

Bence Jones Island in Shepherd Bay, Nunavut: a little known tribute to the legendary physician and chemist's "thé de voyage"

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Abstract

Henry Bence Jones is among the esteemed physicians of the mid-19th century. Eighteen biographical medical journal articles, published between 1952 and 2021, describe his life and contributions to medicine. Unmentioned, however, is an island in the waters of Shepherd Bay in northern Canada, now Nunavut, designated Bence Jones Island, by the British explorer John Rae in 1854. Rae had sailed from Great Britain to the regions extending north of Hudson's Bay in search of information regarding Sir John Franklin and 133 other officers and men who departed from the Kingdom of Great Britain in two ships in 1845 to search for the Northwest Passage to the Pacific Ocean; they disappeared. In anticipation of Rae's voyage to search for evidence of Franklin's expedition, Bence Jones provided a special preparation of tea that could be drunk cold, if necessary. It was so meaningful to the crew of Rae's ship that it resulted in Rae naming an island near Boothia Isthmus in Shepherd Bay in recognition of this contribution to the contentment of his men under arduous conditions and in acknowledgment of Bence Jones's professional standing, upon which we comment. Rae's report of his voyage in 1855, cited herein, mentioned the island and showed its position on a map of the region. We have located it on a current map of the waterways and landmasses of Nunavut using Google Earth Pro by showing its position at the approximate coordinates of latitude and longitude cited by Rae.

The naming of Bence Jones Island

A desire to acquire furs trapped by indigenous people spurred the exploration of the region of Hudson's Bay and the subarctic waters and landmasses of North America by the English in the 17th and 18th centuries. The Kingdom of Great Britain under a charter by Charles II (1630-1685) formally initiated this bountiful trade in 1670. Later, in the mid-19th century, having experienced over 150 years of exploration of those regions of the North American continent and their extensive waterways, British seamen searched for a navigable passage through that land mass to the Pacific Ocean, the Northwest Passage, so as to provide a more direct route to Asian markets. Commercial interests in Europe, especially in Great Britain, would have benefited from such a shipping route to Asia. Discovery of this, then mythical, route became a principal goal of the explorers of the northern territories and the subarctic regions of North America in the 1800's. Today, such a route

can be traversed during the Arctic summer, with the aid of icebreakers. As a result of global warming transit from the Atlantic to the Pacific Ocean or *vice versa* may become possible, unassisted, through arctic waters by the mid-21st century.

The exploration commanded by Rear Admiral Sir John Franklin (1786-1847), which was his fourth attempt to find the Passage was composed of two ships, HMS *Erebus* and HMS *Terror*, previously under sails, but converted to power by installation of special screw propellers driven by a wheel-less locomotive steam engine. The two ships departed in May 1845 with 134 officers and men and a multi-year supply of food, including approximately 8,000 tins of meat, vegetables and soup. Two whalers encountered Franklin's ships in late July of 1845 and were the last known of any of his contacts. Franklin died suddenly on the *Erebus*. His body or grave was never found.¹ He, presumably, was buried in a sailor's grave, the icy waters of the Northwest Territories. Despite their large food supply,

the officers and crew, trapped in ice for over a year, abandoned their ships. Under the leadership of Francis Rawdon Moira Crozier (1796-1848), second in command to Franklin, the surviving officers and crew were lost in the vastness of the North American wilderness.² The submerged remains of the two sunken ships were located in 2014 (*Erebus*) and 2016 (*Terror*) by the Parks Canada's Underwater Archaeology Team and Inuit collaborators and are design-

nated a national historic site. In an effort to find evidence of the fate of Franklin's expedition, Captain John Rae (1813-1893), who had previously explored northern Canada and its extensive waterways and land masses, set out to unravel the mystery. Rae was a physician and sea captain. Franklin's widow Lady Jane Franklin (1791-1875) urged this effort. Their goal was to determine the fate of the officers and men who had left their

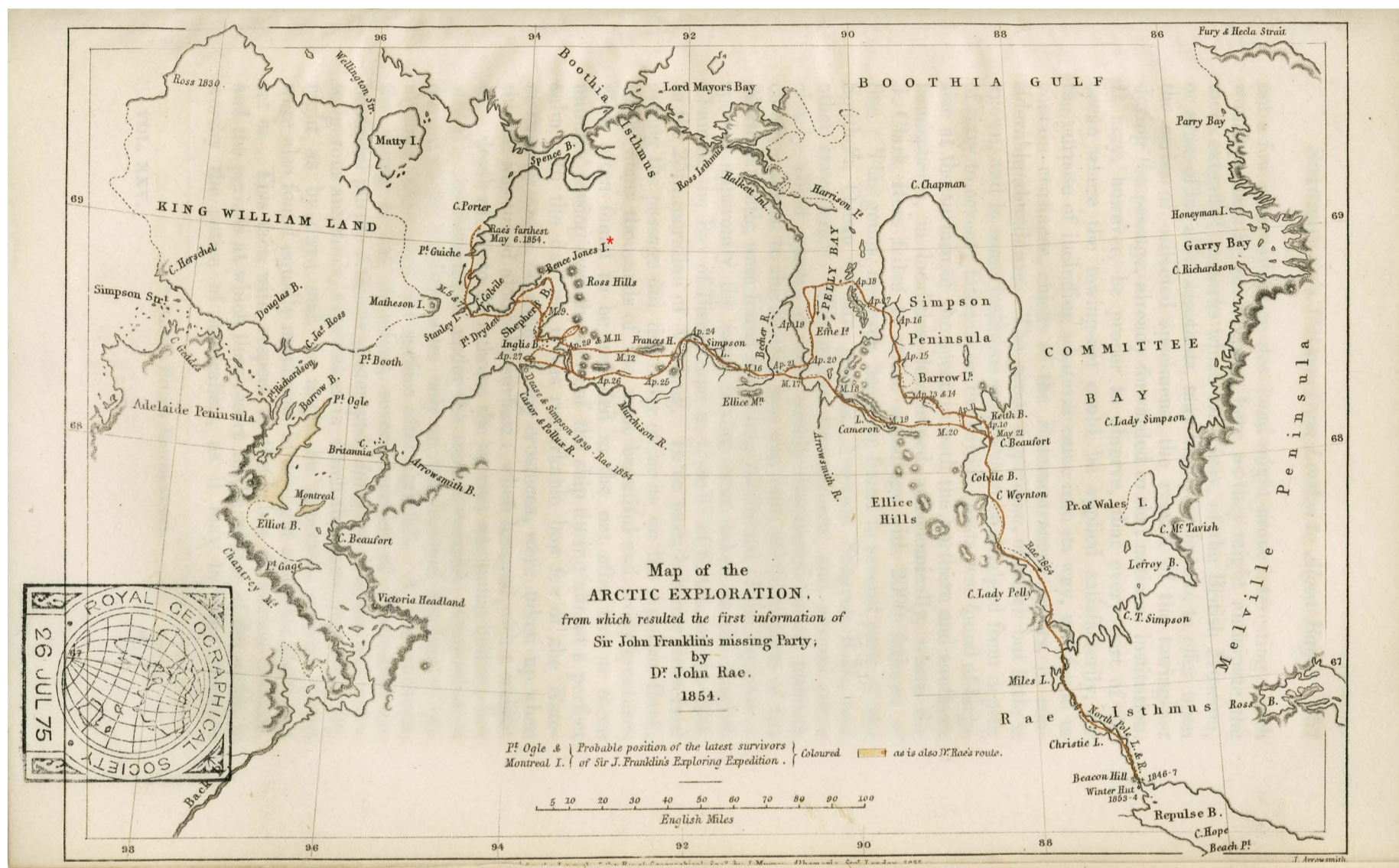


Figure 1. A replica of John Rae's original map, dated 1854, of the region of North America in which his search for Sir John Franklin's expedition was undertaken. He shows the location of the small island named for Bence Jones. The original report describing his action and containing the map can be viewed at (<http://www.jstor.com/stable/1798121>.) We have added a small red asterisk to this replica of Rae's map to indicate the location of Bence Jones Island.

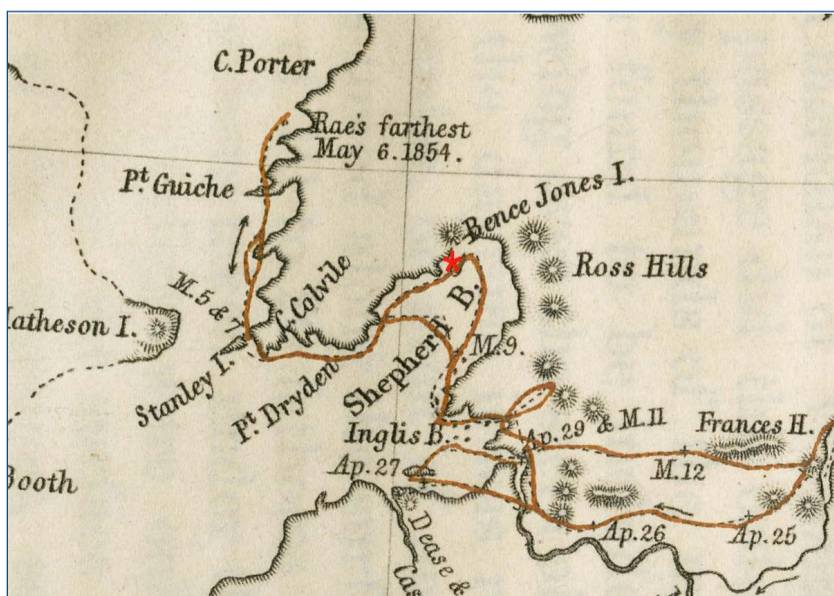


Figure 2. This is an expanded view of John Rae's original map of 1854 shown in Figure 1 with sufficient enlargement to see the island's contour in Shepherd Bay, which Rae also named. The line denoting the path of his travels crosses what he designated as Bence Jones Island.

ships in search of a haven for the winter. The two ships were presumed crushed by ice, forcing their abandonment. Rae's party, while in Pelly Bay, encountered Inuit who had heard of Crozier's last whereabouts. Based on that guidance and subsequent encounters with Inuit, his party eventually discovered their last encampment. There were several graves, relevant artefacts and some mutilated exposed bodies; the bodily alterations and other evidence indicated the few remaining survivors had resorted to cannibalism.³ This behavior was, undoubtedly, compelled by those few of the ship's crew still alive attempt to escape starvation until the spring when hunting and fishing could resume or, perhaps, rescue might occur. Rae's report was comprehensive. His forthright description of the evidence led Lady Franklin and other interested parties, including Charles Dickens (1812-1870), to attack Rae's conclusions for casting aspersions on British seamen and so noble an English gentleman and naval officer, and, of course, her husband. Lady Franklin made this attack on Rae despite her husband having died on shipboard; he was not part of that last fatal trek.

Rae described his journey and findings in appropriate detail in the *Journal of the Royal Geographic Society of London* in 1855.³ During the explorations, he entered a body of water that he designated Shepherd Bay and named a small island at its head for the esteemed British physician-scientist Henry Bence Jones (Figures 1 and 2). This action was described on page 253 of the *Journal* containing Rae's report,³ the relevant excerpt of which follows:

"On the evening of the 29th [April] the weather was so stormy that, although we were prepared to start at 8 o'clock, we could not get away until past 2 on the following morning. When after travelling little more than 5 miles, a heavy fall of snow and strong wind caused us to take shelter.

Our advance was much impeded by thick weather and soft snow that we did not arrive within a few miles Cape Porter of Sir John Ross until the 6th of May. In doing this we traversed a bay, the head of which was afterwards found to extend as far N. as lat. 68° 54' N. Point Sir H. Dryden, its western boundary, is in lat. 68° 44' N., long. 94° 11' W. To this bay the name of Shepherd was given, in honour of the Deputy-Governor of the Honourable Hudson's Bay Company, and an island near its head was called Bence Jones, after the distinguished medical man and analytical chemist of that name, to whose kindness I and my party were much indebted for having proposed the use of, and prepared, some extract of tea for the expedition. This article we found extremely portable, and as the tea could be made without boiling water, we often enjoyed a cup of that refreshing beverage, when otherwise from want of fuel we must have been satisfied with cold water."³

This report describes the naming of Bence Jones Island in North America and, based on Rae's coordinates, provides

its location on a Google Earth Map of the region (Figure 3 and 4). We use the term "approximate coordinates" because Rae's coordinates were only to the nearest arc minute of latitude and longitude, which is approximately a mile.

Rae was a person of accomplishment and was a physician educated at the medical school in Edinburgh and spent considerable part of his adult life in London when not at sea or on explorations for the Hudson's Bay Company. Indeed, even when in Canada on an exploration, he interrupted his captaincy and devoted a considerable period of time to practicing medicine among the Inuit. He, thus, shared his medical background with the distinguished physician and chemist in London, Henry Bence Jones. I presume this proximity, common interests and record of accomplishment in each case resulted in their acquaintanceship and the provision of this special formulation of tea given to Rae for his voyage by Bence Jones

The standing of Bence Jones

Henry Bence Jones (1817-1873) was among the most distinguished physicians and chemical pathologists of the mid-19th century. Bence was his mother's family name and Jones his father's family name. He was elected to the Royal Society at the age of 33 years and was named the Secretary of the Royal Institution of Great Britain, chartered in 1800 to advance science. He was a confidant of Charles Darwin (1809-1882), who was his patient, of Florence Nightingale (1820-1910), who sang his praises and of Michael Faraday (1791-1867) about whom he wrote a biography, *The Life and Letters of Faraday* in 1869, with a second edition in 1870.

Bence Jones involvement in the case of Thomas Alexander McBean (d. 1846), a London grocer, admitted to St. Georges Hospital, is legendary and has been the subject of historical commentary in medical journals on at least 18 occasions in the last 70 years.⁴⁻²³ It has, also, been cited in innumerable monographs and textbooks of medicine, hematology, immunology or oncology. This fame was the result of positing an answer to the query by the patient's primary physician William Macintyre (c. 1791-1857) and a consultant Thomas Watson. They sent Bence Jones a urine sample with the accompanying note:

"Dear Dr. Bence Jones, The tube contains urine of high specific gravity. When boiled it becomes highly opaque. On the addition of nitric acid, it effervesces, assumes a reddish hue, and becomes quite clear; but as it cools it assumes the consistency of appearance you see. Heat reliquifies it! What is it?"

Bence Jones's study of the patient's urine confirmed Macintyre's and Watson's findings; the urine contained a substance that precipitated on heating and then dissolved

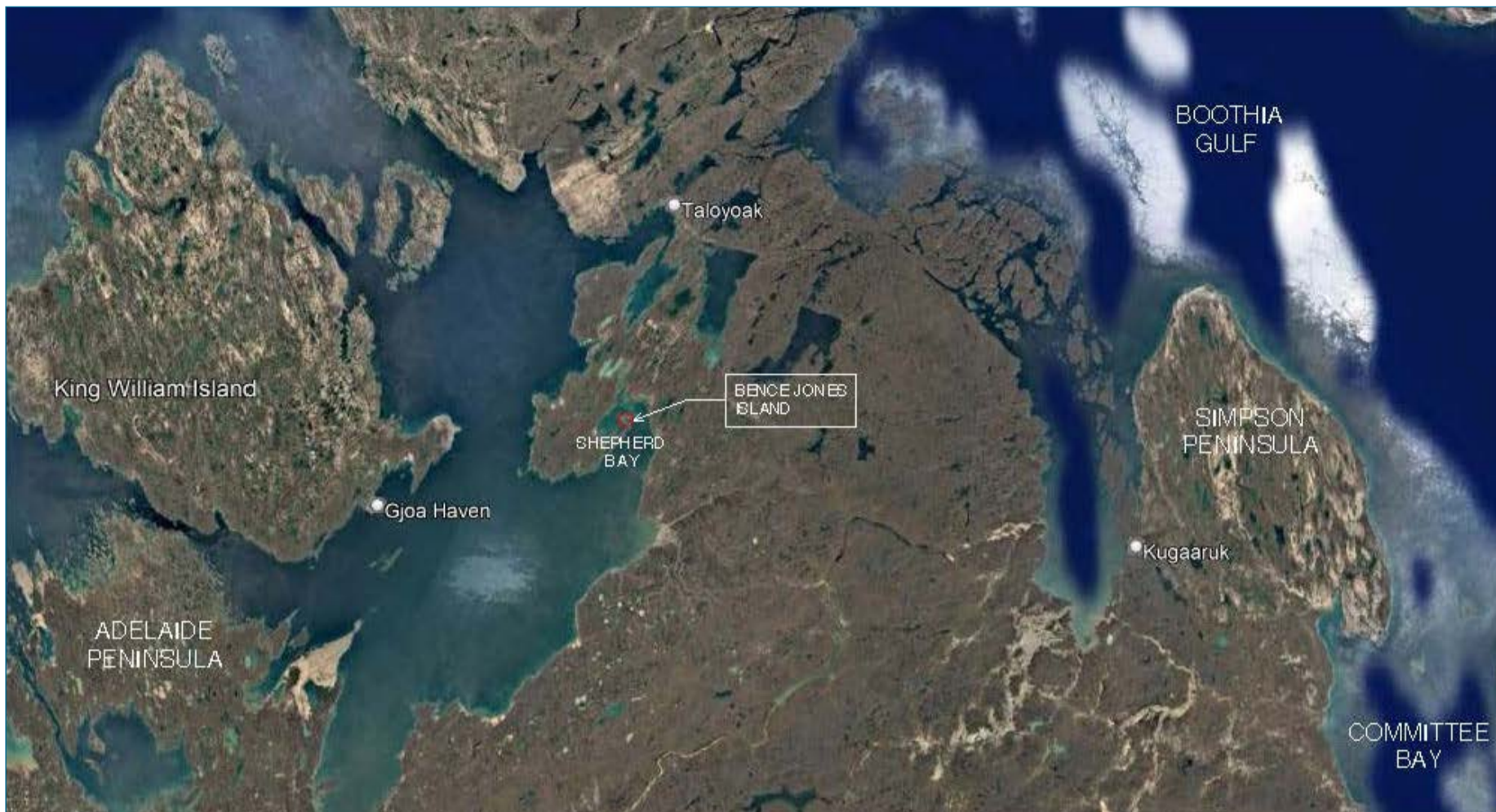


Figure 3. The region of North America in which John Rae’s search to locate Sir John Franklin’s lost expedition was conducted, as seen using Google Earth Pro (July 26, 2022). We show the location of Bence Jones Island based on Captain John Rae’s approximate coordinates of longitude and latitude as cited in the excerpt of his report in our text and shown in Figure 1. We use the term “approximate coordinates” because Rae’s coordinates were only to the nearest arc minute of latitude and longitude, which is approximately one mile. On May 25, 1993, an agreement was reached that gave the Inuit control over the central and southern portion of the Northwest Territories, now referred to as Nunavut. Some of the English names assigned by Rae and other British explorers in that region may not be used by the Inuit.



Figure 4. Enlarged image of the site of Bence Jones Island at the head of Shepherd Bay shown in Figure 3, based on Captain John Rae’s approximate coordinates of latitude and longitude as cited in the excerpt of his report in our text and derived from Figure 1. We use the term approximate coordinates because Rae’s coordinates were only to the nearest arc minute of latitude and longitude, which is approximately one mile.

when warmed further. Bence Jones confirmed these findings, did extensive further chemical studies of the urine and its content and did so on repeated samples. Bence Jones estimated the concentration of the chemical in the urine to be approximately that of serum albumin. He gave it a name “hydrated deuterium of albumen” and published two articles on its description in 1847²⁴ and 1848.²⁵ In the mid 1800’s, “albumen” was a generic term for protein and did not refer specifically to the plasma protein albumin. Bence Jones explicitly stated: “Lastly, this peculiar reaction with nitric acid hinders all possibility of confusing this new substance with albumen. Indeed ordinary albumen may be separated from this new substance by adding nitric acid, boiling- and filtering whilst hot; on cooling, the hydrated oxide will be precipitated from the filtered liquid, and it will again be dissolved by heat, whilst the albumen will remain on the filter.”²⁴

Drs. Macintyre and Watson first identified the unusual finding in Mr. McBean’s urine. Nevertheless, Bence Jones gained ownership of this discovery by his: (i) repeated and very extensive chemical analyses of Mr. McBean’s urine; (ii) giving the material in the urinary precipitate a name; (iii) rapidly publishing the findings; and (iv) associating it with mollities ossium and offering the admonition to search for it in the urine of all cases of that illness.^{20,24,25} Dr. Richard Fleischer applied the eponym “Bence-Jones protein bodies” to the urinary finding in a paper published in 1880, 33 years after Bence Jones’s initial report.²⁶

Dr. Macintyre’s report of the case several years after Bence Jones’s two reports contained a description of the

disease mollities ossium. The description of the cellular content of Mr. McBean’s marrow was compatible with its infiltration by myeloma (neoplastic plasma) cells.²⁷ Its publication 3 years after Bence Jones’s reports of his urinary findings contributed to Bence Jones receiving priority for that aspect of the case. This case report of a man in his 60’s with spontaneous fractures, a marrow cellular content compatible with replacement by neoplastic plasma cells and with a urinary protein with physico-chemical features later shown to represent a urinary fragment of monoclonal immunoglobulin, should be given priority as the first description of myeloma. It was, however, Bence Jones who gained lasting fame for his descriptions of the urinary findings, later shown to be monoclonal immunoglobulin light chains by Leonhard Korngold (1921-2010) and Rose Lipari.²⁸ Their paper resulted in the designations kappa (from the K in Korngold) and lambda (from the L in Lipari) for the two species of immunoglobulin light chains.

Disclosures

No conflicts of interest to disclose.

Contributions

MAL and EMR co-wrote the manuscript.

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