first time catheterization ($5.00) and the range charged for "lithotomy" of $40.00 to $100.00.(10,11) Contemporary tables that do list rates for hydrocele surgery include those of physicians from 1831 Hartford who charged $15.00 for "radical cure" and in 1836 Pittsburgh where the prevailing charge was $20.00.(12,13) A surgical bill from Lowell Massachusetts of 1840 recommends the fee of $2.00 for simple hydrocele drainage

and $5.00 for the "operation" while the charge in Macon, Georgia for hydrocele was $50.00.(14,15)

Surgical Billing for Urinary catheterization. Unlike hydrocele therapy, we considered that the technique of routine male urinary catheterization may be similar throughout the history of the republic. We therefore compared surgeon reimbursement from 1818-1850, 1851-1900, 1976-1985, and 1992-2020, first as contemporary charges, and then in 2020 US dollars. The surgical fees for a first encounter male urinary catheterization remained flat throughout the 19th century study period with an average price of $4.28 +/- 1.25 from 1818-1950 compared to $4.75 +/- 5.62 from 1851-1900 (p-value 0.67). In comparison, during the pre-RVU based Medicare years of 1976 to 1984, the average (standard deviation) reimbursement for urinary catheterization was $22.93 +/- 5.65. In the RVU-era, from 1992 to 2020, the average reimbursement for urinary catheterization was $18.16 +/- 1.11. Adjusting to 2020 dollars, however, the reimbursement for urinary catheterization in 1818-1850, 1850-1900, 1975 to 1984, and 1992-2000 was $113.04 +/- 38.06, $131.20 +/- 169.53, $73.87 +/- 2.38, and $23.05 +/- 4.69, respectively.

DISCUSSION

Our contemporary view of surgical reimbursement under Medicare is that payment for services is derived from RVUs multiplied by a geographic practice cost index value (GPCI). Urologists are able to calculate their expected CMS reimbursement for any specified CPT code performed in any state. Throughout the history of the republic, however, surgical fees were in large part based on consensual levels established by local and state medical societies.(3,16-18) Data, however, that documents just what those pre-Medicare fees were and how they evolved over the history of American medicine has rarely been reported. This study allowed us to understand the billing behavior of physicians over the entire 19th century and then compare those to our era. We found that not only was President Jackson's physician,

Year	Location	Low	High	Ref.	Year	Location	Low	High	Ref.
1818	New Hampshire	$2		3	1875	Chicago	$20	$50	21
1831	Hartford, CT	$ 15		12	1879	Los Angeles, CA	$25	$100	21
1836	Pittsburg, PA	$ 20		13	1882	Central District, IA	$20	$ 30	17
1841	Macon, GA	$ 50		15	1882	Iowa Un. Med. Soc.	$15	$40	17
1848	Philadelphia, PA	$ 5	$ 20	22	1882	Brooklyn	$20	$75	23
1848	Allegheny Cnty PA	$ 20		24	1883	Milwaukee	$25	$50	20
1850	San Francisco, CA	$ 100	$ 200	25	1883	Des Moines, IA	$15	$100	17
1852	Philadelphia, PA	$ 5	$ 10	26	1886	Polk County, IA	$10	$25	17
1855	New York NY	$ 5	$ 20	27	1886	Scott County, IA	$10	$25	17
1855	Sacramento, CA	$ 50	$ 100	27	1889	Kansas City, MO	$25	$100	28
1858	Hamden, MA	$ 5	$ 10	29	1891	Average US	$20	$50	30
1859	Louisville, KY	$ 25	$ 50	31	1891	North Parma, NY	$10	$25	30
1860	New York NY	$ 20	$ 60	16	1891	Chattanooga, TN	$25	$50	30
1862	Madison, IN	$ 50		32	1891	Kershaw County, IA	$15	$25	30
1862	Knightstown, IN	$10		33	1891	Kansas City, MO	$25	$100	30
1864	Sullivan, IN	$25	$ 50	34	1892	Sullivan, IN	$25	$50	34
1864	Philadelphia, PA	$25		27	1892	Chicago, IL	$50	$200	35
1868	Milwaukee, WI	$10	$25	20	1894	Baltimore, MD	$10	$50	36

All Known Fee Tables for "radical" operative therapy for hydrocele in 19th century America cited in manuscript. Where no low or high fee range was given, the provided fee was placed in the "low" column. Not included: 1898 Fee of the Medical Society of San Francisco for the "radical cure of hydrocele" of $200 (Ref. 21). Abbreviations: Ref.:Reference

Dr. James C. Hall, reasonably fair and appropriate with the fees charged for his services, but that physician fees throughout the 19th century were remarkably unchanged. The pricing of medical fees by physicians took in account several factors including self-perceived value of a service, initial versus subsequent care, simple versus complicated procedures, and risk, all of which are incorporated into RVU billing. Pricing in the 19th century was different in that physicians also took into account the time of day, road conditions, travel time, financial status of the patient, and the generally low rate of payment3. Overcharging was negatively perceived and cast skepticism on the quality of care.

We found that Dr. Hall's charges of $5 for an initial consultation, $2 for a subsequent consultation, and $30 for a hydrocele operation were all in line with prevailing charges recommended by the Society despite the status of Dr. Hall's famous patient. We also found that the "operation", or what many over the 1818-1898 period called a "radical cure" for hydrocele was not what is known today as a "hydrocelectomy". Most 18th-19th century physicians viewed hydrocele care as either a simple drainage via an incision and stylet (or 'seton'), or "operation", that is, 'hydrocelotomy' plus injection of scarifying agents and long term drains. Dr. Hall's "operation" on Jackson most likely was the latter. Thus, for our analysis, we were not able to compare hydrocele costs from the 19th century with those of our current era because of the different nature of the procedure.

For a long term model comparison of urologic costs, therefore, we analyzed the fees for male urinary catheterization which we conjectured was performed similarly to an early 19th century physician as it is in a 21st century emergency room. We found that, in 2020 US dollars, a simple catheterization in the early 19th century would be charged on average about $120. By 2020, the Medicare rate for physician's services for the simple catheterization had dropped to $20. Even at this level of granularity, one may surmise that 19th century physicians charged higher rates, at least 5 fold higher, than physicians are reimbursed now for the same procedure. Physicians may have chosen to demand higher average fees in historical times to compensate for the then notoriously low rate of reimbursement. . Physicians in the Medicare era may be reimbursed at the lowest rates in history but may make up for the difference with increasing services rendered.

Medical societies realized even in pre-Revolutionary America that some patients had limited means to pay fees. The concept of a 'slide fee scale' had become codified in 19th century fee tables, "establishing a minimum and maximum charge...giving each member the liberty of deciding for himself on any sum between the highest and lowest designated".(19) We found that the majority of fee tables in the study utilized the sliding scale and were remarkably consistent across the country, though they rose over time. Mid-century surgeons in Philadelphia charged $5-20 for hydrocele drainage and scarifi cation which rose to $10-50 in 1890 Baltimore. The discretionary nature of physician billing, to some, reflected the self-perceived quality of the services provided , a concept somewhat anathema to the RVU era of the same price for low or high quality procedures.

We recognize many limitations with our analysis, namely that the paucity of data on billing in the 19th century may not make up a legitimate set of numbers for statistical analysis. Our data sets are derived from the current digitalized landscape and may not reflect the unknown and potentially unlimited texts yet to be available through computer based searching. Similarly, the only bills we analyzed of Dr. Hall, the original subject of the analysis, were preserved by the federal government and do not refl ect a larger pattern of billing of non-Presidential patients.

Still, ours is the fi rst study, of which we are aware, that documents historical billing fees over the course of American history for any medical let alone urological procedures and places into perspective the diminished fi nancial returns on medical care, despite a presumed increase in quality, and the education required to deliver quality care. The study may also suggest whether a well self-regulated and transparent physician-driven fee table as a basis for quality-focused surgical care should be revisited.

CONCLUSIONS:

Surgical billing in the 19th century was included as a direct doctor to patient discretionary charge, based on published medical society fee tables, taking into account case complexity, time, experience required, and travel. Charges for hydrocele were stable over the 19th century and reflected the flat, non-infl ationary period of the gold standard of that time. Dr. James Hall was a prescient leader of Washington, DC medicine and appeared to bill President Andrew Jackson for hydrocele therapy that was consistent with prevailing charges. Reimbursement for male urinary catheterization, however, appears to

have decreased, correcting for infl ation, from early 19th century highs to their lowest levels in US history by 2020.

REFERENCES

1. Hsiao WC, Braun P, Dunn D et al: Resource-based relative values. An overview. JAMA 1988; **260**: 2347.
2. Schroeder SA: Personal reflections on the high cost of American medical care: many causes but few politically sustainable solutions. Arch Intern Med 2011; **171**: 722.
3. Crombie J: Fee Table of the Southern District of the New Hampshire Medical Society 1818; p 4.
4. Andrew Jackson papers, 1775-1874, Library of Congress.
5. Medicare Learning Network: How to Use the Searchable Medicare Physician Fee Schedule (MPFS) 2020; ICN 901344: .
6. History of Medicare Conversion Factors. American Academy of Pediatrics (www.ama-assn.org/system/files/2021-01/cf-history.pdf)
7. American Medical Association: Medicare RBRVS: the physicians' guide 1993; .
8. Earle J: An Account of the Method of Obtaining a perfect of Radical Cure of the Hydrocele by Means of a Seton. In: The Chirurgical Works of Percival PottAnonymous London: Wood & Innes 1808; p 3.
9. Brokaw AVL: Report of Cases. Saint Louis Courier of Medicine 1891; **5**: 110.
10. Fee Table. In: Regulations and System of Ethics of the Medical Association of WashingtonAnonymous Washington: Charles H. Barron 1833.
11. Medical Ethics. In: Regulations and System of Ethics of the Medical Association of Washington, D.C.Anonymous Washington: Jacob Gibbon, Jr. 1837.
12. Russell GW: Fee Table of 1831. In: *Sketches of Physicians in Hartford*. Hartford: Case, Lockwood, & Brainard, 1890.
13. Addison W, Agnew J, Armstrong CL: A Fee Bill Sixty Years Old. Pennsylvania Medical Journal 1897; **28**: 288.
14. Smith JVC: Lowell Medical Association. In: *The American Medical Almanac of 1840*. Boston: Marsh, Capon, Lyon, and Webb 1840; p 2.
15. Curtis A: Macon Medical Fee Bill. Botanico-Medical Recorder 1841; **9**: 334.
16. Baker AH, Thacker JA: Fee Bill of the Medico-Surgical Society of New York, 1860. Cincinnati Medical and Surgical News 1862; **3**: 148.
17. Lothrop CH: Fee Bills Adopted by Medical Societies in Different Parts of the State. In: *Medical and surgical directory of the state of Iowa for 1886-1887*. Clinton, IA: Allen, Steam Printing, Binding 1886.
18. Bradbury S: Fee Table of the Chicago Medical Society. In: *The cost of adequate medical care*. MM Davis (Ed.). Chicago: University of Chicago Press 1937.
19. Transactions of the Medical Society of the County of Albany. Albany, NY: Charles Van Benthuysen 1872.
20. Frank LF: Fee Bill Adopted by the Milwaukee County Medical Society. In: *The Medical History of Milwaukee, 1834-1914*. Milwaukee: Germania Publishing 1915.
21. Felton KC, Smith FW, Dunlop GH: Appendix: The California Survey. In: *Report of the Social Insurance Commission of the State of California*. Sacramento: California State Printing Office 1919.
22. Meigs CD: Fee Bill. In: *Summary of the transactions of the College of Physicians of Philadelphia*, Philadelphia: William F. Geddes 1848; p 2.
23. Hopkins GG: Fee Bill of the Medical Society of the County of Kings. In: *The proceedings of the Medical Society of the County of Kings. Brooklyn, New York*. Brooklyn: Office of Publication 1882.
24. Baker AH, Thacker JA: Fee Bill of Medical Association of Allegheny County, PA. Cincinnati Medical and Surgical News 1862; **3**: 83.
25. Dimon T, Harris SR, Grover WA: By-Laws and Fee Bill of the San Francisco Medical Society. San Francisco: California Daily Courier 1850.
26. College of Physicians of Philadelphia: Charter, ordinances and by-laws of the college of physicians of Philadelphia. Philadelphia: T.K. and P.G. Collins 1851.
27. College of Physicians of Philadelphia: Charter, ordinances and by-laws of the college of physicians of Philadelphia. Philadelphia: T.K. and P.G. Collins 1864.
28. Lanphear E: Kansas City Fee Bill. Kansas City Medical Index 1889; **10**: 338.
29. Adams N, Chapman TL, Otis GA: Tariff of Fees. In: *Rules and Regulations of the Hampden District Medical Society* Springfield: Samuel Bowles 1858.
30. Taylor JJ: The Physician as a Business Man. Philadelphia: The Medical World 1892.
31. Miller H, Powell L, Bell TS: A Scale of Fees Adopted by the Physicians of Louisville. Cincinnati Medical and Surgical News 1862; **3**: 53.
32. Hendricks JG, Conner WJ, Kunkler GA: Bill of Charges, Madison, Indiana. Cincinnati Medical and Surgical News 1862; **3**: 377.
33. Canadry NH: Fee Bill of the Union Medical Society, Knightstown, Indiana. Cincinnati Medical and Surgical News 1862; **3**: 108.
34. Maple JB: A Medical History of Sullivan County, Indiana. Sullivan, Indiana: Sullivan Union Press 1936.
35. Robison JA, Thackeray WT, Doering EJ: Fee Table Chicago Medical Society. Chicago Medical Journal 1892; **3**: 419.
36. Johnson RW: Amendments to the Constitution: Report of Committee on Revision of the Fee Table. In: *Transactions of the Medical and Chirurgical Faculty of the State of Maryland, 96th ed.* Baltimore: Griffen, Curley & Company

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The First Two Total Cystectomies – A brief history of failed-successes

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Introduction: Radical cystectomy is a complex surgery for bladder cancer which has undergone progressive changes for a century. The originators of the procedure required pioneering innovation and their biographies place the challenges of radical cystectomy in proper perspective

Sources: English and German textbooks and secondary sources

Results: Bernard Bardenheuer (1839-1913) and Karl Pawlik (1849-1914) performed the world's first two cystectomies for bladder cancer, overcoming challenges of contemporary anesthesia, vascular control, and renal drainage.

Conclusions: The originators of radical cystectomy illustrate that true advances in surgery require bold innovation and forward thinking but also that the limitations of contemporary technology must be overcome.

Keywords: cystectomy, history

In the late 19th century, partial cystectomy was used to treat bladder tumors on rare occasions, but total removal of the whole bladder was believed to be beyond the limits of surgery. Two renowned surgeons rejected existing dogma and, when presented with challenging cases for which no other means were available, decided to risk a Blasenextirpation (Ger.: Bladder removal). The heroic story of their clinical innovation, from contemporary accounts of peers and in the surgeons' own words, demonstrate the basis for such a gewagter Eingriff (Ger.: "a daring surgical intervention").

SOURCES

We cited German works by Frederick Moll et al. as indicated, used contemporary surgical texts, translations of Bardenheuer's and Pawlik's descriptions of surgery, and photography in the public domain or cited from indicated sources.

RESULTS

The First Cystectomy. Bernhard Bardenheuer (1839-1913) (Figure 1, left) was a prominent German surgeon at the Cologne Citizens' Hospital in 1886 when he examined 57 year-old Theodor Baum, who suffered from locally advanced bladder cancer blocking both ureter.(1,2) Bardenheuer could not palpate the tumor and established the diagnosis by the newly invented cystoscopy. He knew effective surgery was nonexistent at the time for advanced pelvic cancers, but he wrote…"I have always asked the question about bladder cancer if it would be possible to remove the whole bladder, in the cases where the entire bladder or the ureteral orifices are affected by tumor". (3,4) Faced with the challenge of an incurable locally advanced bladder cancer by conventional means, "I decided and suggested to the patient removal of the tumor and perhaps the bladder, then planned to implant the ureters into the rectum."(2)

The operation took place on January 13, 1887 in the City Hospital of Cologne (Figure 2). Bardenheuer documented the operation as follows:

"Through a superficial oblique incision and cutting the outer muscle layers of the bladder wall, it appeared that one could easily separate the whole bladder and individual muscle layers from the mucosa, so that one would be able to remove the mucosal cover alone. I began to peel off the mucosa everywhere from the

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FIGURE 1 (Left) Bernard Bardenheuer (1839-1913) performed the world's first cystectomy in Cologne, Germany in 1887 (Bernard Becker Medical Library Archives, Washington University, St. Louis) (Right) Karel Pawlik (1849-1914) performed the second cystectomy in Prague a year later (Wikimedia)

muscle; this went well on the back and sides, but not the dome because here the cancer had extended far beyond the bladder wall. The right ureter was enlarged, the size of a finger ("*fingerdick*"), and was transected extravesically. Despite excision of the left sidewall (of the bladder), I was unable to find the left ureter, so I assumed that it was obstructed. The fundus together with the prostate was then lifted off the rectum after the urethra was severed. (The) patient had become very weak." The operation had lasted 75 minutes.

During the first days after the operation, recovery appeared hopeful, however after two weeks, Baum succumbed to uremia.

"Operation successful, patient dead". The autopsy report stated, "The left ureter was obstructed, the left kidney markedly hydronephrotic, the right (kidney) showed likewise the early stage of hydronephrosis. The wound cavity was completely closed, nowhere existed an infection."

Bardenheuer did not explain why he neglected to implant the right ureter into the rectum as he had planned and left it to drain freely into the pelvis. Moll suggests that he had to forego implanting the ureter owing to excessive bleeding encountered while removing the prostate.(3) We also do not know pathology of the bladder specimen to ascertain whether Bardenheuer may have cured his patient. Nevertheless, his first ever total cystectomy represented forward thinking and pioneering work, which opened the door for others to follow. Although he never performed another cystectomy, the next case occured two and a half years later.

The Second Cystectomy. Karel Pawlik (1849-1914) (Figure 1, right) was an Austro-Czech gynecologist working in Prague who trained in Vienna under the famed surgeon and polymath Theodor Billroth (1829-1894). Pawlik innovated many urologic advances including air cystoscopy.(5) Howard A. Kelly (1858-1943), an American gynecologist who sometimes did work in the emerging field of urology, credited Pawlik for identifying the anatomic landmarks, and for technologic innovations, that allowed for free-hand ureteral catheterization.(6) Pawlik performed his first cystectomy during his tenure as Professor at the University of Prague.

"The patient (woman) came to Prof. Pawlik for the first time on June 16, 1888 on account of persistent hematuria... (At cystoscopy), he detected a thin-stalked polyp the size of a cracked almond. After creating an artificial vesicovaginal fistula, he cut out the attached stem of the polyp with thermocautery and sutured up the fistula. Complete healing followed, and the woman left the clinic July 28, 1888.(3)

"A year later, on July 11, 1889, she came again to the clinic in very weak anemic condition. For eight months

FIGURE 2. Site of the world's first cystectomy by Bardenheuer, the Kölnische Bürgerhospital an der Fleischmengergasse (City Hospital of Cologne). "The large glass window gave a view of the bare chestnut tree in the inner courtyard and the west facade of the Church of St. Cecilia" in the Neumarkt sectin of Cologne. Despite red crosses on the roof, half the building was destroyed in the air raids of 1942.

after the operation she had felt well, then hematuria recurred without stopping. Endoscopic examination of the bladder interior showed massive, widely situated papillomas. Malignancy was confirmed through the microscope.

Pawlik conceived of performing a cystectomy in two stages with the ultimate goal of forming an orthotopic reservoir using redundant vaginal wall. The first stage occurred on August 3, 1889, when Pawlik performed a transvaginal procedure to dismember the ureters from the bladder and have them form ureterovaginal fistulas. "On August 27 the total cystectomy followed. Through a *sectio alta* (extraperitoneal suprapubic incision used for bladder stones)..., Pawlik mobilized the bladder down to the (bladder neck)...The anterior vaginal wall ...was split transversely and the bladder was pulled through... into the vagina and cut off at its internal orifice. The woman collapsed here but was resuscitated with a subcutaneous injection of 300cc of warm, physiological saline solution." The anterior and posterior vaginal walls were circumferentially sutured to the urethra using colpocleisis. Before closure, elastic ureteral catheters were introduced into both ureters through the urethra.

"The subsequent recovery was relatively good", despite the development of a pelvo-vaginal fistula, poor post-operative nutrition, and midline abdominal wound healing.

"The opening at the lower end of the abdominal wound healed first about three months after the operation; the cavity behind the symphysis and the vaginal fistula even after eight months. A second attempt to close the vagina on June 20, 1890 failed.

"On July 18, Pawlik performed a new colpocleisis in the sagittal direction reinforced with widely placed continuous level sutures. This healed down to a very fine fistula just under the urethra. Lying down the patient now held the urine for a long time; when she stands up however, it trickles down through the fistula. The woman notices (that the vaginal bladder may contain up to 400 cc which she was)...able to spontaneously empty by contracting her perineal muscles. It will now be possible to close the small fistula and... it is very probable that the new bladder will possess sufficient continence. In any case, the woman, who a year ago had a threatening villus cancer, now was able to undertake a trip to Berlin to visit the great city. This operation, the first ever performed on a woman, has found all-around appreciation and recognition from colleagues."(7)

DISCUSSION

We can assume that the first two cystectomies were 'simple' cystectomies. Both were extraperitoneal, violated tumor margins, and did not remove perivesical fat or pelvic lymph nodes around the bladder. They were not radical cures or obeyed the principles of a formal cancer operation that we know today as a radical cystectomy. On the other hand, medical advances are appreciated in context of their unique time and place. It was nearly a century later, after all, that modern

surgical oncologic principles began to be established. No previous surgeon had attempted to remove the whole bladder which may have been deemed a 'radical' attempt to manage incurable bulky papillary or invasive bladder cancers. The alternative was that patients were otherwise consigned to languish without treatment until their inevitable, painful deaths.

These two attempts at cystectomy, despite their patients' ultimate outcome, represent successes. Bardenheuer's surgery may have failed because of bad (i.e. advanced) disease, the lack of a urinary diversion, and antibiotic chemotherapy. Pawlik had more success partly owing to a favorable (i.e. localized) tumor and a creative viable urinary diversion which was no less than a novel, albeit primitive, orthotopic neobladder.(8) What became clear from these moments in the late 19th century was that removal of the whole bladder was feasible and sometimes necessary to cure bladder tumors, but that long-term survival was inextricably linked to successful and well-maintained diversion of the urine.

Surgical 'first' claims are common, and most are minor modifications (albeit some significant) of existing techniques. True 'firsts' in surgery, which establish a new standard of care or a basis for future advances, are, indeed, rare. Although many factors other than surgical experience and skill contribute to revolutions in surgery, the essential element is a brave patient and a visionary surgeon - an individual who possesses more talent, imagination and will than her/his contemporaries, who sees what is possible where others can't, who, despite the admonitions of influential colleagues, proceeds with an innovative, but untried operation, not for fame and fortune, but a fervent desire to help a desperate patient in need for whom contemporary treatment does not exist. Some true 'Firsts' initially fail, but if scientifically sound, most later attempts succeed and become landmarks in the history of urology. To this, the contributions of Bardenheuer and Pawlik stand out.

Significant change in medical practice comes slowly, and from the end of the 19th to the first half of the 20th century, few cystectomies were performed. The urine was diverted into the vagina, large bowel, or to the skin.9 Most attempts failed miserably, and surgeons acquired little enthusiasm for an aggressive operation associated with a greater than 50% mortality. Total cystectomy was just too dangerous, referred to "as a life-threatening operation, which for the bearer would be possessed with life-long severe, unpleasant consequences, whose assessment prohibits a final judgement."(3) Urologic textbooks warned, "that patients in general can live better without as with the operation."(3) It was not until after World War II that the modern open radical cystectomy was introduced into urologic practice as a safe (albeit still morbid) and therapeutic operation for invasive bladder cancer, thanks to the research and further attempts of Wyland Leadbetter (1907-1974), Victor Marshall (1913-2001), Willet Whitmore (1917-1995), and later Donald Skinner. all standing on the shoulders of Bernhard Bardenheuer and Karel Pawlik.

CONCLUSION

Bernard Bardenheuer and Karel Pawlik, within a year of each other, completed the first two known cystectomies for bladder cancer. Their pioneering efforts led the way for the long and unending process of improving surgery for the betterment of patients and their outcomes.

REFERENCES

1. Moll F, Dulfer R, Botel J et al: Bernhard Bardenheuer's (1839-1913) contribution to the development of modern urology. J Med Biogr 1998; **6**: 11. doi: 10.1177/096777209800600102
2. Bardenheuer B: Der Extraperitoneale Explorativschnitt. Die differentielle Diagnostik der Erkrankungen des Abdomens [The Extraperironeal Exploratory. The Differential Diagnosis of Abdominal Illnesses]. Stuttgart: Ferdinand Enke 1887, pp 674-676
3. Moll F: Anfange der modernen Urochirurgie im 19. Jahrhundert. In: Streiflichter aus der Geschichte der Urologie. Edited by D Schultheiss. Berlin: Springer Verlag 2000. doi.org/10.1007/978-3-642-59647-6_2
4. Frank M, Moll F: Die Harnblase des Theodor Baum. Von kleinen Leuten und grossen Taten. In: Kolner KrankenhausgeschichtenAnonymous Cologne, Germany: Verlag des Koelnischen Stadtmuseums 2006.
5. Schultheiss D, Machtens SA, Jonas U: Air cystoscopy: the history of an endoscopic technique from the late 19th century. BJU Int 1999; **83**: 571.
6. Kelly HA: Catheterization of the Ureters. Gyn Paed 1893; **6**: 641.
7. Pawlik K: Ueber Blasenextirpation. Wien Med Wochenschr 1891; **41**: 1816.
8. Pawlik K: 1. Über das Sondieren der Ureteren der weiblichen Blase aus freier Hand ohne vorbereitende Operation. Centralblatt für Gynäkologie 1881; **7**: 1.
9. Fischel E: Total Cystectomy for Cancer – An obsolete operation? J Urol 1925; **14**: 285.

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The Impact of Syphilis on Late Works of Classical Music Composers

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Introduction: Tertiary syphilis represents an advanced stage of infection with treponema pallidum and was an endemic problem in pre-penicillin society. The disease was easily contracted and transmitted in all walks of life and the small coterie of European classical music composers was no exception. We wished to identify those artists of the genre who suffered from *Treponema pallidum* infection and establish potential effects of the disease on their musical output and career.

Methods: We reviewed contemporary accounts and secondary source biographic information of known syphilitics who wrote and performed in the mid to late 19th century, the period normally referred to as that of 'classic music. We correlated known medical features of *Treponema pallidum* infection, and its therapy, with their potential effects on composer creative output.

Results: We found that seven composers of the 19th century suffered from the physical stigmata of *Treponema pallidum* infection as well as familial and social stigmatization. Tertiary infection, and its neuro-psychiatric consequences, appears to have been directly related to premature death (e.g. Franz Schubert died at the age of 31); suicidal ideation and/or major depressive disorders (Robert Schumann, Hugo Wolf, Bedrich Smetana); persecutory manic bipolar disease (Gaetano Donizetti); blindness (Frederick Delius); and mercury-induced laryngoplegia (Niccolò Paganini).

Conclusions: Syphilis has been a fatal disease through ages and among its victims, authors and artists died with symptoms of mental deterioration due to neurosyphilis. The influence of the disease upon their last works can be traced especially in the case of composers, as hallucinations and horrors and psychological conflicts are reflected in their music.the need for a journal wholly dedicated to the history of urology.

Key Words: classical music, syphilis, psychosis

Classical music generally refers to the musical output of western Europe between the Baroque era to the rise of the modern composers of the early 20th century. Classical music has been said to reflect the momentous societal changes of a rapidly industrialized ethos and rise of the middle class where composers embraced folk music and culture, a broader access to music and performance, and the 'virtues' of nature and a non-urban idyll.(1) At the same time, enormous population pressures, warfare, rising international commerce and trade, and poor public health polices created an environment ideal for contagion, pulmonary infection, and sexually transmitted diseases. Amongst these, infection with *Treponema pallidum*, which originated in 9th century Asia Minor, and first documented in Europe in the late 1500s, was particularly insidious. (2) Primary infection, with its classic painless 'chancre', may be self-limited, especially in females, and months to decades may elapse before victims developed the cutaneous signs of secondary syphilis and the debilitating and typically fatal effects of tertiary or neurosyphilis. Congenital syphilis is typically acquired via transvaginal delivery and such patients may develop syphilis without ever being sexually active at all. Therapy for syphilis in the classical era was wholly empiric, and likely injurious, and incorporated topical salves, suction, and injections of mercury, itself a neurotoxin.(3,4) Progression was the rule and with the development of neuro-syphilis, patients suffered a cognitive decline, physical decompensation, and cardiogenic death.

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Classical composers who suffered from syphilis would have been no different but the impact of the disease on their creative output is unknown. We wished to identify those syphilitic composers the period of Classical Music and identify how features of their *Treponema pallidum* infection that may have shaped the music we have come to recognize as from one of the greatest culturally creative epochs in history.

SOURCES

We used WorldCat, regional and national bibliographic libraries, and PubMed to identify any potential composers for the study using the keywords "syphilis", and its stages, "composers", "19th century", and "classical music". We then correlated known medical features of Treponema pallidum infection, and its therapy, with composer creative output including delay of care, diagnosis, physical complaints (e.g. tinnitus) and psychiatric symptoms (e.g. mood disorders, auditory and visual hallucinations).

RESULTS

The Composers. We found seven composers of the Classical Age were diagnosed with syphilis during their lifetimes and serve as the cohort for this study: Nicolò Paganini (1782-1840), Franz Schubert (1797-1828), Gaetano Donizetti (1797-1848), Robert Schumann (1810-1856), Bedrich Smetana (1824-1884), Hugo Wolf (1860-1903), Frederick Delius (1862-1934).

Nicolò Paganini (1782-1840) was a Genoese virtuoso violinist and composer known throughout Europe for his extraordinary ability to perform the most complex pieces.(5) Both an innovator and performer, Paganini created some of the greatest works for the violin including his legendary *24 Caprices for Solo Violin* in the early 1800s. He was active from 1795 to 1838 and composed at least 112 concertinas, sonatas, and quartets for violin, cello, and guitar. It is likely that Paganini became infected with treponema pallidum in 1822 at

Figure 1. (Left). Niccolo Paganini (1782-1840) in an 1888 lithograph, from Merveille de Paganini (the Marvel of Paganini), National Library of France (gallica.bnf.fr) (Right) Franz Schubert (1797-1828) in a 3D rendering by Hadi Karimi (courtesy of the artist at hadi.karimi.com, 2021)

Figure 2. (Left). Robert Schumann (1810-1856), in an 1850 daugerrotype by Johann Anton Völlner, Hamburg. (Right) Bedrich Smetana (1824-1884), Prager Presse, issue 4, March, 1924, National Library of France (gallica.bnf.fr)

the age of 40. He underwent surgical care of necrotizing osteitis of the jaw at the age of 46 and endured years of therapy for recurrent syphilis with mercury and opium, which, while a contemporary standard of care, resulted in career-ending physical and psychological dependence. He also developed severe dysphonia rendering him unable to speak which some have argued was due to syphilitic aortic arch dilation, tuberculosis, or the Ehlers-Danlos syndrome that allowed him such remarkable finger dexterity (Figure 1, left). In 1834, Paganini was so ill that his performances were kept at a minimum and he declined a personal invitation by Héctor Berlioz (1803-1869) to perform the composer's viola concerto Harold in Italy.(6) By 1838, Berlioz found Paganini nearly aphasic and the stricken violinist could only communicate by whispering into the ear of his 13-year old son, Achille Paganini.(7)

Franz Schubert (1797-1828) (Figure 1, right) was a prolific, exceedingly popular Viennese composer of piano and symphonic works who developed primary syphilis in 1822 and was, thereafter, in and out of syphilis hospitals for the remaining years of his short life. His more than 1500 secular and sacred works, ranging from solo piano to symphonic orchestral works, including the famous 'Trout' Quintet (1819) and *Ave Maria* (1825), are some of the most enduring pieces of classical music ever created. By 1823, he was incapacitated by mood changes, depression, headaches and dizziness. Two of Vienna's preeminent physicians, Drs Ernest Rinna von Sarenbach and Joseph von Vering, subjected Schubert to some 20 repeated sessions of mercury inhalation therapy despite its severe side effects.(8,9) An erroneous diagnosis of typhus seems less likely than end-stage syphilis (as no typhoid epidemic was recorded in 1828) and he died at the age of just 31 years, or four years younger than Mozart.(10)

Gaetano Donizetti (1797-1848) was an Italian composer of almost 70 operas famous throughout Europe but also created dozens of symphonic, chamber, and sacred music including *Poliuto* (1838). He likely acquired syphilis at the age of 31 and long suffered from its neurologic effects. Working at the Paris Opera, he consulted with Parisian specialists in venereal diseases, including Philippe Ricord, but Donizetti's syphilis progressed through all its stages until, suffering from headaches, convulsions, incontinence, psychosis, and aphasia, he died in a mental institution, a post-mortem confirming the diagnosis of neurosyphilis.(11,12)

Robert Schumann (1810-1856) (Figure 2, left) is regarded as one of the greatest composers of the

Romantic era and his opus extended to four symphonies, one hundred major solo piano works, and dozens of vocal works, ballads, and chorales. Born in Zwickau, Germany, an accidental hand injury, intended to improve his virtuosity, forced him to abandon his soloist aspiration.(6) At the age of 23, he suffered the first of many severe, and incapacitating melancholic depressive and manic episodes, with persecutory and suicidal delusions. He married the famous composer and pianist Clara Schumann nee Wieck (1819-1896) in 1840. Robert Schumann likely had syphilis as early as 1830 and developed tertiary disease, which is rarely infectious, before his marriage as Clara never contracted the disease.[13] Robert died in an insane asylum suffering from visual and auditory hallucinations, enduring rapid cycles of demonic and angelic visions.

Bedrich Smetana (1824-1884)(Figure 2, right), regarded as the father of Czech music, and composer of the beloved symphonic poem *The Moldau* (1874), died from neurosyphilis in an insane asylum. Smetana's first symptoms occurred at the age of 38 as auditory hallucinations, followed by tinnitus and hearing difficulties.(14) In 1849 he married Katerina Kolarova but three of their four children died between 1854 and 1856. (15) After 12 years Smetna became completely deaf, although examined and treated by the most eminent specialists in Paris. The last years of his life were plagued by delirium and occasional violent behavior, mentioned visits of non-existing persons, and addressing letters to imaginary friends. His memory impairment eventually led to confusion between the Czech and the German languages. After his death, an autopsy performed attributed his mental disease to neurosyphilis and a century later, when his body was exhumed and examined, all tests for syphilitic infection were positive and huge concentrations of mercury were found in his tissues.(16)

Hugo Wolf (1860-1903) was an Austrian composer, a contemporary of Brahms and Wagner, who was first diagnosed with syphilis at the age of 31. He developed increasing depressive symptoms, only occasionally having lucid intervals to finish about 300 songs, and was eventually resigned to an insane asylum after several suicide attempts.(6,7)

Frederick Delius (1862-1934) was a late 19th century American-influenced British composer best known for orchestral fantasies, tone poems, and sonatas that achieved considerable fame in early 20th century England. He probably contracted syphilis in the Bohemian conditions of 1888 Paris but later married the painter Jelka Rosen in 1903 and enjoyed good health during their first years of marriage. During a visit to England at the age of

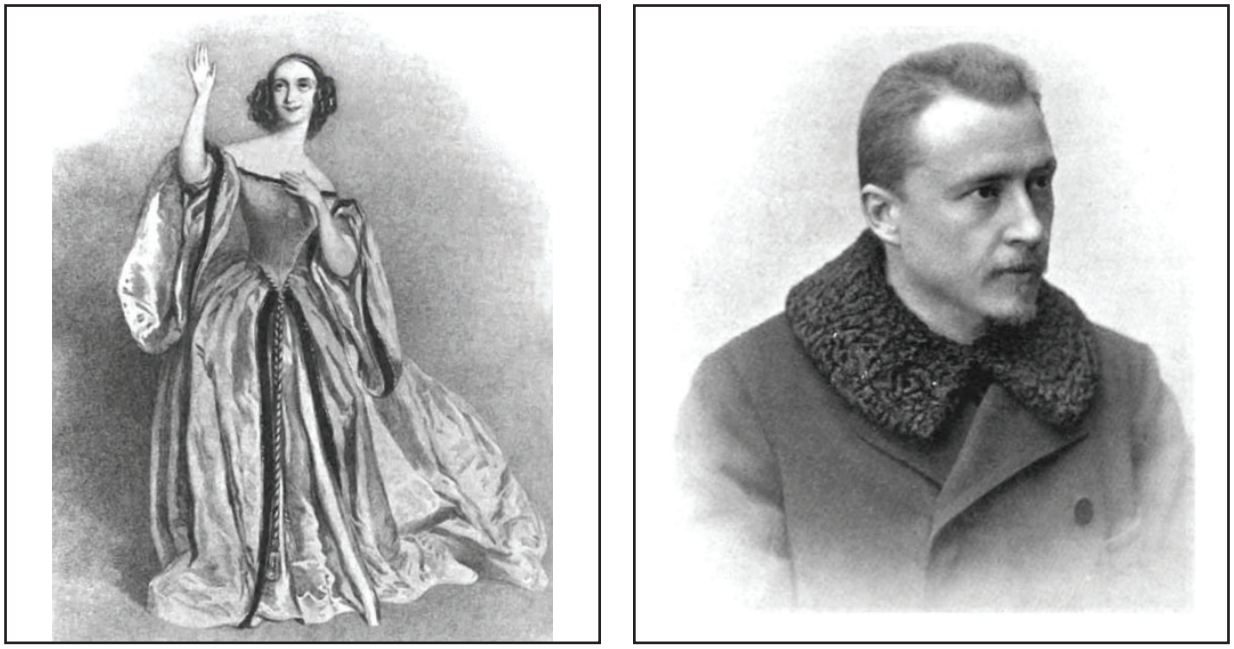

Figure 3. (Left). Fanny Facchinardi Persiani (1812-1867) as Lucia at the London Premier of Donizetti's *Lucia di Lammermoor.* (Right) Hugo Wolf, from *Hugo Wolf,* by Erbest Newman, London, Methuen & Co., 1907

48, he developed severe headaches and back pain, followed by blurred vision. Ten years later he was wheelchair bound, blind, and, at the end of his life.(18) He was only able to transcribe his late works through a famous relationship with the composer Eric Fenby who volunteered to act as Darius' amanuensis from 1929 to the composer's death in 1934.

Diagnostic impact on late compositions

Franz Schubert was informed of his diagnosis of syphilis in 1822 which, it is said by biographers and musicologists, contributed to his halting work on the music that has become known as the Unfinished Symphony.(15) At the time, most symphonic works were in 4 movements. Schubert, who was as prolific as Mozart, completed 'only' two symphonies and suggests an abrupt and profound alteration in his productivity. The gifted young composer, suffering from pain, fever, rashes, and hair loss, writes music that takes a darker turn, reflecting a soul in pain and fear of death, in sharp contrast to the joyful, exuberant works of his earlier years.(9) As he drank his 'mercury tea', and continued with hair loss, his *lieder* and other compositions, like *Der Tod und Das Mädchen* (Ger.:Death and the Maiden)(1824) and *Die Winterreise* (Ger.:Winter Journey)(1827), reflected bleakness, despair, and mortality.(13) Reacting in a similar way to his diagnosis, Smetana anticipated its consequences, writing "final page" in the middle of a score.

Auditory effects within compositions

Bedrich Smetana long suffered from hearing loss and tinnitus which are manifestations of so-called otosyphilis, occurring in up to 40% of those with tertiary syphilis. He had been suffering from otosyphilis during the creation of his *First String Quartet* (1876), subtitled *"From My Life"*, which, in the composer's view, heralded his greatest infirmity, the acquired deafness "which (cut him) off from the enjoyment of the art of music". The quartet expresses the composer's joy at his professional success but then, in its last movement, is suddenly interrupted by the profound silence of a diminished seventh chord. An agitated low tremolo coupled with an extremely high harmonic E then replicates the whistling sound of an A-flat major chord that Smetana associated with his tinnitus. The quartet never recovers its optimism thereafter and resigns itself to a sad, ignominious conclusion. The work is considered one of the great string quartets of the 19th century as well as a great example of artistic self-reflection and medical self-assessment.(19,20)

Similarly, Robert Schumann suffered from what was termed a "syphilitic sound". His last published work, *Ghost Variations* for piano, completed after a suicide attempt, evokes the relentless tinnitus that plagued Schumann for the remainder of his life. Underperformed and recorded, the *Variations* are some of the most beautiful melodies of the Romantic Period, dedicated to Clara Schumann, as well as the most tragic. Schumann wrote down themes which he thought he heard delivered from "angels" and "demons".(21) Schumann had a decades long bout with mood disorders and may have suffered from both neurosyphilis and cyclic bipolar disease. His canon and compositional output did not appear to be as affected by his years of syphilis as the other composers in the study but impacted his daily life. At one soiree, he was taken away from the piano where he had begun to play non-sense music and his wife, Clara, became increasingly protective of his public perception. Ten months before his death, she prohibited the famed violinist Joseph Joachim from playing Shuman's *Violin Concerto in D minor* (1853), his only such piece, as she felt the work "showed definite traces" of her husband mental decline. After a less organized but 'symphonic' 1st movement, the 2nd movement was said to be composed after Schumann had dreamt of a ghost that dictated to him a "spirit theme" consistent with other auditory hallucinations he experienced throughout his life.(22) The 3rd movement has long been considered as so challenging it verges on the unplayable and awkward partly due to Schumann's requirement that it be "lively but not too fast" ("Lebhaft, doch nicht so schnell"). It has thus been conjectured that Schumann's neurosyphilis and bipolar disease made him conceive or and realize music at not only the plane of the sublime but a different, surreal tempos.(21)

Psychoses within compositions

Schumann may have suffered from the dual diagnoses of treponemal infection and bipolar disorder but Gaetano Donizetti, whose symptoms were similar, was more autobiographical about the general effects of psychosis. In his famous 1835 tragic opera, *Lucia di Lammermoor*, the "mad scene" of the emotionally fragile title character, Lucia di Lammermoor, depicted Donizetti's own evolving psychosis (Figure 3, left). In Act III, Lucia bursts onto the scene, covered in blood, having murdered her husband in a fit of rapid cycling joy and terror, mad

with visual and auditory hallucinations, and blurring the borders of fantasy and reality. In his earlier 1830 opera about the 2nd wife of King Henry VIII, Anna Bolena, Donizetti considered the depression and psychosis of her involuntary confinement in the Tower of London. Tragically prescient, Donizetti's worsening neurosyphilis and psychoses eventually led him to be involuntarily hospitalized in an asylum in the Parisian suburb of Ivry. (12) The composer left his mark on at least 4 of his 65 operas by portraying in musical terms, from personal experience, the psychological and physical effects of chronic mental illnesses.

Depression and Resignation within compositions

The Overture from Schumann's *Szenen aus Goethe Faust* (1844-1853) is one his last works Schumann completed over many years of depressive disease, creativity, and infirmity. Its complex melodies and challenging harmonics invokes a sense of profound anxiety which some argue that "(the Overture) is a tormented orchestral score of certainly debatable unity and control."(23) Clara Schumann became increasingly concerned about her husband's health and the direction of his musical output. It is rumored that she and their friend Johannes Brahms destroyed many of the composer's later, troubling works, which they thought to be evidence of his mental decline. While *Five Pieces for Cello and Piano* (1849) may have indeed followed such destiny, his *Violin Sonata* (1851), *Violin Concerto* (1853), and the F*antasy for Violin and Orchestra* (1853) thankfully remain in the universal repertoire.

A well-known composition of Franz Schubert from his last year, one of his "*Schwanengesang*" (Ger.: "Swan Songs"), is entitled *Doppelgänger* (1827) based on the poem by Heinrich Heine about meeting one's 'spirit double'. The idea of an exact but usually invisible replica of every human or animal is an ancient one and traditionally associated with imminent death. Some biographers interpret the song as revealing Schubert's two-sided nature of his personality, pre-announcing the common fate he shared with his close-knot circle of Viennese friends. A letter of 1824 reflected the pessimism of his now two year battle with the disease that would end his life. "Imagine a man whose health will never be right again, and who, in sheer despair over this, ever makes things worse and worse, instead of better...(24) The imminence of death, as represented by the Doppelgänger, thus haunted Schubert his final years. Smetana may have shared such premonitions as he too evoked the Doppelgänger theme in his very last opera, *The Devil's Wall* (1882). The opera's hero, the hermit, Benes, and his devilish counterpart, Rarach, do battle in a conflict portraying the powers of love over evil.(15,20)

Hugo Wolf shared with Schumann and Schubert all the psychological and neurological symptoms that interfered with their artistic expression, especially in respect to his song ('Lied') compositions.(25) Wolf's last opera, *Manuel Venegas* (1897), remained unfinished,

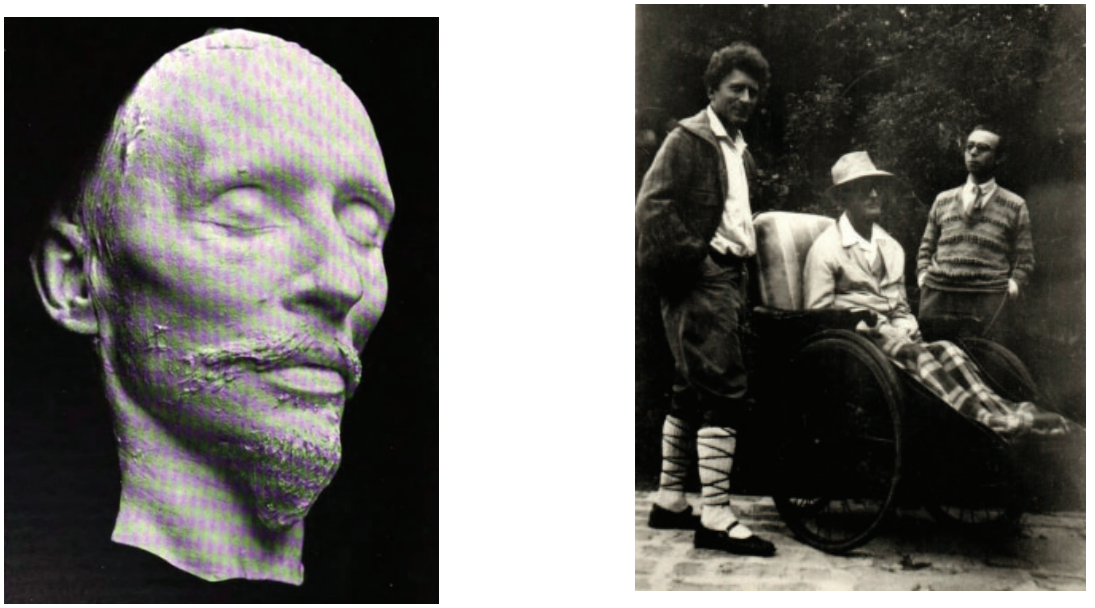

Figure 4. (Left) Death mask, of Hugo Wolf, from *Hugo Wolf*, by Ernest Neuman, London, Methuen & Co. 1907. (Right) Frederick Delius, in 1929, flanked by the Australian composer Percy Grainger (on left) and Delius', amanuensis Eric Fenby, on right (Courtesy Delius Trust).

though he desperately tried to complete it, creating 60 pages of score, before he was neurologically unable to work. He last three songs were based on the poems of the legendary painter and sculptor Michelangelo (Buonarroti), the so-called *Drei Michelangelo-Lieder*, "Often do I reflect", "Does my soul feel", and "All that is created must perish". Shortly after, he was taken to a Viennese asylum, recovered briefly, but with further neuropsychiatric decompensation, he attempted to drown himself. Unlike Donizetti, Wolf wished to return to the asylum where he eventually died in 1903 (Figure 4, left). Wolf's music was known to use tonality to reinforce meaning, and his chosen texts, like those of Michaelangelo, often reflected an inner anguish and hopelessness, in confronting one's mortality:

"All that is created must perish,
everything around us passes away.
For the time flies and the sun sees
that everything has an ending-
Thinking, speaking, joy and sorrow.
And our children's children die away. Like night's shadow in the daylight or like a mist in a breath of wind, We also were human beings, merry or sad like you. And now we are lifeless here,
Nothing but dust, as you see. All that is created must perish, everything around passes away."(26)

Delius said his own farewell with the song cycle Songs of Farewell with words selected by his wife Jelka, from the "Leaves of Grass" poems of Walt Whitman (1819-1892). His initial idea has been sketched in 1920 but in 1925, blind and paralyzed, could not collaborate with his wife in order to dictate it. Only when Eric Fenby joined the Delius household, the composer could complete his unfinished works or initiate new ones in days of relative health (Figure 4, right). Delius poignantly set to music text from *Now Voyager* with such great rapidity and frenzy he would become exhausted.

"Now Voyager depart,
(much, much for thee is yet in store)...
Depart upon thy endless cruise old Sailor."(27)

DISCUSSION

In the pre-antibiotic era, syphilis was an extremely common disease. During the 18th and the 19th centuries, many artists became its victims eventually developing end stage or neurosyphilis, typically expected in 5-10% of untreated cases.(5) Psychiatric symptomatology is the most common clinical manifestation of neurosyphilis but small vessel disease, especially branches of the middle cerebral and basilar artery can explain neurologic findings. (28) We found that in seven syphilitic classical composers, all arguably geniuses, neurosyphilis had devastating effects on their quality of life and musical output. The onset of severe symptoms may have been associated with a decrease in their productive output but periods of lucidity allowed for brief bursts of creative genius to bring forth many works of enduring beauty, introspection, and acceptance of fate.

The composers in our study, Paganini, Schubert, Schumann, Donizetti, Wolf, Smetana, and Darius, had to contend not just with the social stigmatization and physical effects of their disease, but with the effects of so-called therapy as well. Mercuric vapor poisoning and high doses of opium only served to worsen many syphilitic symptoms, like hair loss, and certainly contributed to even further physical limitations to accomplish their work.

Limitations of our study include small size, selection bias, and the conjectural basis of historical diagnosing making. Only Donizetti and Smetna, the latter controversially so, underwent post mortem examination to confirm their tertiary syphilis diagnosis. Still, the classical music these seven artists created, despite their neuropsychiatric and physical limitations, has gained the immortality they themselves could not achieve in life. Their masterpieces still continue to inspire modern audiences and their visionary innovations remain fertile ground for interpretation and wonder.

CONCLUSIONS

Seven classical music composers created works of unparalleled genius and expressivity despite, and potential at times influenced by, chronic infirmity from the effects of tertiary syphilis

REFERENCES

1. Lloyd N: Golden Encylopedia of Music. New York: Golden Press 1968.
2. Sigerist HE: *A History of Medicine*, Volume I: Primitive and Archaic Medicine. New York: Oxford University Press 1955.
3. Drysdale CR: Treatment of Syphilis, Chapter X. In: T*he Nature and Treatment of Syphilis,* 4th ed, London: Balliere, Tindall, and Cox 1880.
4. Parker L: *The Modern Treatment of Syphilis*. London: John Churchill 1860, p124
5. Franzen C: Syphilis in composers and musicians--Mozart, Beethoven, Paganini, Schubert, Schumann, Smetana. Eur J Clin

Microbiol Infect Dis 2008; **27**: 1151.
6. Salter L: *The Gramophone Guide to Classical Composers*. London: Salamander Books 1978.
7. Remy P: Berlioz. *Le Roman Du Romantisme*. Paris: Albin Michel 2002.
8. O'Shea JG: Franz Schubert's last illness. J R Soc Med 1997; **90**: 291.
9. Sewell M: Franz Schubert Dreamt of Indians. The Georgia Review 2010; Spring: pp 111-129.
10. Hetenyi G: The terminal illness of Franz Schubert and the treatment of syphilis in Vienna in the eighteen hundred and twenties. Bull Can Hist Med 1986; **3**: 51.
11. Ashbrook W: *Donizetti and His Operas*. Cambridge: Cambridge University Press 1982.
12. Peschel E, Peschel R: Donizetti and the music of mental derangement: Anna Bolena, Lucia di Lammermoor, and the composer's neurobiological illness. Yale J Biol Med 1992; **65**: 189.
13. Rietschel ET, Rietschel M, Beutler B: How the mighty have fallen: fatal infectious diseases of divine composers. Infect Dis Clin North Am 2004; **18**: 311.
14. Mojžíšová O, Ottlová M: The Bedrich Smetana Museum. Prague: Libertas 1999.
15. Roos KL: Neurosyphilis in musicians and composers. Semin Neurol 1999; **19** Suppl 1: 35.
16. Hoschl C: Bedrich Smetana - art and disease. Psychiatr Danub 2012; **24** Suppl 1: S176.
17. Kornhauser P: Syphilitic Progressive Paralysis in the Pathography of Two Composers: Hugo Wolf and physician and composer Josip Ipavec. Acta med-hist Adriat 2005; **3**: 87.
18. Wainapel SF: Frederick Delius; medical assessment. N Y State J Med 1980; **80**: 1886.
19. Newmark J: Neurological problems of famous musicians: the classical genre. J Child Neurol 2009; **24**: 1043.
20. Habánová R: Smetana (His Life and Work). In: *Smetana*. Ed. by O Mojžíšovám. Prague: Libertas 1998.
21. Thompson D: The syphilitic sound of Schumann's violin concerto is part of its genius. The Spectator 2013; 29 June, 2013: .
22. Pucarin-Cvetkovic J, Zuskin E, Mustajbegovic J et al: Known symptoms and diseases of a number of classical European composers during 17th and 20th century in relation with their artistic musical expressions. Coll Antropol 2011; **35**: 1327.
23. Stricker R: Szenen aus Goethes Faust (transl Martin, D.), Harmonia Mundi. Bibliothèque de l'École des Beaux Arts 1998.
24. Code D: Listening for Schubert's "Doppelgängers". J Soc Music Theory 1995; **1**:1.
25. Bazner H, Hennerici MG: Syphilis in german-speaking composers - 'examination results are confidential'. Front Neurol Neurosci 2010; **27**: 61.
26. Hellmer E: Drei Gedichte von Michelangelo fuer eine Bassstimme und Klavier. In: *Gesammelte Aufsaetze* [Assembled Poems], 2nd ed, Berlin: S. Fischer 1899.
27. Whitman W: Now Finale to the Shore. In: *Leaves of Grass*. New York: The Modern Library 1892.
28. Czarnowska-Cubala M, Wiglusz MS, Cubala WJ et al: MR findings in neurosyphilis--a literature review with a focus on a practical approach to neuroimaging. Psychiatr Danub 2013; **25** Suppl 2: S153.

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It's pronounced "EE-lick": Milo Ellik, veteran, urologist, and inventor of the evacuator that bears his name

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Introduction: The Ellik Evacuator is a commonly used tool in transurethral endoscopic surgery and a standard of care for the rapid removal from the bladder of resected tumor fragments, prostatic chips, or blood. Little is known, however, about the inventor of the Ellik evacuator, his urologic contributions, and how the evacuator came to be.

Sources: We contacted surviving descendants of Dr. Milo Ellik, and conducted interviews as part of an oral history project. Original medical equipment and personal belongings, provided by the family of Dr. Ellik, were analysed. Secondary source materials included published urologic articles and unpublished biographic information.

Results: Milo Ellik was born in Chicago in 1905 but was orphaned and put himself through college. He graduated from the University of Iowa with an MD in 1932 and began residency under Nathan Alcock. Ellik conceived of the evacuator that bears his name as a resident, visiting the glass-blowing facility at the Iowa University Hospital to construct the prototype. He published the results in a 1937 issue of the Journal of Urology but did not obtain a patent which was eventually procured by Bard in 1940.

Conclusions: Milo Ellik designed a major innovation in transurethral surgery as a resident in urology by constructing the first glass evacuator that bears his name. The Ellik family donated a large quantity of Dr. Ellik's inventions to the AUA's Didusch Museum for permanent storage and study.

Key Words: Milo Ellik, urologic technology, transurethral surgery, evacuator

Henry J. Bigelow (1818-1890), the renowned Boston surgeon, invented, among many things, a manual pump-based irrigator that allowed the urologist to evacuate the innumerable fragments of stone from the bladder obtained after blind lithotrity.(1) Popular in the 1870s and 1880s, the evacuator had a limited capacity to evacuate other products of transurethral surgery including prostatic chips, tumor, and blood that were becoming the modern routine by the 1930s.(2) By then, a young urology resident conceived of a single chambered tool which allowed for the cystoscopic irrigation of the bladder and the settling of stone or tissue fragments at the bottom of the irrigator that would not interfere with the irrigating cycles. Thus, the Ellik evacuator was born. There is little known about the inventor of this evacuator, Milo Ellik, despite his many urologic contributions throughout the 1930s-1950s. We wished to develop an intimate biographical portrait of Ellik and further study the development of the evacuator that bears his name.

SOURCES

We contacted surviving family members of Dr. Milo Ellik and conducted telephone interviews which were immediately transcribed to a digital archive. We were provided photographs from the Ellik family and personal materials of Dr. Ellik including secondary school and college data as well as surgical instruments and their prototypes. We also consulted with secondary source materials including his published urologic works.

RESULTS

Born on October 15, 1905 in Chicago, Illinois to Pearl C. (nee) Frederick and Earl A. Ellik, Milo, who always pronounced his last name "EE-lik", was orphaned at a young age.(3) He was known as a studious and quiet child who spent his free time sketching and doodling. Ellik's 1925 Boone High School yearbook, The Scroll, featured his quirky illustrations throughout showcasing

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Figure 1. The Ellik evacuator, held by the inventor, and as originally appeared in 1937 (courtesy, The Ellik family)

his creative side4. He also had a predilection for theatre, where his comedic performance during the annual senior's play surprised his fellow classmates. Ellik's other activities included founding the Social Sciences Club to "promote interest in the study of government," and spearheaded the distribution of Christmas presents gifted from the students to the poor of the community. His high school yearbook described him as a "clever artist," who "wore a mean crease in his trousers."(4)

Following his high school graduation in 1925, Ellik worked as an assistant in a local pharmacy to put himself through college. The job piqued his interest in medicine and allowed him to complete a Graduate Degree in Pharmacy at the University of Iowa in 1928, at age 23. Ellik strived for further education and gained admission to the University of Iowa, School of Medicine, earning his M.D. in 1932. Ellik's family members recall that Milo originally had career aspirations in dermatology but, unable to find satisfaction in his work, switched to urology as he found the field "straightforward and predictable, and (one) can fix (its problems)".(3) This specialty ignited a passion for tinkering and innovation, redirecting his creative energy to bettering the field of urology.

Ellik trained under Dr. Nathan G. Alcock, who developed the urology program at the University of Iowa in 1922, and Alcock's former resident, Dr. Rubin H. Flocks. Alcock and Flocks worked together to collaborate on many innovations including a technique for transurethral resection of the prostate (TURP).(5) It was Alcock who urged Ellik to improve on designs of contemporary transurethral tools, such as the Davis evacuator. Ellik toiled in the chemistry department's glass-blowing shop to develop his first transurethral prototype evacuator.(6)(Figure 1) Ellik's simple, yet elegant design, with an upper and lower chamber, could be manipulated with one hand allowing for ease of use during TURP. The instrument did away with the valves and tubes of the Bigelow evacuator and allowed the urologist to continue a steady stream of flow between 'systole' and 'diastole', as Ellik termed the cycles, while allowing for tissue or chips to settle to the bottom of the chamber during diastole1. When first described, the evacuator found an immediate and enthused audience but Ellik himself did not pursue any monetary reward from the device.(3,7) He deferred getting the U.S. patent for the invention which was eventually obtained by Bard in 1940.

Dr. Ellik completed his training in 1936 and moved to Long Beach, California where he married Edythe Carolyn Greene on December 25, 1937. (Figure 2, left) The Elliks went on to have 3 sons, the first of whom, Ron Ellik (1938-1968), became a science fiction writer.

Dr. Ellik's third son passed away as a newborn but the middle son, Noel (1940-), became a poet and artist, and provided the authors with first hand insight into Ellik's life and family.

Dr. Ellik worked with Dr. George D. Stillson, and was an early member and leader of the LA Urological Society.(8) He was drafted into the Navy during World War II and served as Lieutenant Commander from 1942-1946 in the 73rd United States Naval Construction Battalion. Also known as the 'SeaBees', the construction battalions were deployed in the South Pacific and were widely known for their engineering prowess and ingenuity.(9) He continued to have a longitudinal relationship with the United States Naval Reserves, where he practiced as a civilian consultant for many years for the United States Naval Hospital and Fort MacArthur in Los Angeles, California.

Ellik gained success in his career and cared deeply about his patients but sometimes at the expense of his personal life. In 1945, after 8 years of practice, he and his wife separated. While they never officially divorced, they never reconciled and both moved on from the relationship. His children lived mostly with their mother but remember spending weekends with their father (Figure 2, right). The dissonance between his professional life and personal life only grew stronger as he returned from the military. His son recalls that his father was a "very quiet man, never heard anything about him..., only about war stories."(3) The stress of war, the drive for success, and passion for creativity weighed heavily on Ellik, who sometimes approached his personal life with a short temper and periodically drank to cope with these stressors.(3)

Dr. Ellik was a man of many interests and many careers, including time in pharmaceutical development, military work, and, his greatest passion, urology. One common theme that persisted throughout all of these fields, and throughout his entire life, was creativity and innovation. He developed ureteral loop stone baskets and manipulators, and meatotomy forceps, to name a few. At the 1971 Australasian Urological Society meeting, he showcased his last invention, the "Styptic Popsicle," a type of balloon

Figure 2. (Left) The Elliks during the Second World War, he as a Lieutenant Commander in the 73rd Seabees. (Right) The young Ellik family, Los Angeles, California, 1940s. (Courtesy, Noel Ellik)

Figure 3. The Ellik "styptic popsicle" device, as presented at the 1971 Australasian Urologic Society and the Western Section of the American Urological Association (AUA). In Dr. Ellik's words, "a large Foley will pass through the lumen of (the) popsicle and almost any amount of inflation of the balloon provides a bolster for all types of traction. Using ice water to inflate the balloon will prolong the life of the popsicle. After the cone of ice 'self destructs' the balloon on the Foley should carry on some tamponade."(Courtesy Noel Ellik)

tamponade device that fit snug around a large Foley catheter and which would aid in tamponade after open simple prostatectomy.(Figure 3)

After a long career, Ellik passed away in 1979. He was a "quiet and private man," who was well-loved by his patients. His son, Noel Ellik, remembered that "people would live and die by every word he said. They thought he was one of the finest urologists in the world."(3)

DISCUSSION

Surgical instrumentation is continuously improved by innovators to achieve, safer more effective outcomes. Current surgeons benefit from the struggles of predecessors who provided us, through their experimentation and diligence, a better way to perform surgery. Across all fields of medicine there are many commonly used instruments known more by the eponymous name of their inventor than by the technical name itself. Indeed, it would be difficult to recognize a surgical table without an Adson clamp, a DeBakey forcep, a Mayo or Metzenbaum scissors, or a Balfour retractor.(10-12) We contacted the descendants of Milo Ellik to discover the person and the vision behind the Ellik evacuator, a mainstay of all transurethral surgery. Our oral history project revealed new photographs and inventions of Dr. Ellik which, as a result of the benevolence of the Ellik family, have been donated to the William Didusch Urology Museum.

The Ellik Evacuator remains an important tool of all urologists but non-urologists have also utilized its ease of use in gynecologic procedures.(13,14)

Ellik himself revered history and one's contributions to it. He wrote on the original concept of a bladder evacuator, lauding the idea first conceived by Bigelow in 1883, and credited Bigelow for the inspiration to develop his own evacuator.(7)

The Ellik family recalls he was driven by ingenuity, strived for improving the way things were done, and wasn't motivated by "making any money off of (the invention)".(3) By yielding the patent and subsequent 'ownership' of it, Ellik relied on his published works and the device's eponymous use by peers as his historical legacy.

Ellik's creativity never subsided but he also felt that surgical instrumentation had to be feasible and practical to be useful. He tried to solve the problem of post-prostatectomy bleeding using his ice 'popsicle' that could be adapted to any size Foley and would occupy the space of the prostatic fossa under traction, a kind of 'cryotherapy'. He also saw the limitations of current 'looped' stone extractors, methods of the early 20th century to remove ureteral stones by blind engagement within loops of wire or thread.(15,16) Ellik's modification of the Balkus loop proved successful in removing 104 stones from 80 patients in a 5 ½ month

study and was adaptable to the pediatric population. (17) He was adamant that the surgeon could make such loops without the expense of commercialized products. He credited Thomas Moore (AUA President 1950-1951) with innovative surgery of the female diverticulum when reporting his own experience with ablative surgical techniques of the female diverticulum.(18)

Ellik's legacy lives on through his creativity and dedication to urology. That spirit of inquisitiveness and ingenuity still benefits patients of today.

Conclusion

The "Ellik Evacuator" has enjoyed widespread use since its invention by a urology resident in 1937, Milo Ellik (pronounced EE-lik), a creative innovator whose contributions to urology have quietly benefited generations of his successors.

REFERENCES

1. Ellik M: A Modification of the Evacuator. J Urol 1937; **38**: 327.

2. Herr H: History of Transurethral Resection and Fulguration of Bladder Tumors. In: *The History of Technologic Advancements in Urology*. Edited by SR Patel, ME Moran, SY Nakada. Cham, Switzerland: Springer 2018.

3. Phone interview, Noel Ellik with author (BZ), 4/5/2020.

4. The Scroll. Boone, Iowa: Boone High School 1925, (http://boonesacheart.manriquez.net/bhs-1920s-yearbooks.html)

5. Hawtrey CE, Williams RD: Historical evolution of transurethral resection at the University of Iowa: Alcock and Flocks . J Urol 2008; **180**: 55.

6. Tasleem AM, Khan F, Mahmalji W et al: The Ellik Evacuator: Evolution in Emptying. Eur Urol Suppl 2014; **13**: e328.

7. Ellik M: Henry Jacob Bigelow (1818-1890). Investigative Urology 1965; **3**: 217.

8. Hendricks, ED: L.A. Urological Society True to Founders' Aim (https://laurological.org/about/history/)

9. *The Story of the Seventy-Third United States Construction Battalion*. Baton Rouge: Army and Navy Pictorial Publishers 1946.

10. Craig WM: Alfred Washington Adson—Pioneer Neurosurgeon, 1887–1951. J Neurosurgery 1952; **9**: 117.

11. El-Sedfy A, Chamberlain RS: Surgeons and their tools: a history of surgical Instruments and their innovators--part I: place the scissors on the Mayo stand. Amer J Surg 2014; **80**: 1089.

12. Eckman J: Donald Church Balfour, M.D. Lancet 1964; **84**: 177.

13. Su Y, Huang K, Chuang F et al.: Use of an Ellik evacuator to remove tenacious bladder clots resulting from transvaginal oocyte retrieval: 2 cases and a literature review. Taiwanese J Obst Gyn 2019; **58**: 880.

14. McArdle C, Feehily A, Allison KP: The Ellik evacuator. A modified technique for autologous fat collection during fat harvest. J Plastic Reconst Aesth Surg 2013; **5**: 737.

15. Ellik M: The Looped Catheter Ureteral Stone Extractor: Perplexities in its Construction and Use. J Urology 1949; **61**: 351.

16. Ellik M: Stones in the Ureter: Their Extraction by Looped Catheter. J Urol 1947; **57**: 473.

17. Ellik M: Ureteral Calculi: Experiences in Looped Catheter Management. J Urology 1951; **65**: 532.

18. Ellik M: Diverticulum of the Female Urethra: A New Method of Ablation. J Urology 1957; **77**: 243.

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The (Not-So) Ancient Practice of Anatomical Trophy Taking: An Emphasis on Penile Dismemberment

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Introduction: Since the first known hieroglyphics showing the war trophy taking of the penis, the capacity of anatomical amputation has always been a nightmarish aspect of wars. War trophies were a prodigious aspect of war in preliterate societies and ancient Greece. Herodotus wrote that Scythian warriors would present to their king the heads of enemies to claim their share of plunder. We performed a literature search to identify instances of war-associated phallotomy in its historical perspective.

Sources: A review of the literature from primary military and secondary sources was undertaken to assess the aspects of warfare specific to trophy taken, its origins, and impact.

Results: Egyptian warriors were famed for collecting as many enemy phalluses as possible in the battle of Khesef-Tamahu. There is some evidence that they spared those enemies who were circumcised. Anthropological studies point to the practice of phallotomy in some indigenous peoples of the Americas. There are biblical accounts of phallotomy that specify foreskin status which themselves were also used for royal presentation. Phallotomy also appears to have been documented in African, Arabian, and Meospotomian cultures but continued in some form into the Second World War.

Conclusions: The barbarity of war may be eclipsed by additional atrocities inflicted by victor over the defeated with the collection of anatomical relics. Such war 'trophies' included the penis as an ultimate attempt to humiliate the vanquished

Key Words: war, trophy taking, phallotomy, circumcision

Hippocrates wrote that "war is the only proper school for a surgeon" yet the same may not be said of the combatants.(1) Evidence of war is as old the record of humankind and suggests a certain inextricability of violence of one group of people over another. "War is hell", as laconically stated by the American general William Tecumseh Sherman, but the hellish nature of military fighting may extend well beyond the time of battle and engagement.(2) (Figure 1) Post-bellum revenge violence may be among mankind's most horrific and inexplicable components of war, and that of trophy taking, or the radical disfigurement of the vanquished, its most bestial.(3,4) The practice of human trophy collecting involves the appropriation of human remains. Following a massacre, warriors would return with heads or some other bodily part of their fallen enemy.(5,6) These trophies would bestow honor and prestige upon the victor; it provided an opportunity for revenge and was the ultimate display of dominance and power over the desecrated. Even if no trophy is taken, mutilations were commonly inflicted upon victim's corpses – features defaced, ears or eyes removed, abdomens splayed open, genitals severed. History is not lacking in such examples and this unique form of pillaging does not appears to be rare in the military record. The phallus appears to have had no protection against vindictive warriors.(7) We performed a study of documented instances of genital war trophy taking to identify historical patterns and frequency, and its human impact.

SOURCES

We used secondary literature on all aspects of warfare and trophy taking from the early period of recorded history to present. US military documents in the public domain, memoirs, and historiographies were analyzed. We catalogued published literature on phallotomy to identify anatomic variation in genital trophy taking and trends over time.

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Figure 1. Victim of wartime phallotomy from Abyssinian conflicts of the 1800s. (4)

RESULTS

Ancient Egypt

Circumcision may be one of the earliest documented surgical procedures known but we found that the hieroglyphic record of ancient Egypt reveals at least two prominent pharaohs, Merneptah (r. 1213-1203 BCE) and Ramses III (r. 1186-1155 BCE) also condoned or ordered phallus war trophy taking.(Figure 2) Ramses' soldiers collected thousands of penises following the battle of Khesef-Tamahu.(8) These offerings are depicted on the walls of Medinet Habu Temple, where Ramses' subjects are seen laying enemy hands and penises at his feet. Even earlier, in the 19th dynasty, Merneptah waged war against a combined Libyan army and an invading horde of "Sea Peoples".(Figure3) Mernepteh emerged victories and, as was recorded in the Ahthribis Stele in the Cairo Museum, "the uncircumcised phalli from the slain Libyans were carried off…to the place where the king was totalling 6,111 men…"(8) Merneptah memorialized his victory with inscriptions in the walls of the Temple of Karnak, as well as on the Merneptah Stele, (ca. 1208 BCE).(9) In total, the Egyptians amassed a total of 13,240 severed penes and did not discriminate among rank or nation and included six from Libyan generals; 222 from Sicilian warriors; 542 from Etruscan warriors; 6,111 from Greeks; and 6,359 from Libyan soliders.(10)

The Narmer Palette, from an even earlier period of Egypt, from the 31st century BCE, or 5,000 years ago, during the reign of the king Narmer, shows two rows of decapitated and bound enemies, with their genitalia placed on their heads.(11)(Figure 4) This detail depicts a victory celebration and scholars have described the scene as the "aftermath of an act of punishment, the execution and deliberate humiliation of enemy prisoners, decapitated and emasculated"; the severed phalli are displayed prominently as a way to "heap insult upon injury" to the slain enemies.(11,12)

Violence in the Old Testament

The historical record of the Middle East is reflected in Old Testament authors including Samuel who documented some of the important military events of the early Israelites and constitutes what is referred to as the Deuteronomistic history of the 6th century BCE.(13) In one account, Saul offers his daughter to David for marriage in exchange for 100 Philistinian foreskins, whereby David delivers twice what is required. "David arose and went, he and his men, and slew of the Philistines two hundred men; and David brought their foreskins, and they gave them in full tale to the king, that he might be the king's son in law. And Saul gave him Michal his daughter to wife." (Samuel 18:27) Biblical scholars have argued that "foreskin" was a mistranslation and refers to the entire penis.(14)

African, Arabian, & Assyrian Acquisitions

Female warriors of the African kingdom Dahomey brought back male genitalia to the king as war trophies. The mother of the Islamic ruler, Muʿāwiya (r. 661- 680 CE), encouraged her supporters to slash the foreskins and genitals from their foes. To avenge the death of her father, she "hacked off [his killer's] penis and testicles, and strung them around her neck".(15) In a record of Assyrian torture and war tactics, the practice of tearing off enemy genitals and testicles borrowed from the agrarian lexicon. "With the bodies of their warriors, I filled the plain, like grass. [Their] testicles I cut off, and tore out their privates like the seeds of cucumbers."(16)

The Americas

There is evidence that trophy taking involving the scalp

Figure 2. Hieroglyphics showing a ritualistic circumcision (from Cox et al. 14)

was practiced in both the Old and New World, the latter by both native and non-native peoples, even up to the 19th century. In one infamous episode known as the Sand Creek Massacre of 1864, Colonel John Chivington led the 3rd Colorado Cavalry of the United States Army in an unprovoked attack on Cheyenne and Arapaho villagers, murdering nearly 200 women, children, and older men. "Fingers and ears were cut off the bodies for the jewelry they carried" wrote one historian, while the body of Cheyenne Chief White Antelope was specifically targeted. In addition to being scalped, the soldiers "cut off his nose, ears, and testicles - the last (used) for a tobacco pouch."(17)

In South America, two Incan chiefdoms were known to "cut off an enemy's penis", exhibiting it on the roadside to shame their foes.(18) In an early 20th account, English writer Thomas Whiffen, described second hand reports of the supposed Amazonian custom of wartime anthrophagy as an extreme form of extreme insult inflicted upon the enemy. "When a feast is to take place, the prisoners are knocked down and despatched, their heads removed to be danced with and eventually dried as trophies. The body is then divided and shared amongst the feasters. Only the legs and arms…are eaten ceremoniously. Anything like the brains, the intestines and so forth are regarded as filthy and never touched, nor is the trunk eaten. The male genital organs are given to the wife of the chief, the only female who has any share in the feast."(5)

Modern Warfare

Although not as common an occurrence, trophy-taking appears to have persisted into the modern era. World War II memoirist E.B. Sledge described graphic tales of body mutilation of fallen soldiers who had their dismembered phallus placed in the victim's oral cavity. (7) Such sordid details were also documented on all sides during the Vietnam War . One veteran recalled a case where the "(victim) was dragged into the village where he was beaten… and executed… The usual surgery was performed on his genitals, which were then stuffed into his mouth."(19)

DISCUSSION

We found evidence that the war time trophy taking of the penis has existed as long as war has been described,

Figure 3. (Left) Hieroglyphics on the Medinet Habu Temple, Luxor Governorate, Egypt, showing offerings of enemy penii to Pharaoh Ramses III after that battle of Khesef-Tamahu. (Right) Enlarged view (From Billington B, 2013 (22))

spanning 5000 years from the earliest Egyptian cultures to the modern era.(20) Trophy taking is rooted in personal efficacy, power, or status, is linked to intimidating one's adversaries, and perpetuates the act of revenge.(6)

The barbarity of war and the atrocities inflicted by one combatant over another reaches its nadir with the collection of anatomical relics. These almost inconceivable acts included the penis as an ultimate attempt to humiliate the conquered, a kind of macabre memento mori. The brutality of corpse defilement was ultimately outlawed by the 3rd article of the Geneva Conventions of 1929 and articles following the end of the Second World War.(21)

Defilement by phallotomy does deserve an altogether different connotation and categorization of the *memento mori*. Phallotomy would imply an intent far more than trophy taking, as a ritualized attack on a defining element of the conquered. There is some evidence, however, that very early war cultures may have collected penises as a physical accountability of the dead since, presumably, one could obtain more than one finger or toe and only one phallus from a single victim(8). The phallus also provided the physical basis for remuneration by tribal leaders, clan members or kings. The penis, as a symbol of virility and power, was, as a war trophy, more symbolic than the head, the ears, or the hands. In the long and violent history of warfare, the practice of phallotomy played a recurring and central role as a particularly ghastly *momento mori*.

CONCLUSION

War trophy taking especially of the phallus has been documented in ancient and modern cultures. The act of trophy taking is a war time atrocity rooted in revenge violence and subjugation perhaps brought to its brutal nadir by the practice of phallotomy.

REFERENCES

1. Cubano MA, Lenhart MK: Prologue. In: *Emergency War Surgery*, 4th ed. Fort Sam Houston, Texas: Office of the Surgeon General 2014.

2. Sherman WT: *The Memoirs of General William T. Sherman by Himself*. Bloomington: Indiana University Press 1957.

3. Loktionov AA: May my nose and ears be cut off: practical and "supra-practical" aspects of mutilation in the Egyptian New Kingdom. J Econ Soc Hist Orient 2017; **60**: 263.

4. Christopherson JB: The Mutilation of Wounded on the Battlefield: A Case Described. Ann Trop Med Parasit 1914; **8**: 129.

5. Whiffen T: *The North West Amazons: Notes of Some Months Spent among Cannibal Tribes*. New York: Duffield & CO. 1915, p232.

6. Harrison S: *Dark Trophies: Hunting and the Enemy Body in Modern War*. New York: Berghahn Books, 2012.

7. Breed AG, Watson J: Desecration of the dead is as old as war itself. San Diego Union-Tribune 1/13/2012.

8. Gollaher DL: *Circumcision: a History of the World's Most Controversial Surgery*. New York: Basic Books 2000.

9. Schulan AR: The Great Historical Inscription of Merneptaḥ at Karnak: A Partial Reappraisal. JSTOR 1987; **24**: 21.

10. Pinon R: Friction and Fantasy: *Opening Pandora's Box*. Houston: Strategic Book Publishing and Rights Co 2014.

11. Tiradritti F, Luca AD: *Egyptian Treasures from the Egyptian Museum in Cairo*. New York: H.N. Abrams 1999.

12. Davies V, Friedman R: The Narmer Palette: An Overlooked Detail. In: *Egyptian Museum Collection around the World*. Edited by M Eldamatay & M Trad. Cairo: American University in Cairo Press 2002.

13. Polzen R: *Samuel and the Deuteronomist: Part Two 1 Samuel*. Bloomington: Indiana University Press 1993.

14. Cox G, Morris B: Why Circumcision: From Prehistory to the Twenty-First Century. In: *Surgical Guide to Circumcision*. London: Springer-Verlag 2012.

15. Trexler RC: *Sex and Conquest: Gendered Violence, Political Order, and the European Conquest of the Americas*. Ithaca: Cornell University Press 1997.

16. Bleitreu E: Grisly Assyrian Record of Torture and Death. Biblical Archaeology Review 1991; **17**: 1.

17. Hoig S: Massacre at Sand Creek. In: *The Sand Creek Massacre*. Norman: University of Oklahoma Press 1961.

18. Goldstein JS: *War and Gender: How Gender Shapes the War System and Vice Versa*. Cambridge: Cambridge University Press 2004.

19. Combs J: *Mercy Warriors: Saving Lives Under Fire*. Bloomington: Trafford Publishing 2012.

20. Mark JJ: Narmer Palette. In: *Ancient History Encyclopedia (now World History Encyclopedia)*: World History Encylopedia 2016, (https://www.worldhistory.org/Narmer_Palette/)

21. George WF: *Geneva Conventions for the Protection of War Victims*. Washington, D.C.: United States Government Printing Office 1955.

22. Billington B: Medinet Habu. Flickr 2013. Available at https://www.flickr.com/photos/brian_billington.

Figure 4. Narmer Palette (left) and magnified section (right) portraying a victory celebration with depictions of decapitated, bound, and slain enemies, with their genitalia placed on their heads (from Mark JJ (20)).

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Sentiment analysis and predictors of optimism in AUA Presidential addresses, 1902-2019: A digitial humanities project

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Introduction: The annual addresses of the President of the American Urological Association (AUA) may articulate and reflect the contemporary goals, values, and concerns of contemporary AUA membership. There is no organized archive of such addresses. We aimed to create a searchable database of all AUA Presidents and their addresses to determine variables associated with speech sentiment including positivity, negativity, and emotional tone through the 117 years of the AUA's history.

Sources and Methods: We queried AUA archives, journals, recorded tape, and personal records, to create a database of all existing AUA Presidential addresses and biographic data. We applied natural language processing and machine learning techniques to evaluate the addresses for overall sentiment with validation using analog analyses (i.e reading and annotation). Multivariable logistic regression was performed to identify significant predictors of Presidential address sentiment.

Results: Between 1902-2019, a total of 113 annual AUA meetings were held. A total of 85 of 113 (75.22%) presidential addresses were transcribed and archived in the database representing 254,124 words by male presidents with a median (IQR) age of 61.43 (53.1-66.5) years. AUA Presidents during the second half of the history of the AUA (1960-2019) were significantly older at time of inauguration and gave more positive speeches in the active voice than presidents during the first half (1902-1959) ($p < .05$). The only significant independent predictor of the degree of positivity in an AUA President's annual address was speaker age (95% CI 1.007-1.119).

Conclusions: We created the first digital, searchable database of all AUA Presidential speeches from 1902-2019 and aim to add additional addresses prospectively. Artificial intelligence analyses mirrored the findings of human reading and demonstrated that from 1902-2019 AUA Presidential addresses became more positive and optimistic with increasing speaker age but without consistent predictors of a speech's emotional or factual content.

Keywords: AUA Presidents; sentiment analysis; machine learning; artificial intelligence

The annual address given by the President of the American Urological Association (AUA) has been a tradition at the national meeting of the AUA since 1902 when the first AUA President, Ramon Guiteras, said that "some remarks about the current state of the union, and its future, are in order".(1) There is no defined requirement for the content expected of each year's presidential address which is at the discretion of the speaker. Unlike the American College of Surgeons, which has a web-based publically available digital archive of 97 Presidential Addresses from 1913-2019, the AUA Presidential Addresses have not been collected, organized, or digitally preserved. The AUA Presidential Addresses may represent a valuable yet untapped source of information that reflect the viewpoints, challenges, and sentiments of the AUA membership at any given time.

Advances in computational natural language processing (NLP) have allowed multiple, unrelated texts, like the novels of Jane Austen or the billions of user comments on Twitter, to be analyzed for sentiment and attitudes.(2,3) NLP has also been used to better analyze medical records and shown benefit in understanding trends of care in nephrolithiasis, asthma, and preeclampsia, and may identify patients who have modifiable risk factors for sudden cardiac death.(4-7)

We hypothesized that NLP and reader-based linguistic analyses of the AUA Presidential Addresses may provide a similarly valuable data source to help understand the contextual history of the AUA and its membership.

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METHODS

Demographics and Addresses.
Dates of birth and death were obtained from the William P. Didusch Center for Urologic History (Linthicum, Md) and publicly available obituary notifications. The inauguration date of the AUA President was defined for the study as the first day of the respective year's AUA annual meeting. City of residence in the year of the presidential term was used to assign AUA sectional affiliation.

AUA Presidential addresses were obtained from the meeting archives of the AUA (Linthicum, MD) (1902-1917), from the Journal of Urology (1920-1997), from AUA audio- or video-archives, or AUA past-Presidents' personal records (1998-2019). The corpus of transcribed text files were then subjected to analog (i.e. reading) and several digital analytical techniques as follows.

Natural Language Processing (NLP) and Sentiment Analyses.

We used Microsoft Word (Microsoft Corporation, 2010) "Readability Metric" tools to enumerate the number of passive sentences of a text and assign Flesch Reading Ease and Flesch-Kincaid Grade Level scores to an analyzed document.(8) NLP modalities typically utilize 'semantic' and 'syntactic' methods to gain insight into natural language.(9) Semantic analytical techniques rely on pre-trained machine learning classifiers to interpret context and sentence structure for meaning. (9) The 'syntactic' approach utilizes a pre-validated lexicon to analyze each line of text to compute overall document sentiment as 'polarity' and 'subjectivity' scores (Python TextBlob library Version 0.15.2).(10)

Polarity refers to the overall negativity or positivity of a given text represented by a most negative value of -1.0 to a most positive value of +1.0. Subjectivity is a measurement of the degree of non-factual personal opinion making. Perfectly factual statements, therefore, would have a subjectivity of 0 compared to a value of +1.0 for statements of a highly subjective, emotional, or opinionated nature.(10,11)

Analog sentiment analysis required each reader (JP, AD, or RP) to judge and count each sentence of each address, where possible, for its 'negative' or 'positive' tone, including salutations, but excluding statements of fact, questions, or quotes. (See Appendix for examples of 'negative' or 'positive' tone). A 'sentiment ratio' was the (number of positive counts) divided by (total positive plus negative counts) per address. Two-sample student's t-test was used to evaluate differences in scores.(12)

Thematic analysis.
Each address was categorized by the authors (JP, AS) as belonging to one of seven potential themes: the AUA; the History of Urology; 'Scope & Practice'; 'Arts & Philosophy'; 'Costs & Congress'; Education & Research; or Clinical.

Statistical Considerations.
SPSS Subscription Version v1.0.0.137 was utilized for all described statistical analyses.(13) Significant univariates from logistic regression analyses were entered into a stepwise multivariate model to predict dichotomous outcomes, using a two-tailed p-value of 0.05 to indicate model significance.

	1902-1959	**1960-2019**	**p-value**
Age at inauguration, median (IQR), years	53 (48-60)	66 (62-69)	<0.01
Age at death, median (IQR), years, n=66	75 (70-84)	77 (72-87)	0.16
Post-term survival, median (IQR) years, n=87	23 (14-34)	14 (12-25)	.02
AUA sections 1-4 (# presidents and (%))	26 (46.42)	27 (46.55)	
AUA sections 5-8 (# president and (%))	30 (53.57)	31 (53.44)	1.00*
Female Presidents (#)(%)	0 (0)	0(0)	1.00

Table 1. AUA Presidential characteristics, 1902-2019, and significant differences assessed with unpaired T-tests or *2 x 2 χ^2

RESULTS

Demographics: There were a total of 113 male and zero female AUA Presidents from 1902-2019 (The first AUA President, Ramon Guiteras, was the only President to serve more than one year (1902-1904)). Dates of birth were found for 109 of 113 (96.46%) AUA Presidents and dates of death were found for 87 of 88 (98.86%) known deceased ex-AUA Presidents. The median (IQR) age of an AUA President at inauguration was 61.43 (53.14-66.48) years (range, 36.62 (HH Young (1907-08)) to 74.83 years (PC Sogani (2013-14)). Presidents in the first half of the AUA (1902-1959) were younger at inauguration (median (IQR) 53 (48-60) years) compared to Presidents in the second half (median (IQR) 66 (62-69) years) (1960-2019) ($p < 0.01$)(Table 1).

The four most common AUA sections represented by number of AUA presidents were the North Central (20), New York (17), New England (15), and Western (13). However, there was nearly equivalent representation of the Atlantic bordering sections (i.e. Sections 1-4) vs the other sections (i.e. Sections 5-8) when comparing Presidential representation over the 117 years of the AUA (Table 1).

The AUA Presidential Addresses: There were no AUA meetings or addresses in 1918-19, 1943, 1945, or 2020. A total of 85 of 113 (75.22%) AUA Presidential addresses were found: 11 (13.1%) from the internal meeting transactions of the AUA (1902-1917); 61 (72.6%) published in the Journal of Urology (1920-1997); 11 (13.1%) from video- or audiotape recorded during the address itself (2002-2019), and one from personal files (JM Barry, 2008-09). One address was destroyed by its author (HH Young, 1907-08) purportedly due to errors in its 1908 transcription. We therefore restricted our subsequent analyses to the 85 Presidents who delivered their addresses at AUA meetings between 1902 and 2019. On average, AUA Presidential addresses were a median (IQR) length of 2811 (2039-3466) words and have remained similar in length over the study period (Table II, p-value 0.10).

Address Themes: We identified seven potential 'themes' in the 85 archived addresses from 1902-2019. (Figure 1) The "AUA" was the theme of 29 of 85 address (34.1%); followed by 15 (17.6%) addresses on the 'Arts & Philosophy' of medicine; 13 (15.3%) on the 'Scope & Practice' of urology; eight (9.4%) on urologic training and research; seven (7%) on 'Costs & Congress' including financial, legislative, and advocacy issues; seven (7%) on urologic history; and six (6%) on a purely clinical topic. There were differences in the topic theme and the age of the speaker. For example, speakers

n=85	**1902-1959**	**1960-2019**	**p-value**
Word Count	2828 (2031-3599)	2654 (2093-3356)	0.10
Unique Words	701 (574-952)	722 (623-843)	0.25
Percent Passive Voice	25 (21-35)	18 (11-23)	<0.01
Flesch Reading Ease Score	36 (32-42)	38 (34-44)	0.32
Flesch Kinkaid score,	14 (13-16)	13 (12-15)	0.07
Positive statements/address	18 (12-27)	25 (17-38)	<0.01
Negative statements/address	12 (8-20)	15 (10-25)	0.05
Sentiment ratio	0.58 (0.53-0.67)	0.63 (0.55-0.74)	0.27
Polarity score (SD)	0.12 (0.09-0.14)	0.15 (0.12-0.18)	<0.01
Subjectivity score (SD)	0.44 (0.43-0.46)	0.42 (0.40-0.45)	0.11

Table 2. Readability and Sentiment of AUA Presidential Addresses, first vs second half of AUA history, 1902-2019, as median (IQR)

on the 'Scope & Practice' of urology were significantly younger than those who spoke on 'Arts & Philosophy' (median ages (IQR) 52.3 (43.5 -61.2) vs 61.9 (58.4- 67.8), respectively, p-value, <.01).

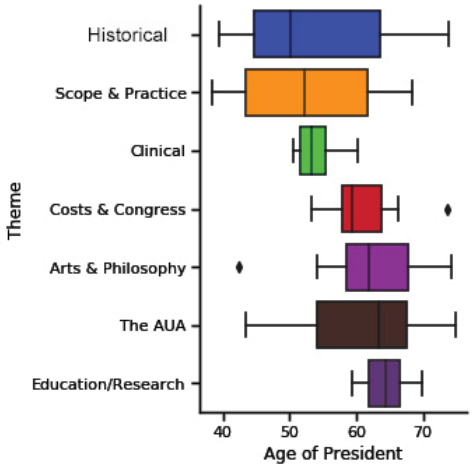

Figure 1. Annual AUA Presdent's address theme versus speaker age, displaying range and median age on horizontal bars (diamonds represent outliers). Median age of 'Arts & Philosophy' speakers (median (IQR) 61.9 (58.4- 67.8) was significantly older than those of speakers on the 'Scope & Practice' of urology (median (IQR) 52.3 (43.5 -61.2), p-value, <.01)

Natural Language Processing.

A median (IQR) of 25 % (21-35) of the sentences in addresses from 1902-1959 were in the passive voice compared to a median (IQR) of 18 % (11-23) of the sentences from 1960-2019 (p<.01) and decreased linearly (IQR) grade level of the AUA Presidential Addresses over the same time period (p<.01)(data not shown) 14. The AUA Address with the lowest and highest Flesh Kinkaid scores were "AI, Robotics, and the Future of Urology" (score: 8.3, JB Thrasher, 2018) and "The AUA: Advancing Urology Globally" (score: 22.4, PC Sogani, 2014), respectively.

Computational sentiment analysis: As described in the methods, we measured 'polarity', or the negative/ positive tone of an address (scale -1.0 to +1.0) and 'subjectivity' or the fact/opinion based nature of an address (scale 0 to +1.0). Of the 85 AUA Presidential Addresses in the study, the median (IQR) polarity was 0.14 (0.10-0.16) and subjectivity 0.43 (0.40-0.46) (Figure 3). There were no "negative" speeches as defined by polarity scores less than zero in sentences from 1960-2019 (p<.01) and decreased linearly (IQR) grade level of the AUA Presidential Addresses over the same time period (p<.01)(data not shown).(14)

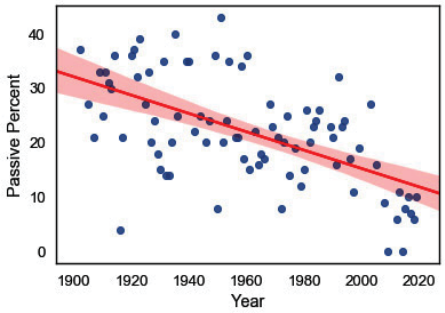

Figure 2. Use of the passive voice in AUA Presidential Addresses, 1902-2019, displaying percent of passive voice sentences/per address vs year of address (R2 0.34, p < .01).

The AUA Address with the lowest and highest Flesh Kinkaid scores were "AI, Robotics, and the Future of Urology" (score: 8.3, JB Thrasher, 2018) and "The AUA: Advancing Urology Globally" (score: 22.4, PC Sogani, 2014), respectively.

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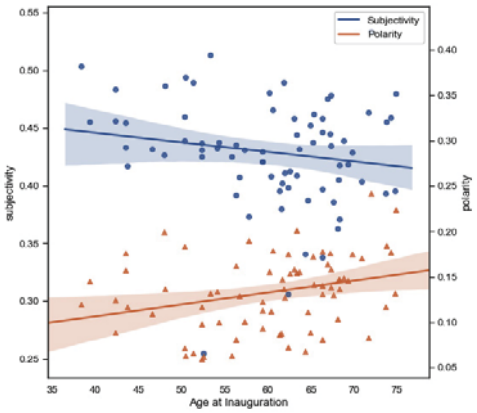


Figure 3. Distribution of polarity (orange data points) and subjectivity (blue data points) scores 85 AUA Presidential addresses versus age at inauguration. Age is associated with increasing speech polarity (OR 1.059 (1.007-1.113) (p=0.025) but not subjectivity (OR 0.958 (0.913-1.005) (p=0.082).

'subjectivity' or the fact/opinion based nature of an address (scale 0 to +1.0). Of the 85 AUA Presidential Addresses in the study, the median (IQR) polarity was 0.14 (0.10-0.16) and subjectivity 0.43 (0.40-0.46) (Figure 3). There were no "negative" speeches as defined by polarity scores less than zero. For comparison, we found that Abraham Lincoln's 1863 "Gettysburg Address" had

a polarity/subjectivity of 0.16/0.55 and ML King Jr.'s 1963 "I Have a Dream" speech of 0.14/0.48.(15,16) In contrast, Germany's 1941 declaration of war against the Soviet Union had a polarity/subjectivity of 0.02/0.37. Subjectivity scores allowed for identification of the least and most opinion-based addresses. The least opinion-based address was given in 1935 by Miley B. Wesson (subjectivity 0.25) entitled "History of the Western Branch Society". In comparison, the address by R Flannigan (2018-2019) "117 Years of the AUA" had the highest subjectivity of 0.53. Presidential addresses between 1960-2019 were found to be significantly more positive (polarity 0.15) than those between 1902-1959 (polarity 0.12) ($p < 0.01$) without substantial differences in subjectivity ($p = 0.11$). (Table 3)

Analog Sentiment Analysis: We counted the number of positive and negative statements in the 85 addresses as described in the methods to generate a 'sentiment ratio'. There was no significant difference in sentiment ratios by three scorers in six randomly selected addresses ($p=0.501$). The sentiment ratios over the course of the first half of the AUA was similar to those of the second half ($p=0.27$) although sentiment ratios increased with AUA Presidential age ($p<.01$). Addresses within the theme of the 'Arts & Philosophy' had the highest number of positive statement counts while talks on 'Costs & Congress' had the highest number of negative statement counts. We found that the digital

	Univariate		**Multivariate**	
Address variables	*OR (95% CI)*	*p-value*	*OR (95% CI)*	*p-value*
Year given	1.013 (1-1.027)	0.055	-	
Age	1.059 (1.007-1.113)	0.025	1.061 (1.007-1.119)	0.027
Total Words	1 (.999-1)	0.143	-	
Unique Words	0.999 (.998-1)	0.379	-	
Passive	0.943 (.898-.989)	0.016	-	
Sentiment Ratio	1.667 (1.160-2.395)	0.006	1.679 (1.154-2.444)	0.007
Flesh Ease	0.996 (.950-1.045)	0.883	-	
Flesh Grade	1.066 (.878-1.293)	0.520	-	
Theme of the Address				
The AUA	Ref	Ref	Ref	
Arts & Philosophy	1.053 (.282-3.935)	.939	-	
Clinical	0.105 (.011-1.029)	.053	-	
Costs & Congress	0.088 (.009-.833)	.034	-	
Education	0.164 (.062-1.601)	.316	-	
History	0.702 (.131-3.771)	.68	-	
Scope & Practice	0.451 (.119-1.710)	.242	-	
AUA Sections represented				
Sections 5-8	Ref	Ref	Ref	
Sections 1-4	1.511 (.634-3.602)	0.351	-	

Table 3. Univariate and multivariate predictors of speech polarity or 'optimism' by AUA Presidents, 1902-2019

computation of positivity, as measured by polarity, strongly correlated with the manual measurement of positivity, as expressed by sentiment ratios with an R^2 of 0.23 ($p<.01$).

Logistic regression analysis: We wished to identify predictors of AUA presidential address sentiment. We found that variables positively associated with speech polarity, that is, the speeches were more 'positive' in sentiment, were AUA President age (95 % CI 1.007-1.113), reader sentiment ratios (95% CI 1.160-2.395), and use of the passive voice (95% CI 0.898-.989), while speeches on financial and legislative matters were associated with lower or more 'negative' polarity (95% CI 0.009-0.833)($p<.05$). On multivariate analysis, only presidential age and sentiment ratios were independent predictors of address polarity ($p<.001$). A higher than average subjectivity score of an address, that is a more emotional than fact-based speech, was only associated with addresses in the 'Arts and Philosophy' category (95% CI 1.126-13.425), p-value <.01) but not on multivariate analysis. (Table 3)

DISCUSSION

This study constructed a digital archive of all extant AUA Presidential Addresses to analyze variables associated with speaker sentiment over the 117-year history of the AUA. Using computational and analog techniques, we found that an independent predictor of the positive sentiment of an AUA Presidential address was speaker age but not AUA meeting year, section membership, speech length, readability, or use of the passive voice. We also found that our digital approach, using natural language processing of greater than 250,000 words in 85 addresses, arrived at the same conclusions as an analog approach whereby readers manually judged and tallied the number of positive and negative sentiment statements of each address.

The study revealed several characteristics of the AUA Presidents as a group. AUA Presidents were significantly older in the second half of the AUA's history than the first half. Over 117 years, the Presidential representation has been evenly distributed amongst the eight AUA sections. Addresses have made significantly less use of the passive voice over time, a long-held surrogate marker of better, more direct writing.(17)

Our findings that older AUA Presidents had an overall more positive tone to their addresses is consistent with previous observations that link optimism and psychological well-being with longevity.(18) Lee et al., for example, showed that the most optimistic quintile of a 1,117 male VA population had a 60% greater chance (95% CI OR 1.0-2.4, $p<.001$) of reaching 85+ years than men in the lowest quintile, after adjusting for health conditions and behaviors.(19)

Sentiment analysis is of increasing interest not just in the humanities and the interpretation of online content but in health care. In a study of 27,000 ICU patients, sentiment 'polarity', or the positive tone of clinicians' notes, was associated with a decrease in 30-day mortality while increasing polarity in 2,500 psychiatric discharge notes was associated with decreased hospital readmission rates.(11,20)

There are several important limitations to our study. First, no AUA meetings were held during many of the years of the World Wars so there was no opportunity to assess changes in sentiment during the two potentially most influential epochs of the 20th century. Of the remaining 108 AUA meetings, there were 17 (16%) missing addresses, which we continue to locate for the archive. No addresses were published after 1997 and subsequent AUA audio or video archiving was inconsistent. Our final dataset of 85 addresses, therefore, was a relatively small study population and limited the number of factors evaluable in multivariable regression modeling.(21) Our analog analyses were prone to the subjective biases inherent to reading such as the scoring of address sentiment ratio or the assignment of a 'theme' to an address. Still, our analog sentiment analyses did appear to correlate well with the computational methods. It should also be noted that the computation of 'polarity' and 'subjectivity' are measures of the sentiment value of an entire address not the relative impact of keynotes phrases or statements, which at times may have a far more durable effect on a participant, as may be observed in some of history's most famous speeches. For example, we found that Winston Churchill's June 1940 Parliamentary address ("We will never surrender") and Martin Luther King's August, 1963 Washington DC ("I have a Dream") speech had polarity scores of 0.11 and 0.14, respectively, or no more positive than the AUA Presidential addresses in our study, yet may be regarded as some of the most influentially positive speeches in the English canon.

We believe that our findings concerning the increasing positivity of the older AUA President, after a career of service, accomplishment, and peer-recognition, are reasonably intuitive. We believe that the database is the first of its kind archiving an important element of

the AUA's history and will serve as a valuable addition to scholarly work through the Didusch Center for Urologic History Website (urologichistory.museum).

CONCLUSION

A digital archive of 85 extant AUA Presidential Addresses was created representing the history of the AUA's highest office holder from 1902-2019. After multivariable analysis, AUA President age was an independent predictor of positive sentiment address.

REFERENCES

1. Guiteras R: The evolution of urology. NY Med J 1902; 76: 617–22.
2. Draxler B and Spratt D: Engaging the Age of Jane Austen: Public Humanities in Practice. 1 edition. Iowa City: University Of Iowa Press; 2019.
3. Saif H, He Y, Fernandez M, et al: Contextual semantics for sentiment analysis of Twitter. Information Processing & Management 2016; 52: 5–19.
4. Jungmann F, Kämpgen B, Mildenberger P, et al: Towards data-driven medical imaging using natural language processing in patients with suspected urolithiasis. International Journal of Medical Informatics 2020: 104106.
5. Juhn Y and Liu H: Artificial intelligence approaches using natural language processing to advance EHR-based clinical research. Journal of Allergy and Clinical Immunology 2020; 145: 463–469.
6. Xie F, Im T and Getahun D: A computerized algorithm to capture patient's past preeclampsia and eclampsia history from prenatal clinical notes. Health informatics journal 2019; 25: 1299–1313.
7. Moon S, Liu S, Scott CG, et al: Automated extraction of sudden cardiac death risk factors in hypertrophic cardiomyopathy patients by natural language processing. International journal of medical informatics 2019; 128: 32–38.
8. Kincaid JP, Braby R and Mears JE: Electronic authoring and delivery of technical information. Journal of instructional development 1988; 11: 8–13.
9. Liu B and Zhang L: A Survey of Opinion Mining and Sentiment Analysis. In: Mining Text Data. Edited by CC Aggarwal and C Zhai. Boston, MA: Springer US 2012; pp 415–463. Available at: http://link.springer.com/10.1007/978-1-4614-3223-4_13, accessed April 9, 2020.
10. Loria S: textblob Documentation. Release 0.15 2018; 2.
11. McCoy TH, Castro VM, Cagan A, et al: Sentiment measured in hospital discharge notes is associated with readmission and mortality risk: an electronic health record study. PloS one 2015; 10.
12. McDonald JH: Handbook of biological statistics. sparky house publishing Baltimore, MD; 2009.
13. SPSS I: IBM SPSS Statistics for Windows, version 25. Armonk, NY: IBM SPSS Corp 2017.
14. Ostermeier DE: Keeping It Simple: Obama Records 2nd Lowest Flesch-Kincaid SOTU Grade Level Score Since FDR. Smart Politics 2011. Available at: https://editions.lib.umn.edu/smartpolitics/2011/01/27/keeping-it-simple-obama-record/, accessed April 23, 2020.
15. Lincoln A: The Gettysburg Address. Reprint edition. Boston: HMH Books for Young Readers; 1998.
16. King ML: I Have a Dream: Writings and Speeches That Changed the World, Special 75th Anniversary Edition. 75th Anniversary ed. edition. San Francisco: HarperOne; 2003.
17. King S: On Writing: A Memoir of the Craft. Anniversary edition. New York: Scribner; 2010.
18. Reed AE, Chan L and Mikels JA: Meta-analysis of the age-related positivity effect: age differences in preferences for positive over negative information. Psychology and aging 2014; 29: 1.
19. Kim ES, Hagan KA, Grodstein F, et al: Optimism and cause-specific mortality: a prospective cohort study. American journal of epidemiology 2017; 185: 21–29.
20. Lee LO, James P, Zevon ES, et al: Optimism is associated with exceptional longevity in 2 epidemiologic cohorts of men and women. Proceedings of the National Academy of Sciences 2019; 116: 18357–18362.
21. Peduzzi P, Concato J, Kemper E, et al: A simulation study of the number of events per variable in logistic regression analysis. Journal of clinical epidemiology 1996; 49: 1373–1379.

APPENDIX

Representative examples of positive versus negative tone statements used in the manual scoring method of the AUA Presidential Addresses, 1902-2019:

Negative statements:

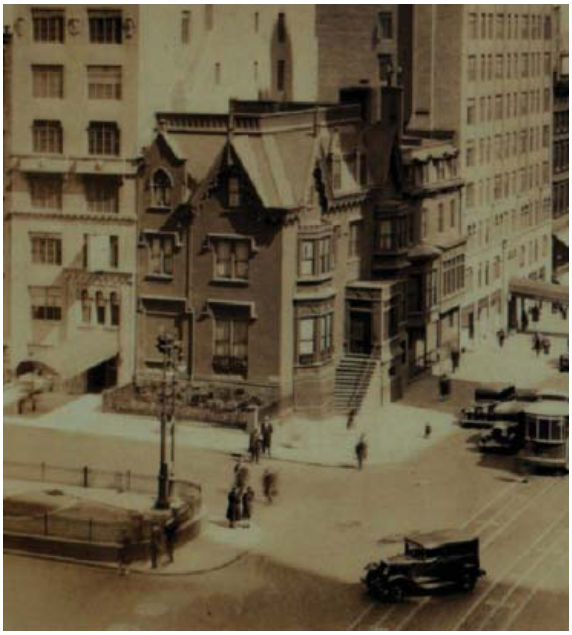
● "Skyrocketing medical costs are receiving increasing and well-deserved publicity, as well as consumer anxiety." Kerr WS, "Challenges in Urology", J Urol 1977; 118(3):359.
● "The world is in a very hectic state" Lowsley, OS, "Urology in a Changing World", J Urol 1942; 48(5):459.
● "There are great dangers ahead for both medicine and religion" Rusche, C. "Not by Medicine Alone", J Urol 1950; 64(3):441.
● "At the same time we need to be aware of potential threats to our organization", SS Lacy, 2012 (AUA Video Archive, Linthicum, MD)

Positive statements:

● "This is excellent!!" Hoffman, CA. "The American Urological Association- The Voice of Urology", J Urol 1968. 100(5):587.
● "The future is bright." Ainsworth, T. "The Anatomy of Change", J Urol 1972. 108(5):663
● "The financial condition of our association is secure." Higgins, C. "The Present Organization of the American Urological Association", J Urol 1949. 62(6):799.
● "Life is to be cherished and enjoyed." DA Pessis 2013 (AUA Video Archive, Linthicum, MD)

LOCATIONS:

Birthplace of the American Association of Genito-Urinary Surgeons (AAGUS), New York



On October 16th, 1886, the revered fin de siècle New York city urologist Edward L. Keyes, Sr. (1843-1924) hosted a meeting of equally devoted leaders in urologic surgery at his residence at Number One Park Avenue, New York, New York (left). That evening the American Association of Genito-Urinary Surgeons was formed. The famous home stood in the Murray Hill section of Manhattan at the northeast corner of Park avenue and 34th Street. (1) The home was eventually purchased by banker Robert Bacon in 1897 and Dr. Keyes moved further uptown to a 5th avenue mansion at 1 East 74th Street (right).(2) Dr. Keyes' son, Edward Loughborough Keyes (1873-1949) became a urologist in his own right eventually serving as the 10th President of the American Urological Association (AUA) in 1916.(3) Meanwhile, the old Murray Hill neighborhood around Number One Park Avenue continued to grow upward. In 1926, a skyscraper was built between 32nd/33rd streets and Park Avenue which the city of New York designated as the new Number One Park Avenue. Incensed, the now widowed Mrs. Roger Bacon fought in court to have her more 'elegant' address restored but eventually lost the case in 1928 and the home was assigned the ignoble new address of Number Five Park Avenue but managed to avoid the wrecking ball into the 1940s.

REFERENCES

1. Number One Park Avenue (April, 1931), AAGUS birthplace, home of Dr. EL Keyes, Sr. Irma and Paul Milstein Division of United States History, Local History and Genealogy, The New York Public Library. (1929 - 1931). Manhattan: Park Avenue - 34th Street Retrieved from https://digitalcollections.nypl.org/items/510d47dd-4cb7-a3d9-e040-e00a18064a99.

2. Number One East 75th Street & 5th Avenue (June 1925), the subsequent residence of AAGUS founder Dr. E.L. Keyes, Sr.. Irma and Paul Milstein Division of United States History, Local History and Genealogy, The New York Public Library. Manhattan: 5th Avenue - 74th Street Retrieved from https://digitalcollections.nypl.org/items/510d47dc-e80b-a3d9-e040-e00a18064a99.

3. Edward Loughborough Keyes: An Early Twentieth Century Leader in Urology. Stahl PJ, Vaughan ED, Belt ES, Bloom DA: J Urol 2006; **176**: 1946.

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