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## Col. R E B Crompton

by *David Cousins*

*Col. Rookes Evelyn Bell Crompton was a Victorian pioneer - an inventor, innovator, and entrepreneur with a keen interest in the military, electrical and mechanical engineering in the early days of electrical engineering.*

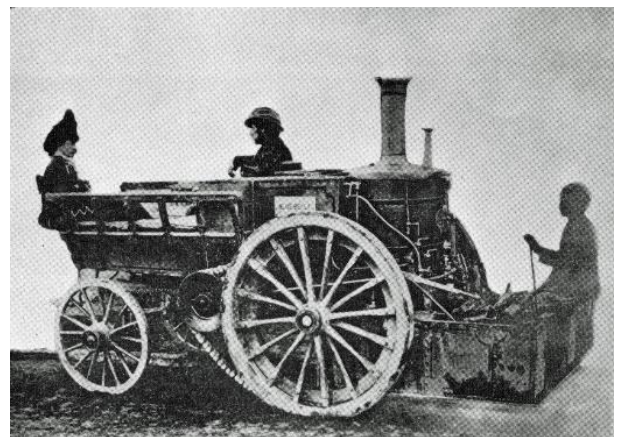
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Crompton was born into a well-connected wealthy family living on one of the families three estates at Sion Hill, near Thirsk, Yorkshire in 1845, His father Joshua had been an MP in Derby and Ripon.

At the age of six he visited the London's Great Exhibition with his father and was particularly attracted by the exhibits in the Machinery Hall. His education at Sharow, near Ripon was interrupted in 1854 by the outbreak of the Crimean war. His father, who served in the West Yorkshire Militia, was ordered to Gibraltar taking his family with him. He apparently persuaded his parents to allow him to go to the Crimea at the end of the war aboard HMS Dragon (captained by his mother's cousin) - aged only eleven years.

On his return to England he studied at Harrow, dropping Latin and Greek for Science and Mathematics. He reportedly made a static electrical machine and enjoyed giving electric shocks to fellow students. From an early age he was interested in carrying out experimental engineering work in workshops on his father's estate. During his holidays at home he started building a steam driven road engine called Blue Belle (Fig. 1) and a fractional electric machine. After attending Harrow, he took a short apprenticeship at the Doncaster Works of the Great Northern Railway.

He went to Paris to learn French before possibly seeking a career in the Foreign Office. However, he took an army examination and was commissioned into the Rifle Brigade in 1864 spending some years in India. The Indian Army used bullock drawn carts for transport and Crompton was interested in using steam traction engines. He had "Blue Belle" tools and equipment sent from England and trained local workers to help build steam-engines in India.

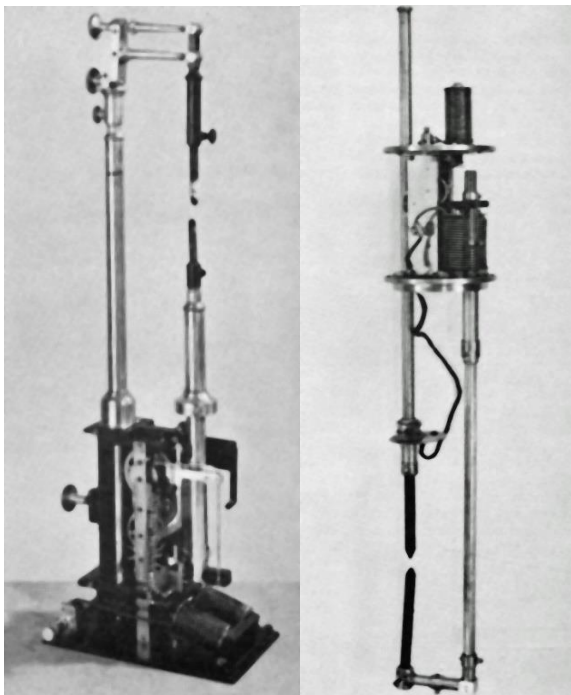


**Fig. 1 Crompton's Blue Belle**

In 1871, he took time out to return to England to marry Elizabeth Clarke the daughter of his friend George Clarke who lived on Crompton's West Tanfield estate near Ripon and had been a great help to him in his younger years. He returned to India with his wife in 1872 to continue his military service. Crompton undertook several Indian Government projects

returning home in 1875. During his periods in India he suffered from Malaria.

Crompton's relatives owned the Stanton Ironworks in Derbyshire and he became a director in the business in 1878. He was keen to promote the economic advantages of standardisation in manufacture by developing new processes in mechanised foundry operations for casting iron pipes. To be economic it needed to be in use day and night, so he took up an interest in electric lighting. At that time there were no United Kingdom manufacturers of electrical lighting equipment, so he set up a business importing dynamos and lamps from Gramme in France, initially for use at Stanton. Crompton was dissatisfied with the French made lamps he was importing so went on to design and patent his own based on the Serrin arc lamp (Fig.2) using Dennis to manufacture his improved design. He moved to Ipswich and went into partnership with T H P Dennis Company of the Anchor Ironworks at Chelmsford.



**Fig.2 Serrin arc lamp and Crompton's improved design**

He took on A P Lundberg, a Swedish engineer, to become foreman of the electrical apparatus workshops and so successful was the project

that he took over the whole of the Dennis Ironworks. As business expanded, he dissolved his partnership with the Dennis Company and created his own company, RE Crompton & Co. Ltd, and took over their premises for the manufacture of electrical equipment – renaming the site, Arc Works. Production soon expanded over a number of years to include the development and manufacture of a wide range of lamps, ac and dc motors and generators, batteries, transformers, switchgear, test instruments and a wide range of domestic and commercial appliances. .

As a diversion from his electrical projects Crompton decided to develop his interest in steam driven road transport, and in the same year he presented a paper on his experience of the 'Reform of Transport in India' to the Institute of Mechanical Engineers in Glasgow.

Crompton met Swiss electrical engineer Emil Burgin on a visit to Basle in 1880 and together they developed a new type of generator that would be manufactured at Chelmsford. Over 400 Crompton Burgin units were made adding to the success of the Crompton Arc Lighting Company.

Based on his experience, Crompton wrote his first electrical booklet 'The Industrial Uses of Electrical Lights' – a practical treatise on the construction and maintenance of the Crompton arc lamp and dynamo.

Called the Guvnor by his staff, he introduced the forerunner of an apprenticeship scheme being a five-year pupillage course; one such apprentice was Frank Christy, who later formed his own company, Christy Brothers & Co Ltd, also based in Chelmsford. He was always interested in his workers welfare providing a factory canteen, wash houses and a social/recreational centre.

Crompton was invited by J W Swan to visit him in Newcastle to see his work on incandescent lamps. Crompton, being impressed by Swan's lamp over his arc lamp, became a director of Swan United Electric Light Company the

maker of Swan lamps. RE Crompton & Co Ltd manufactured light fittings and generators to supply to them.

There was little in the way of textbooks on electrical matters and no standards in terminology. The design of products was very much trial and error. The aim in production was to standardise manufacturing which led to minimum cost for maximum output using these new methods. Crompton was keen on improving efficiency of production and operation, with many of the tools required being designed 'in-house'. Pioneers like Crompton also had to design their own electrical measurement instruments (Fig.3).



**Fig.3 Crompton Potentiometer (c1940) ex Barnstaple Corporation Electricity Department and SWEB Meter Test Station Newton Abbot**

1881 was a busy time with the new firm bringing in many orders. The largest of which was from Berechurch Hall Colchester – possibly one of the first house and premises to be lit throughout by electricity. Many important lighting projects followed including Alexandra Palace, Windsor Castle, Holyrood Palace, Kings Cross Station and many other stations and goods yards. Crompton experimented with the effects of arc lighting on vegetation and flowers at Alexandra Palace. Sebastian de Ferranti, at that time a student, took great interest in Crompton's research whilst he was developing his own alternating system.

Crompton was made a member of the Society of Telegraph Engineers and sat on a committee to report on 'Rules to be Recommended for Prevention of Fire Risks arising from the use of Electric Light'. This society was to be a fore runner of the Institution of Electrical Engineers (IEE) whose Wiring Rules and Regulations

were suggested in 1889 by Crompton together with H Dowsing and others. Crompton and Dowsing designed and patented a socket with a sprung safety shield over the contacts.

He was elected as a member of IEE in 1881. His first paper published in the IEE Journal was entitled 'Artificial lighting in relation to health'. This highlighted the danger to eyesight due to glare when using clear glass lanterns and lamps if placed in direct line of vision. His presentation at the International Health Exhibition in 1884 was based on this paper.

The International Exposition of Electrical Lighting was held in Paris in 1881 and was attended by Crompton. Crompton provided a wide range of their equipment for which he was awarded a gold medal. He was subsequently renowned for standardising electrical terminology by introducing ampere for current, voltage for electro force, ohm for resistance and watt for energy etc.

Crompton carried out many lighting installations in 1882, notable examples being The Mansion House and Law Courts in London, Kings Theatre and Opera House in Vienna and in Moscow for the inauguration of Tsar Alexandra III. Other installations from important well-known public figures included such as Lord Randolph Churchill.

Crompton met in his travels with P E Willan's, the inventor of a high-speed steam engine. They became friends and together worked on the design of water wheels for private housing pumping plants.

Crompton was keen to promote electric heating and cooking for domestic and commercial use. Electric cooking, with his assistance, was demonstrated in 1885 at a banquet held by The City of London Electric Lighting Company using Crompton equipment. In the same year he became President of the Institute of Electrical Engineers (being re-elected in 1908) and presented a paper on the advantages of electric heating.

In 1886 Crompton bought a large house 'Thriplands' adjoining Kensington Court Station and used two floors as a laboratory for improvements to Breguet electrical measurement instruments. He designed many other innovative devices himself and in conjunction with Prof. J A Fleming, who later became Sir Ambrose Fleming.

His company made the first electric toaster (the Eclipse) designed by Alan McMaster in 1893 together with some of the first cookers. Crompton developed many appliances and applications for electrification such as ceiling fans for warmer climates and specialised items such as electric furnaces. In 1894 H Dowsing and E J Fox designed a range of electrical appliances for Compton & Company to manufacture (Fig. 4).



**Fig. 4 Appliances from Crompton catalogue (c1900)**

In the late 1880's in America, Thomas Edison and Nikola Tesla were engaged in the 'War of the Currents or Systems', Edison had promoted direct current (DC) whereas Tesla believed alternating current (AC) was the ultimate solution for distributing electricity over long distances. In England, Crompton like Edison favoured DC for generation and distribution whereas Sebastian de Ferranti promoted AC and had patented his design of alternator in 1882 when he was just 17.

In 1887 as Chairman of Kensington and Knightsbridge Electric Light Company (one of the pioneer electricity supply companies), Crompton succeeded in building a successful central generating station and distribution network which supplied a whole district on a large scale. He used his underground mains system of bare copper conductors supported on glass in conduits below the pavement being accessed by removable covers. Crompton's were the first manufacturer of generating plant in this country at that time

Ferranti meantime was involved in the formation of The London Electric Supply Corporation as their Chief Engineer (aged 21) and the building of Deptford Generating Station using a 10kV generation and distribution system using a unique design of cable. Edison visited Deptford in 1889 remaining critical of its scale and use of 10kV as dangerous. Crompton remained extremely critical of AC systems and especially high voltage. The Board of Trade Commission's electrical specialist, Major Marindin was also not enthusiastic. However, construction took place between 1885 -1890 and commissioned in 1891. Whilst Crompton and Ferranti continued to strongly argue their case for DC versus AC, they remained friends. Frequently their arguments, known as the Battle of the Currents, often confused electrical consulting engineers by whom they were both highly respected.

Under Compton's leadership his company carried out work worldwide mainly in former British Empire countries including involvement in India's first Electricity Act and in 1899 supplying electrical plant for the first generating station in Calcutta.

The IEE became sponsor of the Corps of Electrical Engineers (Royal Engineers) Volunteers providing instructional plant and instruments to the Corps. In March 1900 Major Crompton (later Lieu. Col) was chosen, together with seven officers and 48 men, to sail to partake in the Boer War in South Africa and

to take charge of the Corps of EE (RE) Volunteers. He developed searchlights using his design of arc lamps using dynamos mounted on small compound steam traction engines. He was involved in activities in Bloemfontein and Pretoria whilst there. Crompton had some years earlier designed a complete electricity supply plant and network in Pretoria. He was ordered back to London in the October to use his experiences in South Africa in developing traction engines for military purposes.

By 1904 Crompton was invited by J K Gray, the president of IEE, to accompany him to represent Britain at the Great International Exposition in St Louis USA. He presented a paper on standardisation that was well received. He was invited to investigate the forming of a permanent International Electrotechnical Commission (IEC).

Reform of road transport held appeal to Crompton throughout his life – he was a keen cyclist and trialed many innovations on cycles. He was the owner of a 6hp White steam car and became the First President of the Institute of Automobile Engineers in 1906 and a Hon Member in 1924. He was appointed to the Road Board (the forerunner of the Ministry of Transport) and was a founder member of the RAC. In 1915 he was appointed a member of the committee set up by Mr Churchill to devise mechanically propelled vehicles for the military. Of particular interest were vehicles for crossing trenches, the fore runner of the modern tank. Another of his interests was encouraging the National Physics Laboratory to research wear caused by different types of road surfaces

Crompton was keen on standardisation, particularly in common terminology to describe electric phenomena. Several different schemes were in operation for each electrical distribution network, running at different voltages and interoperability of equipment, creating a huge problem.

The Electrical Association for Women (EAW) was founded in 1924 from the Women's Engineering Society and was based three years

later, with the assistance of Col Crompton, in the offices of Kensington and Knightsbridge Electric Lighting Company. He had wished to develop the domestic use of electricity and EAW was an ideal platform to promote the forming of branches in the UK and overseas.

1926 saw Crompton's role in the development of the electrical industry which led to him being awarded the IEE's Faraday Medal – two years later work started on what was to become the National Grid.

In 1927, Crompton and Co. Ltd. Chelmsford, and F & A Parkinson's Ltd., of Guiseley, (a village at one time belonging to the Crompton family), merged. Crompton, although he had not run the company since 1912, was invited by Frank Parkinson to be the Chairman of the new company.



**Fig. 5 Crompton Parkinson low voltage 'KLAD' circuit breaker**

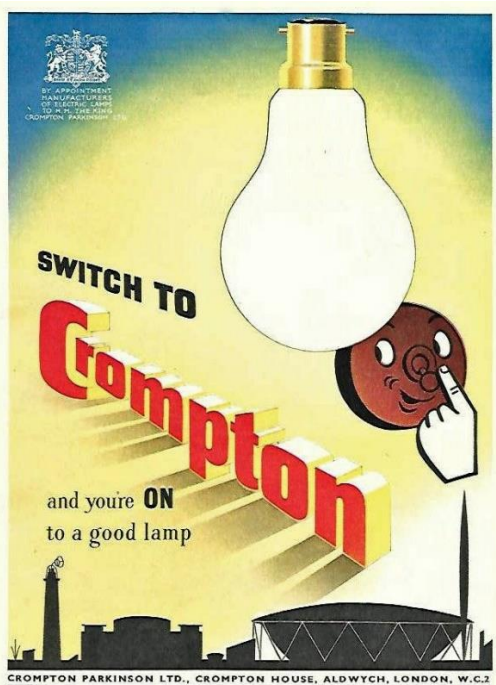
The game of squash can be added to all his other interests. He also became involved in measuring and devising means of comparing the bounce of various balls in circulation. In 1939 he left London to move to his Azerley estate near Ripon in Yorkshire and died the following year at the age of 94.

Several of the Crompton and Clarke family members are buried at St Nicholas Church, West Tanfield, North Yorkshire.



**Fig. 6 Col Crompton, CB., FRS., MICE., MIEE**

After many takeovers, mergers and de-mergers, the name Crompton is still to be found on electrical products today albeit many by companies in overseas ownership.



**Fig. 7. Crompton lamp advertisement**

**Acknowledgments:**

*All the books below are in the WPEHS Archives at Cairns Road*

*Colonel Crompton and the Evolution of the Electrical Industry by J H Johnson and WL Randell (for British Council by Longmans, Green and Company - Revised Edition 1948*

*References and Photo: Fig. 6.*

*The Journal of The Association of The Old Cromptonians - September 1929*

**References**

*REB Crompton Pioneer Electrical Engineer by Brian Bowers, Science Museum, H M Stationery Office – 1969*

*References and Photos: Fig.1, Fig.2 & Fig.4*

*Garke's Manuals*

***All the below items are in the WPEHS Archives at Cairns Road***

*Photos. Fig.3, Fig.5 and Fig.7*

***Other references (internet):***

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