

Stranger's fever in Charleston, South Carolina: a mistaken diagnosis?

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ABSTRACT George Augustus Clough was a young Englishman who died in Charleston, South Carolina, in 1843. The cause of death, which unusually was given on his gravestone, was Stranger's fever, which is now known to be yellow fever. Stranger's fever first appeared in North America in Florida in 1649, and continued to cause both sporadic cases as well as serious epidemics, mainly in the South and along the Eastern seaboard of the US until the beginning of the twentieth century. It gained its name from its propensity to mainly afflict recent arrivals, and Clough had only been in Charleston for two years before his death. However, a re-examination of the evidence suggests that he may not in fact have died of yellow fever.

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INTRODUCTION

In St Michael's churchyard in Charleston, South Carolina, a gravestone bears the inscription:

'George Augustus Clough
A Native Of Liverpool
Died suddenly of Stranger's Fever
November 5th 1843
Aged 22'

This brief epitaph describes the harsh realities of life and death in the southern US in the middle of the nineteenth century, a stark reminder of the terrible impact that yellow fever – as we now know stranger's fever to be – had on the communities that lived through this period of American history. It is, however, also unusual in many ways. First, George was the only member of his family to be buried there. His gravestone stood alone in a cemetery full of Charleston's pre-eminent families. Secondly, his mourners chose to mark Clough out as different – they wanted to remember him as a son of England and not as a child of an alien land. Finally, while the plots around Clough were marked with the details of their occupants' lives, Clough's gravestone was a bleak testament to his death. What makes this story of particular interest is not only that George Augustus Clough was part of an extraordinary family whose impact on English academia and literature was remarkable, but that a re-examination of the evidence suggests that he may not in fact have died of yellow fever.

GEORGE AUGUSTUS CLOUGH

Clough, as it turns out, was no stranger to Charleston. George Augustus Clough was the youngest son of James Butler Clough, a Liverpool merchant who arrived in South Carolina with George and the rest of his family in 1822, hoping to make his fortune in the precarious transatlantic cotton trade. The family immediately moved into a three-storey red brick home at 188 East Bay, a substantial family dwelling which overlooked the wharves of the Cooper River.¹ The Cloughs slipped effortlessly into the upper middle-class society of Charleston, but they never forgot their ties to England. By 1831, George had followed his two older brothers back to England, to begin his education at Mr Pepper's preparatory school in Chester. James' decision to educate his sons in England marked his determination to retain the status that came with his British nationality in a post-colonial America, as well as his upper middle-class ranking in English society. As George's tombstone denotes, James Clough had no intention of allowing his family to become American.

Clough may have guarded his status through social markers, but the volatile business of the cotton trade made it hard for him to maintain his economic standing. Forced by a financial crisis, James returned to England in 1825, leaving his family alone in Charleston. After filing for bankruptcy, he returned to South Carolina a year later, and by 1830, he had regained his economic equilibrium. The family retained five hired slaves, and left the humid miasmas of Charleston's docks every summer, fleeing to the healthier climes of Sullivan's Island. Even so, the family could not completely escape the threat of disease.

In 1830, James Butler Clough contracted yellow fever, seriously frightening the entire family. Although he recovered, his wife, afraid of the tropical illnesses and unhealthy airs of Charleston, finally forced her husband to promise that they would return to England. By 1836, James had kept his promise, and he, his wife and his daughter were reunited with his three sons in England. Liverpool became the family's final home, and it was in England that the Clough family made their name: Anne Jemima, George's sister, went on to found Newnham College, Cambridge, the first all-female college of that old and venerable university. Arthur Hugh, George's brother, also flourished. After academic success at the famous public school, Rugby, he went on to Balliol College, Oxford, and finally made his name as a poet. Along with Matthew Arnold, he would be remembered for posterity as a member of the group known as the Rugby poets.

But these glittering careers did not appeal to James Butler Clough at the time. In fact, he was far more proud of his youngest son, George, who returned to Charleston in 1841, to once again try his hand in his father's business. He seemed to be showing a great deal of promise, and in March 1843, James wrote to Anne Jemima, reporting that the year's trade could add up to a 'pretty handsome sum'.² George was not only making a success of the business, but it seemed that George, at 22 years of age, was finally coming out of his shell, flirting with young ladies in the best of Charleston society.² Indeed, his father felt confident enough to leave him running the business in 1842, as he returned to England to manage yet another financial crisis.

But James' return to Charleston in the winter of 1843 was marked by tragedy. George had succumbed suddenly to stranger's fever. Far away from his home and his family, his friends in Charleston had tried to nurse him as best they could. They told his grieving father that he had remained lucid until the end, not realising until the last how sick he was.³ James no doubt felt the bitter irony not only of having survived his youngest son, but of having beaten the disease which had killed George. No wonder James felt the need to proclaim stranger's fever as the cause of death. Resentful of Charleston and its sunny, savage climate, James wound up the family business and returned home to Liverpool. Less than a year later, James himself succumbed to an unknown illness. His tomb in St James' Cemetery in Liverpool stood as a final marker of his grief for his son, for it commemorated them both.⁴ Thus, Clough's gravestone is explained. His father chose the inscription to blame George's death on South Carolina's tropical climate, and it reflects his guilt that his son should be left buried abroad.

YELLOW FEVER

Genome sequencing of related flaviviruses suggests that yellow fever originated in Africa 3,000 years ago and was subsequently imported to the Americas with the slave

trade,⁵ although tracing its path through history is complicated by the many names by which it has been called, notably Siam fever, *vomito negro*, and yellow jack. In 1900, Walter Reed and his colleagues showed that mosquitoes were the vectors of the disease, demonstrating the disease was caused by a filterable agent and that it could be transmitted by *Aedes aegypti* mosquitoes.⁵ The virus was isolated in 1927 and subsequently characterised as a positive-sense, single-stranded RNA virus with a genome of approximately 4×10^6 Da.⁶

The clinical illness of yellow fever is usually described as occurring in three phases. Following an incubation period of 3–6 days, the patient first develops non-specific features including fever, headache, nausea, vomiting and general malaise. Classically, there is a slow pulse in relation to the fever (Faget's sign). This stage, which lasts about 72 hours, is followed by a brief period of remission when symptoms abate. Then, in about 20% of cases 24–48 hours later, the disease returns, and the patient develops acute hepatic failure and renal failure with features of a haemorrhagic diathesis. There is high fever, jaundice, petechial mucosal and gastrointestinal bleeding (hence the term *vomito negro*). Seizures, confusion, and ultimately coma, develop, and death occurs after 7–10 days of illness. The mortality in fully developed cases is approximately 50%.

A rapid specific immune response follows exposure. There is an early IgM response during the first two weeks, followed quickly by the appearance of neutralising antibodies that persist for many years. Recovery from primary infection appears to give long-lasting protection from subsequent infection.⁷ Serosurveys indicate that as few as 5% of infections lead to clinically apparent disease, and it is this fact that probably underlies the term 'stranger's fever', since during the epidemics that swept the southern US, it was predominantly the newcomers who succumbed to the disease, long-term residents having presumably developed immunity as a result of previous subclinical infection.

STRANGER'S FEVER

There are clear descriptions of epidemics of yellow fever in the Caribbean and Central America between 1647 and 1649; the disease first appeared in North America in Florida in 1649, and spread to Boston, New York and Charleston in 1699. It continued to cause both sporadic cases as well as serious epidemics, mainly in the South and along the Eastern seaboard until the beginning of the twentieth century.⁸

Charleston during the second half of the nineteenth century provided a highly suitable breeding ground for infectious diseases. There were huge areas of standing water that provided an ideal environment for mosquitoes. As a major port, it provided employment for many, and the city was one of the wealthiest in the country, attracting not

only British merchants, brokers and agents such as James Butler Clough, hoping to make their fortune, but also a welter of indigent workers, sailors, slave traders and the slaves they forced with them, all of whom crowded onto the city's docksides, where Clough worked. Public health facilities were often overwhelmed and the streets were full of animal and human waste. In these conditions, the hot humid summer months made conditions ripe for epidemics. Families like the Cloughs understood the risks of Charleston's wharves in the summer, and like many others who had the means, they left the city in the summer, heading either north to Boston, or away from the docks to the open air of Sullivan's Island.

City records for the period 1824–1860 showed that deaths from epidemic infectious diseases were a regular feature: they included malaria, smallpox, influenza, typhoid, typhus, cholera and scarlet fever, as well as yellow fever.⁹ Those who lived in Charleston recorded the daily incursions all these illnesses made into their lives, understanding that these threats were a chronic but inescapable part of life in this almost tropical city.¹⁰ In 1843 (the year that George Augustus Clough died) cases of influenza, scarlet fever and yellow fever were all reported.⁹

It is not clear when the term 'stranger's fever' first arose. In 1795, during an epidemic of yellow fever in Charleston, Martha Laurens Ramsay wrote that 'the reigning disorder is said to be confined to strangers or people who live irregularly'.¹¹ Certainly, eighteenth century observers, both lay and medical, recognised that recent arrivals were far more susceptible to the disease than long-term residents. Data from the 1852 epidemic in Charleston show that almost 80% of the deaths were in people from Ireland and Germany; only 1.2% were natives of South Carolina.¹² It was not just that newcomers died more often than local white people; equally curious was the fact that African-Americans seemed to be unusually resistant to the disease. Other epidemiological observations that puzzled contemporary physicians were that men were more likely to get yellow fever than women, and that there seemed to be an association with the weather. Many believed that the excess incidence in visitors was due to the fact that they had not become acclimatised, hence the idea of the 'unacclimated stranger' or the 'acclimating fever', as it was sometimes called. Not surprisingly, given what we now know about the cause of yellow fever, it was the hot, humid summer months (the 'sickly months', as they were known) that were the most dangerous. Data from the period 1831–1840 in Charleston showed that the peak incidence of death was in September, although deaths continued to occur throughout the year.⁹

Many other suggestions were made to explain the epidemiological findings. Unsurprisingly, social commentators quickly conflated the notion that strangers were afflicted with concepts of social class, blaming in

particular the immigrant poor, whose supposed lack of discipline and immoral uncleanness led directly to their infection. As IH Charles commented in 1847:¹³

'by far the greater part of the victims are the Irish and the Dutch, who have just arrived from a country where the Climate is totally different to ours – And if you could accompany me thro' some parts of this place, & see the miserable, filthy loathsome manner in which the lower orders live, you would not be at all surprised, that when a fever once broke out, that it should spread & become as malignant as it does here.'

Perhaps hoping that they might remain safe, many believed that their class standing would provide the necessary insulation against the disease, claiming that yellow fever:

'attack[ed] indiscriminately but prove[d] fatal to but few except the dissipated and filthy'.¹⁴

In its classic, advanced form (the 'stage of intoxication') yellow fever presented a striking and probably unmistakable clinical picture, particularly during epidemics. Newsom describes South Carolina's last yellow fever epidemic in 1877 when Dr Manning Simons, an experienced physician from Charleston, was called to Port Royal, South Carolina to investigate an outbreak of a lethal febrile illness.¹⁵ Port Royal was highly unusual in that it had been spared earlier epidemics of yellow fever, and the differential diagnoses considered by Simons included malaria, dengue, Febricula, and 'the prevailing fever'. Malaria could be distinguished by a rapid response to quinine, which was in widespread use at the time,¹⁶ but isolated cases of yellow fever must have been more difficult, especially in the earlier stages when the symptoms and signs are rather non-specific. Manning Simons later wrote a remarkably accurate clinical report (cited in ref 15) from which it is clear that physicians had a clear idea of the symptoms and signs of advanced yellow fever.

How confident, then, can we be of the diagnosis of stranger's fever in the case of George Augustus Clough?

Unfortunately we have very little direct information concerning the circumstances surrounding George's death. The single description available to us is in a letter that his father, James Butler Clough, wrote to his daughter, Anne Jemima, back in Liverpool. The only reference to the course of George's illness was to say that he was 'lucid to the end'. This would be surprising, since as noted above, the terminal stages of yellow fever are usually characterised by stupor and/or coma. Perhaps strangely, he mentions neither jaundice nor haemorrhage, which are both features that might have been expected in a fatal case of yellow fever.

The other source of information is his gravestone. The fact that he died 'suddenly of stranger's fever' almost

certainly suggests that his death was caused by an acute infective illness (rather than trauma, or a more chronic process). Of note, George's father, James, survived an episode of yellow fever three years before George died. It is reasonable to suggest that George was exposed and had a sub-clinical infection at that time and hence he developed some immunity, so it is a little surprising that he later succumbed to the infection. But it is in the date that there lies an interesting conundrum. As a mosquito-borne disease, yellow fever was most frequent during the hot, humid summer months. Epidemics usually peaked in August and had generally run their course by October or early November, so while it was by no means unknown for cases to occur in November, George's death on 5 November was unusual. Even more curious was the year: 1843. One of the strange and most disturbing features of stranger's fever was its unpredictability; some years were marked by huge epidemics, while in other years, there were few or no cases. There was no regularity to this: in Charleston during the period 1817–1845, six years (including 1817–1819) saw epidemics with several hundred deaths, while there were fourteen years in which no deaths were recorded. In 1843, the year that George

died, just a single death due to stranger's fever was recorded by the City Council of Charleston.⁹

Several explanations for this suggest themselves. One is that George was extraordinarily unlucky to be the only person in Charleston to die of yellow fever that year. Clearly it is also possible that death certification was less than perfect, and that other cases occurred but were not recorded. The third consideration is that he died not of yellow fever but of some other acute illness. It is impossible even to speculate what that might have been, although as noted above,⁹ there were several other acute infective illnesses that were well known to occur in the area and which were associated with significant mortality rates. The evidence against yellow fever as a diagnosis is certainly not conclusive; however, the clinical description of George's illness, such as it is, is not entirely what one might have expected and the epidemiologic data are intriguing. Although in reality, George Augustus Clough was no stranger to Charleston, his father's bitterness led him to blame the most malignant of all South Carolina's diseases. Despite his epitaph, George Augustus Clough may not have died of stranger's fever.

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