

Historical Note

(Section Editor: J. S. Cameron)

William Charles Wells (1757–1815)—a nephrologist of the Scottish enlightenment

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Introduction

The scientific contributions of William Charles Wells have attracted scant attention since his death in 1815. Several disciplines are the poorer for this, and none more so than nephrology. Hence, I now propose, after outlining Wells's life, to examine his role in developing a concept of renal disease, and to speculate upon why Richard Bright, rather than he, has achieved prime historical recognition in the recognition of glomerulonephritis.

Wells, the man

Wells dictated, shortly before he died, a succinct autobiography that gives deep insight into his character [1]. He was born in May 1757 at Charlestown in the then British colony of South Carolina. His father, a printer and bookseller, had recently migrated from Scotland and established *The South Carolina and American General Gazette* newspaper. Distant ancestors, through his mother, were the Earls of Gowrie who had played a forceful, though ultimately disgraced, role in sixteenth century Scottish politics. He had, he considered, 'rude manners', which he attributed to growing up among the swashbuckling Caribbean seamen who populated the Charlestown docks.

At the age of eleven he was sent to board at Dumfries Grammar School in Scotland, under the headmastership of George Chapman, A.M. Chapman believed that intellectual development required the stimulation of curiosity about natural phenomena to encourage students to seek explanations. Explanations, then, would induce a love for mankind and honour of a Supreme Being. Thereby people would achieve a clear sense of right and wrong [2]. After 2 years at Dumfries and another studying art at Edinburgh University (where he formed a life-long friendship with the nephew of David Hume, the philosopher), Wells returned to Charlestown as an apprentice to Dr Alexander Garden, a Scottish physician.

When civil war erupted in the American colonies in the mid-1770s, the Wells family remained parliamentary loyalists. When political activists pressured every adult male to sign a document known as 'The Association', William Charles Wells, then aged 18 years, refused to sign a 'treasonous' document because: 'the first public act of my life should never disgrace me'. Threatened, he fled to Scotland, where from 1775 to 1778 he studied medicine at Edinburgh University. He then spent a year in London at William Hunter's Great Windmill Street Anatomy School and at St Bartholomew's Hospital before travelling to The Netherlands as a surgeon in a Scottish mercenary regiment serving under the Prince of Orange. Soon, however, he resigned his commission and wrote his MD thesis [3]. By 1781, Charlestown was again in parliamentary hands, so he re-crossed the Atlantic and assumed publication of the family newspaper (now *The Royal Gazette*). When the city capitulated a year later, he fled to Florida—a loyalist colony—and established the first newspaper published there. In 1782, upon the cessation of hostilities, he returned to Charleston (as it became) to pursue some debtors. He was promptly arrested on bogus charges, thereby provoking one of the first diplomatic incidents between the newly independent United States and Great Britain. A British warship was despatched from Florida to rescue him, but was shipwrecked during the return voyage. He survived by swimming ashore naked in the middle of the night.

By 1784, he was again a refugee in London, settling down to a life of clinical medicine and scientific research. He became a Licentiate of the Royal College of Physicians in 1788, was a member of A Society for the Improvement of Medical and Chirurgical Knowledge from 1788 to 1815, physician to the Finsbury Dispensary from 1789, Fellow of The Royal Society from 1793, and Physician to St Thomas's Hospital from 1795 to 1815. Throughout many of those years, he struggled to reduce the stranglehold over medical practice in the capital held through the College by a small clique of self-opinionated men. In this he failed during his lifetime; however, his friends

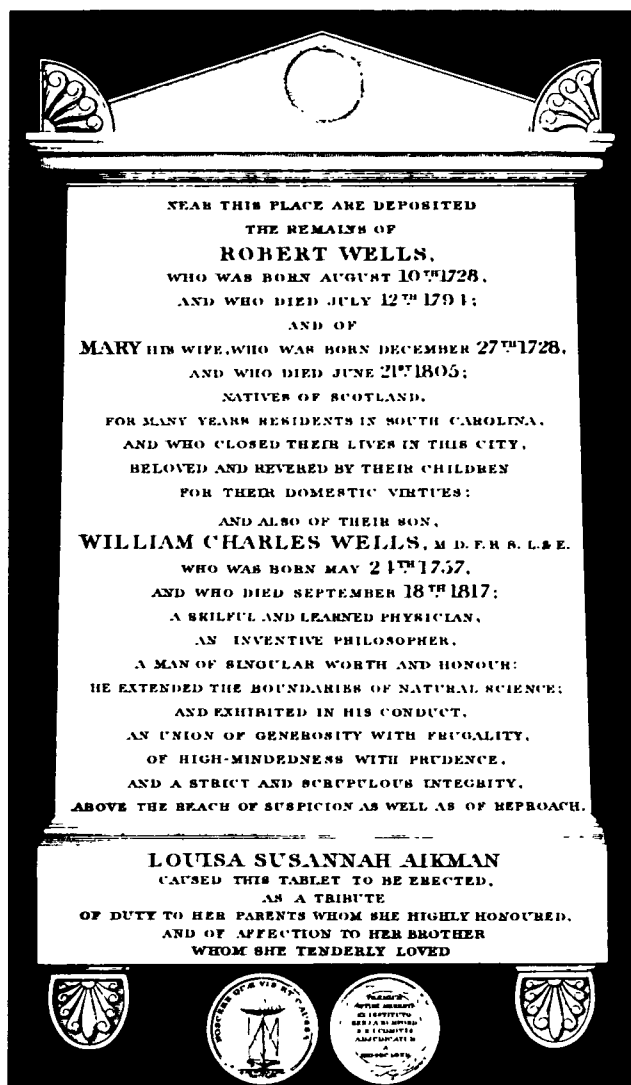


Fig. 1. No portrait was, apparently, painted of Wells; however, this memorial was erected in St Bride's Church, London, after his death. The memorial was destroyed when the church was reduced to rubble during a bombing attack on 29 December 1940.

pursued the issue after his death, eventually persuading Parliament to introduce a formal system of medical licensure under The Medical Act of 1858. In his research, Wells sought a rational analysis of natural phenomena, espousing truth and avoiding emotion.

Although reserved and aloof, he remained a Tory and an ardent loyalist, signing declarations and joining a paramilitary organization when the French Revolution provoked British nationalist fervour. His manners were awkward, 'a tall, thin, scraggy personage with long arms and legs he hardly knew what to do with; and he wore a brown scratch wig which was never in place' [4]. He was abstemious with food and drink, avoiding alcohol and becoming a vegetarian after suffering a stroke in 1800. He was careful with money, a confirmed bachelor, yet no misogynist. It was, however, with men—especially those associated with the publishing and printing world—that he

formed close and enduring relationships. He lived in the shadow of St Bride's Church in Fleet Street, in the heart of the British publishing industry [5]. A memorial erected to him by his sister and by J. B. Nichols (the editor of the *Gentleman's Magazine*) in St Bride's, after his death in 1817, described him as 'A skilful and learned physician, an inventive philosopher, a man of singular worth and honour; he extended the boundaries of natural science and exhibited in his conduct, an union of generosity with frugality, of high mindedness with prudence, and a strict and scrupulous integrity, above the reach of suspicion as well of reproach' [6]. The available evidence suggests that this was a fair description.

Regency London was a city of ostentation, vulgarity, and opulence. Many European aristocrats lived there in exile. Fashion, play-houses, and fops such as Beau Brummell, set the tone. Wells held himself apart from all this, displaying the characteristics now recognized as distinguishing the Scottish Enlightenment—civic humanism (maintenance of frugality and personal morality in an environment of luxury and excessive social refinement), stoicism, inter-personal sensitivity, orderliness, and a belief in causality [7]. The orderliness and causality typified his scientific research.

Wells, the scientist and physician

Apart from a few biographical essays, Wells wrote exclusively on science and medicine. Many of his articles proposed revolutionary ideas: all warrant detailed analysis, since most of his ideas achieved subsequent acceptance. Unfortunately, few of them have attracted the analyses they deserve.

The scientific topics that he addressed ranged from investigations upon why humans have single vision with two eyes (1792); the mechanism of electrical stimulation of muscles (1795); the reason for the red coloration of the blood (1797); the mechanism of pupillary reactions (1811); the implications of coloration of the skin, with proposal of a theory of evolution as natural selection by survival of the fittest (1813—in this long preceding Charles Darwin); to the mechanism of the formation of dew (1814). Most of these publications appeared in *Philosophical Transactions* of The Royal Society.

The clinical topics that he addressed included descriptions of erysipelas (1800); alopecia universalis (1806); oedema formation after scarlet fever (1806); post-traumatic epilepsy (1807); the original written description of acute rheumatic heart disease (1810–1811); proteinuria and haematuria (1811); subcutaneous necrotizing cellulitis (1812); tracheo-oesophageal fistula (1812); aortopulmonary fistula (1812); and neonatal tetanus (1812). Most of these publications appeared in *Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge*, of which Wells was for long the editor.

Wells, the nephrologist

Although one or two authors—such as Rayer and Pleadwell—have found merit in Wells's efforts, many historians have tended to damn him by faint praise [8,9]. Indeed, for most his role was merely to prepare the way for the messiah, Richard Bright. Ralph H. Major, for example, in his *Classic Descriptions of Disease With Biographical Sketches of the Authors*, selectively and briefly quoted Wells's articles, giving no biographical information. Yet he granted Bright a laudatory biography with a full-page portrait [10]. Is this assessment justified? I would argue that whilst it is not, it does describe accurately the perception of those interested in the question. Why?

Apart from urinary calculi, relatively little was known of renal diseases before the nineteenth century. In 1673, Frederick Deckers of Leyden had described coagulability of the urine upon boiling [11]; and in 1764, Domenico Cotugno in Naples had described a patient in whom coagulable urine and oedema occurred concurrently [12]. Hippocrates had noted haematuria [13]. Daniel Sennert, in 1641 in Wittenberg, had written the first clear description of scarlet fever, commenting that oedema could accompany it [14]. Thomas Sydenham, in London in 1676, named and thereby re-emphasized that disease [15]. Although occasional other authors had referred to these conditions, it was Wells who first observed them systematically. He attempted an interpretation in papers presented to A Society for the Improvement of Medical and Chirurgical Knowledge in November 1806 and June 1811 [16, 17].

In the former paper he pointed out that post-scarlatinal oedema usually occurs in children aged under 14 years; that multiple cases may occur in a family; that languor, peevishness, constipation, and vomiting often precede it; and that oedema occurs between 16 and 25 days (mean 22–23 days) after the fever starts; and more commonly after mild than severe fever. Swelling starts in the face, the abdomen can swell, there is often initial oliguria followed by late polyuria, the urine is often red, occasionally there can be frequency and dysuria, the urine precipitates on heating because of the serum in it, and that this (the proteinuria) can last for more than 42 days. Most patients, Wells observed, recover from the condition, although a few die. Poor prognostic signs are severe headache, convulsions, blindness, dilated pupils, and pleural and perhaps pericardial effusions. Of the many treatments tried, there was little evidence that any were efficacious. He also considered pathogenesis. The oedema, he thought, was due to some state of the body other than mere debility caused by fever. He speculated that, in scarlet fever, inflammation might affect internal membranes much as it affected the skin.

In the second paper, dealing with non-scarlatinal haematuria and oedema, Wells started by comparing in the laboratory the two known tests for urinary proteins—precipitation by boiling and precipitation by

nitrous acid. He quantified the proteinuria by dilution, and compared the urinary and serum concentrations. In performing these tests, he included positive and negative controls.

He then mentioned three patients with haematuria and proteinuria. The first was a 39-year-old lighter-man—of whose illness he gave great detail, including a 13-year follow-up. The second was an old sailor from the West Indies who died and whose autopsy revealed the presence of abnormal kidneys, bladder, and liver. The third was a 70-year-old man of whom he gave no clinical details.

In this paper he next described a survey he had undertaken of 130 patients, 78 of whom had oedema. Their urinary protein concentrations remained constant from day to day, but did not correlate with the severity of the oedema. Their appetites were usually good, their skin pale, and their oedema often generalized. Loin pain and diarrhoea were common. Eighteen of them had a bleeding tendency. Twenty-three of 29 patients with peripheral oedema had proteinuria, and in them it usually followed chest disease. Fourteen of 20 patients with pleural effusions had proteinuria, most of whom also had peripheral oedema. Eight of 33 patients with ascites had proteinuria, but this was only present if there was also peripheral oedema. Three of the patients underwent autopsy: the first was mentioned above; the second had hard and thick renal cortices, and lobar pneumonia; and the third had abnormally large and soft kidneys. He thus described two anatomical patterns of diseased kidneys associated with oedema and proteinuria—firstly, hard; and, secondly, large and soft.

In the same paper he investigated the effect of mercury poisoning on the urine, after noting proteinuria in patients receiving mercury treatment for venereal disease. He wondered whether the protein was due to the disease or the treatment. Hence he tested the urine of six untreated patients: five were negative and one had a trace only. Then he treated all with mercury for more than 2 weeks. On retesting the urine, four of the six had become positive. He concluded that mercury exposure causes proteinuria. Finally, he speculated on the pathogenesis of the proteinuria. He suggested that in disease, serum must traverse the kidneys. Further, although the kidneys are not always structurally abnormal when there is proteinuria, they must function abnormally when proteinuria occurs. His conclusion was that some distant cause must induce organic disease of the glomeruli ('the glands'), resulting in malfunction of their capillaries ('secreting vessels').

Wells and Bright: why does history choose to smile upon some and overlook others?

Between October 1810 and October 1812, whilst Wells was a physician attending St Thomas's Hospital, a 22-year-old Edinburgh medical student named Richard Bright was undertaking a clinical attachment at the adjacent Guy's Hospital. St Thomas's and Guy's were

at that time physically and administratively linked, sharing clinical meetings [18]. Wells was, just then, collecting the information for—and presenting—his second paper on the mechanisms of association of proteinuria and oedema. So far as I am aware, Bright never subsequently indicated that he was aware of Wells's work. Yet, 15 years later, and by then elected to a secure position at Guy's Hospital, Bright published a beautifully illustrated book entitled *Reports of Medical Cases, selected with a view of illustrating the symptoms and cure of diseases by a reference to morbid anatomy* [19]. This consisted of many detailed clinical and autopsy reports, including much detail of treatments that he believed to be effective. In his Preface, Bright indicated that he had been collecting cases for twelve years (that is, since about 1815). Of the 90 patients he described, 39 had combinations of proteinuria, oedema, pulmonary disease and liver disease. Of those, 24 probably suffered from renal disease, of whom 17 died and had damaged kidneys at autopsy. In later publications, he added more cases. He emphasized the gross pathological findings, more or less classifying them into two groups—firstly, patients with small, hard, red kidneys; and secondly, patients with large, pale kidneys.

From this, it would appear that Bright did not advance the understanding of renal disease far beyond the conclusions reached by Wells. He initially even avoided hypothesizing about relationships between the structural and functional abnormalities. Later, indeed, he believed others had misrepresented his views and felt it necessary to defend himself [20]. Yet Bright has gone down in history as the great discoverer and Wells remained relatively obscure. Why is this so: why does history choose to smile upon some and to disregard others?

Both Wells and Bright were keen observers. As such, both were empiricists. Both Wells and Bright interpreted what they found, the former relating clinical features to anatomical pathology, and that to pathophysiology; the latter relating clinical features to anatomical pathology, for the interpretation of which he emphasized the importance of autopsy examination. As such, both were also rationalists. Hence, on the classical philosophical grounds of empiricism and rationalism, it is difficult to explain Bright's pre-eminence. They differed from each other, however, in that Bright succeeded in embedding his work in the public mind, whereas Wells failed. Bright achieved a semiotic success, creating a new language of discourse, of which the symbols were the sumptuous book that he published and his own name that signified the disease that he 'discovered'.

Undoubtedly Bright was fortunate. He was wealthy and socially well connected. He worked in an ambitious institution among prominent colleagues. His political leanings were in tune with those of both the British and American intellectual establishments. Furthermore, he was blessed with a euphonious surname that carried overtones of success. Wells, in contrast, was a retiring and awkward man, frugal, a friend

of printers and newspapermen, associated with a stolid institution, politically anathema to the British and American intellectual establishments of the nineteenth and twentieth centuries, and with a surname redolent of dark and dank places. Is it surprising that the term *Bright's Disease* caught the imagination of physicians and laymen alike, whereas Wells drifted into oblivion?

Nowhere is this better illustrated than in answers given in 1834 by Dr William Macmichael, a prominent Fellow of the Royal College of Physicians of London, to a Select Committee of The House of Commons that was inquiring into restrictive practices in British medicine [21]. Upon being asked by a parliamentarian what he knew about Wells, Macmichael stated:

I am not sure that Dr. Wells ever was eminent as a physician: he wrote some papers for the Royal Society on Dew, and was considered a clever man; but he was not at all an eminent physician, and he was an extremely irritable man ... I am not very conversant with his papers, or his works on physic or medicine; they are not voluminous; his papers are chiefly philosophical ... he has written his own life ... He was a clever man, but not successful in his profession ... I do not recollect any [of his medical works] at this moment; they are not often quoted ... There is one paper which I do recollect, which is a very important one, that on the Rheumatism of the Heart; all the others are such as the magazines and publications of the present day abound with. He is not the author of any great work

Macmichael was then asked: 'How many of the present College of Physicians have written great works on medicine?' He replied:

It is not necessary to write great works now: the science is advanced so much, that it is not to be expected that we should have very voluminous publications.

Scientific fame, Macmichael implied, has a social requirement over and above mere observation and interpretation. I would suggest that the key to the social requirement is creation of a symbolism with which to grip the public mind.

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