

Guest editorial

Helmholtz on golf

So much has been written about Hermann Ludwig Ferdinand von Helmholtz (figure 1, left) of late that it has been referred to as the ‘Helmholtz industry’ by Kremer (1990, 1994). Until now, this industry has not included the sporting dimension of Helmholtz’s life—most particularly his encounter with golf!

Helmholtz was invited to Scotland by Sir William Thomson (figure 1, right; later to become Lord Kelvin) in 1871. The two scientists had been friends for some years. They first met while both were on holiday at Bad Kreuznach in 1855, and Helmholtz had been greatly impressed by Thomson:

“I expected to find the man, who is one of the first mathematical physicists of Europe, somewhat older than myself, and was not a little astonished when a very juvenile and exceedingly fair youth, who looked quite girlish, came forward He far exceeds all the great men of science with whom I have had personal acquaintance, in intelligence and lucidity and mobility of thought, so that I felt quite wooden beside him sometimes” (Koenigsberger 1906, page 145).

Helmholtz was the guest of Thomson in Glasgow in 1864, and the visit in 1871 was planned for the meeting of the British Association for the Advancement of Science, which was held in Glasgow that year; Thomson was the President. In his Presidential address, Thomson (noted for his opposition to Darwinian natural selection) speculated that the seeds of life could have been carried to Earth by meteorites. It was an attempt to salvage natural theology from the savaging it had received from the evolutionists, and it is now enjoying a mild renaissance (see Gribbin 2000). Helmholtz had been invited to the meeting, but was not able to attend; he did spend some time in Scotland afterwards, mostly sailing along the West coast aboard Thomson’s yacht.

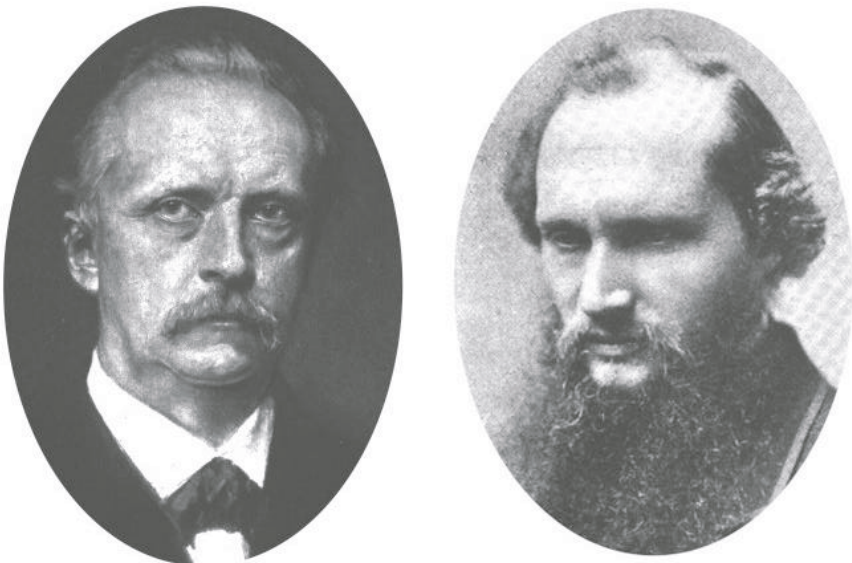


Figure 1. Left, Hermann Helmholtz (1821–1894); and right, William Thomson (1824–1907). The portrait of Helmholtz is after a painting from 1876 (Koenigsberger 1906); that of Thomson is after a photograph taken in 1870 (Thompson 1910).

Peter Guthrie Tait (figure 2, left) had been primed to entertain Helmholtz if Thomson's yacht was not prepared in time:

"If Sir William be not ready to start, you might come with me to St Andrews, where my wife will be delighted to see you, and where you may learn (at its head-quarters) the mysteries of GOLF! I have secured a house there, and so has my brother-in-law, Crum Brown, for the months of August and September. It appears that Huxley also has done the same, so that we may take to scientific discussions in the intervals of exercise" (Knott 1911, pages 196–197).

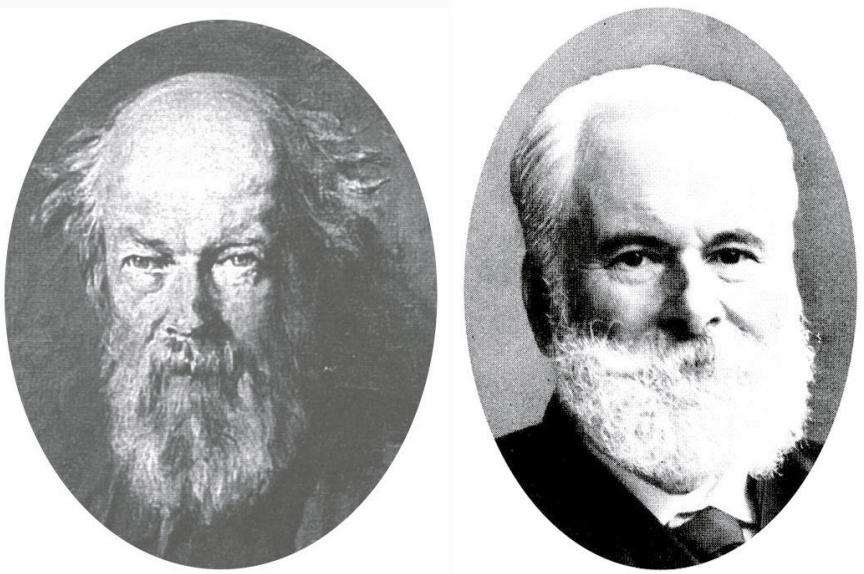


Figure 2. Left, Peter Guthrie Tait (1831–1901); and right, Alexander Crum Brown (1838–1922), Professors of Natural Philosophy and Chemistry, respectively, at the University of Edinburgh. Both accompanied Helmholtz on his round of golf. The portrait of Tait is after a photogravure in Knott (1911); that of Crum Brown is after a photograph in Comrie (1932).

Helmholtz recorded his views of St Andrews and of golf, in letters to his wife, with the precision we associate with his experimental observations:

"St. Andrews has a splendid bay, with fine sands which slope sharply up to the green links. The town itself is built on stony cliffs. There is a lively society of sea-side visitors, elegant ladies and children, and gentlemen in sporting costumes, who play golf. This is a kind of ball-game, which is played on the green sward with great vehemence by every male visitor, and by some ladies: a sort of ball game in which the ball lies on the ground and is continually struck by special clubs until it is driven, with the fewest possible blows, into a hole, marked by a flag, about an English mile distant. The entire round over which each party wanders amounts to about ten English miles. They drive the ball enormously far at each blow. Mr. Tait knows of nothing else here but golfing. I had to go out with him; my first strokes came off—after that I hit either the ground or the air. Tait is a peculiar sort of savage; lives here, as he says, only for his muscles, and it was not till today, Sunday, when he dared not play, and did not go to church either, that he could be brought to talk of rational matters. The Browns are also here, and he (Crum Brown) will accompany me to-morrow to Sir William" (Thompson 1910, page 612).

Tait did not join the party on Thomson's yacht and he had signalled this in advance in a letter to Helmholtz, stating: "I have *no* aversion to being afloat, but that I prefer to spend my few holidays in active physical work, such as a game of golf" (Thompson 1910, page 588). Golf was more than physical work for Tait. As Professor of Natural Philosophy at Edinburgh University he later studied the physics of golf,

and wrote about the art of the game with wry humour. His science was concerned with the trajectories of flight of golf balls and the effects of spin. In a long article on driving, published in 1896, Tait captured the theatre of the game:

“In the great drama, familiarly known as a *Round of Golf*, there are many Acts, each commonly but erroneously called a Stroke. Besides Acts of Driving, to which this article is devoted, there are Acts of Approaching, Acts in (not *always* out of) Hazards, and Acts of Holing-out. There is another class of Acts, inevitable as human beings are constituted—Acts of Negligence, Timidity, or Temerity. Of these we cannot complain, and they give much of interest to the game. A philosophic professional, after missing an easy putt, put this aspect of the game in words which could scarcely be improved: ‘If we cud a’ aye dae what we wantit, there wud be nae fun in’t’. Besides these, there are, too frequently, other Acts wholly superfluous and in general injurious to the game: Acts of Gambling, Fraud, and Profanity. These, however, belong to the domain of the moral, rather than of the natural, philosopher” (Knott 1911, page 329).

Experimentally, Tait measured the velocity of the golf ball at impact, the distance travelled, the elevation of the ball and the duration it was airborne, and the trajectory of the shot. Machines for striking golf balls consistently did not then exist, and so he enlisted the services of his son, Freddie, who was Amateur Champion. Freddie used a club specially made by his father; the loft of the club could be changed by a hinge at the neck, thus varying the height and distance of flight of the ball. This wooden-shafted iron still exists as the P G Tait trophy, and it is competed for annually by teams of academics from Scottish Universities. Tait was inordinately proud of his son’s prowess at golf, and often referred to himself as “Freddie Tait’s father”. There is little wonder that he was devastated when Freddie was killed in the Boer War.

Alexander Crum Brown (figure 2, right) was also present at St Andrews, and he was Helmholtz’s companion for much of the remainder of his holiday on board of Thomson’s yacht. Crum Brown was Professor of Chemistry at Edinburgh University, and he is best known for introducing the modern method of symbols connecting atoms in organic chemistry. His perceptual research was not insignificant. A few years after the meeting with Helmholtz, Crum Brown (1874) formulated the hydrodynamic theory of semicircular canal function, independently of Mach and Breuer (see Wade 2000). His analysis was based on thresholds for detecting body rotation on a revolving stool; the thresholds were lowest when the head was positioned so that one of the semicircular canals was in the plane of rotation. Later, in his Robert Boyle Lecture at Oxford University, Brown remarked

“This hydrokinetic theory of the function of the semicircular canals was propounded at very nearly the same time by Professor Mach of Prague, Dr. Breuer of Vienna, and myself. I give the names in the order of publication. The views expressed by us were not exactly the same. The theory as I have just described it might perhaps have been developed, as I have here developed it, from a consideration of the structure and position of the canals. But as a matter of fact this was not the historical order. It was the experiments of Flourens that first directed attention to these organs as having something to do with equilibrium of the body” (1895, pages 20–21).

One of the differences between the three accounts related to Crum Brown’s proposal that the contralateral canals operated as a pair rather than independently.

Crum Brown, together with Tait, played leading roles in a notorious drama in the history of stereoscopic vision—the discovery and interpretation of the Chimenti drawings (see Wade 1983). Helmholtz made an entry in the final Act of this drama, too, but that is for another round!

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