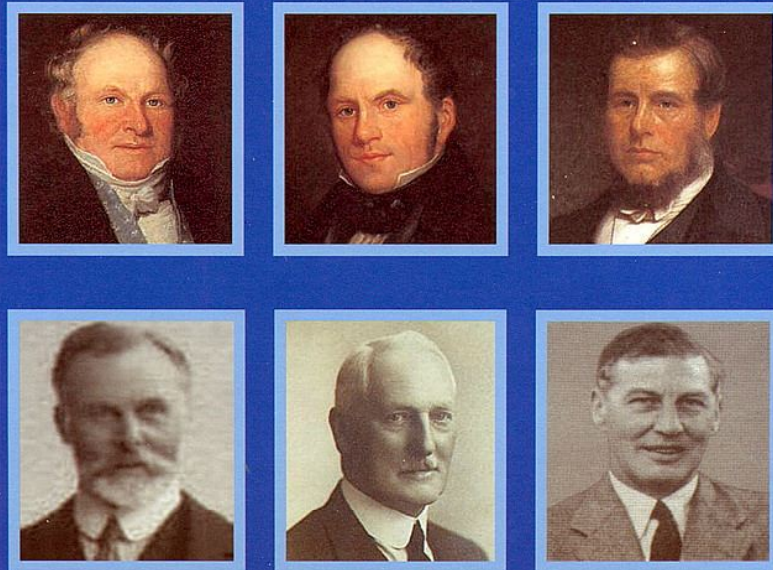


The COMFORT INSTALLERS

Pages 103-110



Hadens *of* *Trowbridge*

The family and the firm 1816-2004

The COMFORT INSTALLERS

When the weather was very inclement, the most robust of my parishioners complained to me of their inability to endure the cold of the Church. We got erected a ventilating stove by Mr. George Haden: the consequence is that our Church is about as warm as any sitting room...from about 52° to 57°...

Reverend Peter Balfour of Clackmannan, testimonial dated 4 February 1840.
Haden 150 Years, The Early Years, p. 13.



Charles SYLVESTER [221]

The KAISER- I-HIND
 INDIAN TRADE & INDUSTRY
 SUPPLEMENT

No. 3097

BOMBAY, 18TH MAY, 1941.

Vol. LX

**FORTY YEARS OF AIR CONDITIONING PROGRESS
 INDIA FINDS NEW BENEFITS**

TREMENDOUS AID TO INDUSTRIAL PRODUCTION

IN 1915 the Carrier Corporation was established, with Willis H. Carrier as its head. He had looked into the future and had seen air conditioning as a major

industry.....a vital function in the scheme of thingsinfluencing life, business, and industry.....
 (Continued on page 7)

CARRIER AIR-CONDITIONING

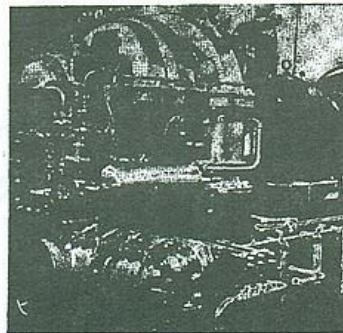
**THE KEY TO BIGGER
 PRODUCTION AND BETTER
 LIVING IN INDIA**

Typical CARRIER Installations

- A. I. R., Bombay, Calcutta, Delhi, Madras.
- GRAMOPHONE CO., Dum Dum.
- TOBACCO MANUFACTURERS, Bombay, Chnala.
- H. E. & FUSE FACTORIES, Kirkee.
- GANESH FLOUR MILLS, Cawnpore, Delhi, Lyallpur.
- H. J. FOSTER & CO., Bombay.
- TATA SONS, Bombay, Calcutta, Jamshedpur.
- COUNCIL CHAMBERS, Bombay, Calcutta, Delhi.
- AIR FORCES INDIA, Lahore, Ambala, Peshawar.
- L. W. HOSPITALS, Lahore, Jaipur.
- KODAK LTD., Bombay, Lahore, Madras.
- FILM STUDIOS, Bombay, Poona, Madras.

and

MORE THAN 100 COTTON MILLS



Carrier Centrifugal Compressor as installed in Metro Cinema, Bombay.

CARRIER AIR-CONDITIONING
 HAS BEEN INSTALLED IN OVER 500 OFFICES
 AND HOMES IN BOMBAY AND CALCUTTA
 ALONE

BY
Volkart Brothers
 Bombay, Calcutta, Madras, Karachi, Lahore



32. Advertisement: Carrier Air Conditioning by Volkart Brothers, Bombay.
 The Kaiser I-Hind newspaper, 18 May 1941.
 (CIBSE Heritage Group Collection)

**[221] Charles SYLVESTER****1774-1828**

Sheffield "chymist" and mechanical engineer. It is said his inventive mind and industry led directly to the founding of contractors Rosser & Russell. He obtained a patent related to metal galvanizing (BP 2842: 1805). Later worked for William Strutt [22] at his Derby Foundry, who "certainly recognized his value as an engineer, for he soon had him working on the development and installation of ventilating systems" and on a heating scheme for Derby Infirmary. Wrote a treatise, *The Philosophy of Domestic Economy as Exemplified in the Mode of Warming, Ventilating, Washing, Drying and Cooking* (1819). Continued work as a heating engineer until his death, leaving his business to his son, John [222].

86, Rosser and Russell, pp. 4-5. 96, HVCA, photo of bust by Francis Chantrey, inside front cover (Derby Museum and Art Gallery).

[222] John SYLVESTER**1798-1852**

Heating engineer. Developed the business left to him by his father, Charles [221]. Obtained patents related to improvements to the Derby hot-air stove (BP 6273: 1832) and to pressurization of hot fluid heating systems (BP 9986: 1843). Proceedings of the Institution of Civil Engineers recorded his assistance to Captains Parry and Ross, in their explorations to discover the North-West Passage and ascribed "the health of the crews in great degree to the excellence (of scientifically planned heating, cooking, and ventilation...) John Sylvester devised."

86, Rosser and Russell, p. 6.

**[223] George HADEN****1788-1856**

Son of George Haden, Sr., who worked for, and was held in high regard by, James Watt [13]. Apprenticed to the firm of Boulton & Watt. Trained on the steam engine side of the business. With his brother James [228], established G. & J. Haden in Trowbridge (1816) as an agent of Boulton & Watt to erect steam engines for West Country cloth mills. George was regarded as somewhat pious but the more dynamic of the two brothers and probably the better business manager. A natural extension of their work was the installation of the associated steam piping systems and this may have awakened the brothers' interest in heating. The real impetus came from the warm air ventilating stove, which was developed and patented by George (BP 9259: 1842). He also became involved in providing boiler plant and heating for the huge growth in institutional buildings, particularly lunatic asylums and prisons. Haden worked with Jebb [204] on the heating and ventilating of Pentonville Prison. The success of the firm was also due to the installation of their patent stove in many hundreds of churches built in the mid-19th century. James Haden retired in 1855, the company becoming G.N. Haden & Son and continuing under the direction of George's son, George Nelson Haden (died 1892).

85, Haden Archive. See also Haden, A Short History of the Company 1816-1991, with portrait from p. 1.

[224] Angier Marsh PERKINS**born 1799**

Born in Massachusetts, son of Jacob Perkins [77]. Went to England as a boy. Later became interested in heating. Worked on high-pressure hot water heating systems utilizing small diameter piping, developed by the firm of John Russell & Son of Staffordshire (1825). He devised the Perkins' system (BP 6146: 1831) using 25 mm tube with 6 mm wall thickness with a furnace apparatus designed to maintain water temperatures at about 350°F, though this sometimes reached a dangerous 550°F. The system initially proved popular in England (1830-1840), being used at the British Museum, the Royal Society of Arts, and Stratfield Saye House (for the Duke of Wellington). It was also used by Soane [189] in his museum and described by Soane's assistant, Richardson [35] in his *Treatise on Warming* (1839).

98. Billington and Roberts, pp. 115-119.

[225] Samuel Egan ROSSER**1821-1877**

Heating engineer. Worked for John Sylvester [222]. Continued the business after Sylvester's death. Company later restyled as "S.E. Rosser, engineer and heating apparatus manufacturer" (c. 1856). Expanded the firm's work to include hydraulic and mechanical lifts and the design of heating for conservatories and glasshouses. Took out a patent for improvements in the ventilation of pressing irons heated by gas (BP 359: 1865). Later, took into partnership Joseph Russell [233] to establish the firm of Rosser & Russell (1866).

86. Rosser and Russell, pp. 6-7.

[226] Wallace C. ANDREWS**c. 1833-1889**

American businessman. The Common Council of New York City granted a franchise to Francis B. Spinola to lay pipes under the streets of Manhattan and form a company to supply hot air or steam (1878). Andrews bought the franchise and formed the Steam Heating & Power Co. of New York (1879). He then bought a controlling interest in a rival. The companies merged to form the New York Steam Co. (1881) and "dug its first pipelines under the direction of its chief engineer Charles Edward Emery." The first customer to be connected was the United Bank Building, 88-92 Broadway (1882). District steam heating quickly became popular. The NYS Co. soon had 62 customers (end of 1882) and within a few years (1886), this increased to 350 customers with 8 km of mains.

Fifty Years of New York Steam Service, *New York Steam Corporation, 1932*. 111. Jackson, pp. 1119-1120.

[227] Jean Baptiste BLONDEL**active 1788**

French engineer. Provided the first central hot water supply installation (1788).

From 106. Usemann.

**[228] James HADEN****born 1790**

Brother of George [223]. Served a general apprenticeship with Boulton & Watt. Co-founder of G. & J. Haden at Trowbridge (1816). A bachelor and said to be an extremely hard worker, James traveled the country for some 20 years, meeting prospective clients, providing estimates for warm air stoves, and frequently supervising their installation. A five-day itinerary (1826), said to have been typical, covered Trowbridge, Birmingham, Manchester, Blackburn, Preston, Carlisle, and Edinburgh—often travelling by coach through the night. He began by working for the landed gentry and had an impressive list of titled customers. For George IV, he provided a warm air stove for the Royal apartments at Windsor (1826), and when apologizing to other customers for delays took delight in writing, “But I have been much occupied fixing stoves for His Majesty

at Windsor.” These efforts laid the foundation of the heating business, which upon his retirement (1855) became G.N. Haden & Son.

85. *Haden Archive. See also Haden: 150 Years, 1966, Chap. 1 Portrait from Haden: A Short History of the Company 1816-1991, p. 1.*

[229] Benjamin BIRAM**active 1819**

German engineer. Established the first heating firm in Berlin (1819).

From **106.** *Usemann.*

**[230] Johann Jakob SULZER****1806-1883****[231] Salomon SULZER****1809-1869**

Swiss brothers. With their father's assistance, opened a new iron foundry at Winterthur (1834). The company was Sulzer Brothers. Attention turned to the manufacturing of equipment and they produced their first wrought-iron steam boiler (1841). Later, the Cornish type boiler was manufactured (1860s), the inclined multitubular boiler (Grand Prix, Paris, 1878), and then water-tube boilers (by 1900). Over the years, the company has developed into a manufacturer of heavy machinery, which includes internal combustion engines, compressors, turbines, pumps, process, and textile plant. Now an industrial giant and active around the world, its comfort engineering activities embrace boiler plant, refrigerating machinery, the installation of heating, ventilating, and air conditioning, and district heating.

87. *Sulzer. Portraits from p. 40.*

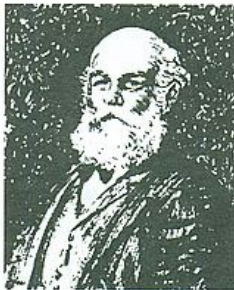


**[232] Frank ASHWELL****1855-1896**

Upon completing an engineering apprenticeship, opened a small mill-wrighting workshop in Leicester (1879). Set up a heating department (1884) run by Nesbit [268]. Took up agencies for various heating and ventilating products, including the "Lancaster" steam trap and the "Korting" stove. Specialized in the heating and ventilating of local schools. Purchased the local "Victoria Foundry" (1887), turning out wrought and cast-iron goods, including gas and coal fire ranges. Continued to develop the school heating business with the introduction of his "Propulsion, Impulsion or Plenum System," which typically used a 5 ft diameter Blackman fan, driven by a 5 hp gas engine, and using heater batteries supplied with steam from Cornish boilers. The plenum system was often supplemented by his "Patent Ventilating Solar Radiator." The

success of the business led Ashwell to take Nesbit into partnership (1892) to form Ashwell & Nesbit. The same year he took over the consultancy practice of Phipson [203]. The business continued to expand and carried out considerable institutional work including "no fewer than 15 lunatic asylums" (1893-1896), but in the middle of this success, Ashwell died unexpectedly from a brain tumor.

83. *Ashwell and Nesbit. Portrait facing p. 60.*

**[233] Joseph RUSSELL****1866-1927**

Marine engineer. Went into partnership with Rosser [225]. Guided the company of Rosser & Russell to become a major heating and ventilation contractor. Legend has it the RR initials stood for the Rolls-Royce of the heating industry. Russell was a versatile engineer and patented a number of heating improvements, including one relating to boilers (BP 2771: 1870). A Silver Medal award at the Paris Exposition (1878) details the company's exhibit as containing "A fire and steam stove, a hot water stove, an air-warmer for churches and other buildings, steam cooking pans for institutions, a hydraulic lift, and a reversible (back-to-back) grate." Later, following Royal recognition, the firm was able to style

itself, "Horticultural Builders and Warming Engineers by Appointment to Her Majesty the Queen" (1884).

86. *Rosser and Russell, pp. 7-13 with portrait from p. 9.*

[234] P. REGNAULT**active 1865**

Devised a central warm air heating system "with requirements for hygiene" (1865).

From 106. *Usemann.*

**[235] Birdsill HOLLY****active 1876**

American hydraulic engineer and inventor. Took an interest in the possibilities of district heating and began experiments (1876-1877). Earlier pioneers of "group schemes" include Benjamin Franklin [8], who heated a row of houses from an iron stove-furnace (1748), Loddidge, who steam heated his Hackney nursery with "over half a mile of 4-inch cast-iron pipes (c. 1818), and Paxton [192] at the Sydenham Crystal Palace (1853). Schemes had also been suggested (c. 1834) by Brunel [59] and Wilhelm Siemens for the city of Birmingham (1863). Holly, at Lockport, N.Y., "built a boiler in the cellar of his home. He buried 160 m of 25-mm pipe and successfully furnished (steam) heat to his own and nearby homes. He followed this up with an extension of 160 m of 37-mm pipe to a neighbor's home. This also being a success, Mr. Holly decided to start a heating utility in Lockport. For this, he used a boiler 2 m in diameter and 3 m high, serving a total of 750 m of 50-mm and 100-mm pipeline laid in bored-out wooden water pipe for insulation. Steam service began in October 1877, when 14 customers were connected to the boiler, operated at 300 kPa." To improve performance, Holly invented a steam trap, an expansion joint, a pressure regulator, and a condensate meter. The pioneering work of Holly was reported by Captain Galton* [171], who saw benefits in reducing atmospheric pollution. District steam heating was introduced in New York (1879), largely through the efforts of Andrews [226].

*98, Billington and Roberts, p. 123. Portrait from Fifty Years of New York Steam Service, New York Steam Corporation, 1932, p. 13. *The Combination System of Steam Heating for Towns and Villages, D.S. Galton, J. Society Arts, 9 December 1881.*

**[236] Bernard Mervyn DRAKE****1858-1931**

Electrical engineer. Pupil of Sir Joseph Whitworth. Worked for Brush Electrical Co. in Madrid and provided the first electrical installation in that city. At 24, he was Managing Director of both the Midland and Great Western Brush Companies. Later Managing Director of Electrical Power Storage Co. (1884), where he met John Gorham [237] and went on to set up the business of Drake & Gorham (1886). Their objective "was to bring the electric light to the stately homes of England." Their finest example was Chatsworth (1893). However, perhaps more significant is the installation of steam-driven dynamos at the Prudential Offices in High Holborn (1886) where Phipson [203] specified that exhaust steam should be utilized for space heating, a very early example of combined heat and power. Drake & Gorham was also later involved in the CHP installation at the rebuilt Bank of England (1926), based on the designs of Kell [219]. Drake & Gorham later (1964) merged with the Bristol plumbing firm of Arthur Scull (founded 1881) to become a major M&E contractor (Drake & Scull).

84, pp. 2-15 with portrait from p. 3.



[237] John Marshall GORHAM

active 1886

Electrical engineer. Worked for King of Roumania. Then Works Manager for Electrical Power Storage Co., where he met Bernard Drake [236] and they lectured to the Royal Society on the rapid failure of accumulator plates. Jointly established the electrical firm of Drake & Gorham (1886), which installed a very early combined heat and power plant at the Prudential Offices in High Holborn (1886) (see [236]).

84, *Drake and Gorham, p. 2 with portrait from p. 3.*