LOOKING BACK ON 80 YEARS OF BUILDING SERVICES ENGINEERING

AS VIEWED BY CIBSE IN THEIR 1977 COMMEMORATIVE JOURNAL ISSUE

CIBSE HERITAGE GROUP
Eighty years of Building Services

In the eighty years history of the Institution of Heating and Ventilating Engineers there have been enormous changes in the technology of the subject, in the design and installation of systems, and the increase in size and variety of manufactured products.

Eighty years ago when the Institution was founded a number of well known present day firms—contractors and manufacturers—were in their infancy; others had been established for years. While the great majority of the firms we know today (especially air conditioning firms) had not yet been established, it is these older firms that have been in existence during most of the life of the Institution, that can be called the backbone of the industry. Some of these firms (a very few nowadays) have continued under the same name and same family proprietorship. Others have retained the original name but have lost all family connection with the founders, and there are still others that have lost name and family origin but have retained a continuity which is still noticeable today.

It is a selection of these firms that we are featuring in the following pages as a record of the development of the industry from heating and ventilating to building services—from IHVE to CIBS.

Acknowledgement

We express gratitude to all the firms who have generously provided information, documents and especially old photographs from their company records. We are also grateful to many individual members of the Institution who have given us personal assistance with this feature. Some of these personal contributions will be published later.

EARLY IHVE ASSOCIATIONS

It was in 1836 that John Jones set up a foundry in Enville Street, Stourbridge, and penny-faithing bicycles are known to have been one of his original products. Walter Jones joined his father in 1862 and his inventive brain was soon at work in the area of hot water heating. The Jones Improved Expansion Joint and his ‘Patent Pipe Cutter’ were two early products that established the company. In 1896 Jabez Attwood joined Walter Jones to form the new company Jones and Attwood Ltd. This partnership was for just over ten years, after which Jones continued on his own, although the name remains to this day.

The early catalogues produced by the company offered for sale a complete range of heating equipment from the pipe work through to the boilers, all designed and developed by Walter Jones.

In 1890 Jones issued his Heating by Hot Water, a most advanced and respected text book on hot water systems. This book was to become a standard reference book for many years.

The company expanded rapidly and it became clear that a larger area was necessary. The company moved to its present location in Old Wharf Road in 1894. This was an ideal site, for the canal next to it was in full use and the now vanished Stourbridge Railway Goods Station was fully operational.

Recognition of Walter Jones’ ability in the heating and ventilating industry was confirmed when he was appointed the second President of IHVE in 1889. His son E. Reginald Jones was President in 1930.

Limited liability was granted in 1910 and the company has remained a private company. Sales were mainly to the trade through the catalogue and by reputation. The design and installation of heating systems in large public and private buildings throughout the area was undertaken, a division of the company which has been expanding ever since.

J. S. Wright and Co. Ltd. commenced trading in 1890 in Moor Street, Birmingham now part of the new Queensway Ring Road, and then moved to Dale End, Birmingham, and 16 years ago they built a new office block and moved to a new addition to the office at Railway Row, Birmingham. In 1890 the bulk of the heating requirements were in 4 in. cast iron pipes and in Perkins high pressure systems mainly installed in public houses, and churches etc.

They have had two well known Managing Directors, the first being Mr. R. E. Otter who now lives in Australia and Mr. F. R. Colton, both of whom became President of HVCA. In the 1930’s the examinations for entrance to the IHVE were held in J. S. Wright’s offices in Dale End under the scrutiny of Mr. Otter. It is interesting to note that two present Directors hold the Five Counties award gained in consecutive years, 1961 and 1962.

From small beginnings, the company has progressed to executing major building services in places like Buckingham Palace and Houses of Parliament, Bagdad Military Hospital Benghazi major factory and offices complex including air conditioning and sprinkler installations etc.

THE HEART OF A HEATING SYSTEM

One of the most essential activities undertaken by the modern day building services engineer relates to environmental heating and steam services, and
it is interesting to note the developments which have taken place in this industry over the past 150 years. The obvious pre-requisite of any plant heating or steam process system requires a heating source, which invariably means a boiler. The development of company and products associated with the ‘boiler-business’ over the years makes quite interesting reading. Take for example Thompson Cochran Boilers in Glasgow: it is necessary to go back to 1825 to discover the embryo idea which has resulted in the modern day European specialist in packaged fire-tube boilers. 1825 saw the setting up of business by William Wilson in Glasgow for the purpose of manufacturing low-pressure egg ended and haystack boilers. Business moved successfully and rapidly, forcing expansion, and by 1875 the Company had doubled its size.

The growth continued and by the early 1900’s it became necessary to find a larger site and erect a new factory in the East end of Glasgow. This move was completed in 1908.

In 1923 the Company changed its name to Wilson Boilmakers Ltd and in 1934 was taken over by the John Thompson Group of companies, who at that time operated one of the largest shell boiler factories in the United Kingdom, in Wolverhampton. From then until 1958 both companies operated separately, manufacturing Lancashire and Economic type boilers. During this period the Glasgow based company again changed its name to John Thompson (Wilson Boilers) Ltd. During 1958 John Thompson (Wilson Boilers) Ltd., introduced the first all British ‘packaged’ shell type boiler giving it the brand name ‘Multipac’. Within three years business had more than quadrupled, to the detriment of the conventional shell boiler, and the Company’s main boiler interest was centralised in Glasgow.

In February 1969 John Thompson took over Cochranes of Ayr and the boiler division of Ruston and Hornsby, Lincoln, to become the largest shell boilermaker in Europe.

A selection of photographs taken in the thirties before modernisation, showing heating and ventilating equipment going back nearly a hundred years.

Original MoW prints supplied by courtesy of PSA. (Crown Copyright Photographs.)

Left. Original heating pipes in main reading room at the British Museum
Then & Now

The amalgamation of Clarke Chapman and John Thompson in 1970 caused a restructure of the new company, which in turn affected trading references. Thus the Thompson Cochran Division of Clarke Chapman Ltd was formed.

Since 1971 the Thompson Cochran’s marketing policy has forced further expansion: this being manifest by the move to a much larger 16 acre factory complex during 1978 and the establishment of marketing companies in France and Germany.

From the low-pressure externally fired egg-ended and haystack boilers to the modern fully automatic package boilers is a great step forward, this has been possible only by the installation of up-to-date plant and machinery also the utilisation of the latest construction techniques. The success of this combination has enabled Thompson Cochran to continue its successful production of shell boilers.

White Horse

In 1867, Colonel Edward Hartley and Mr. Zacharias Sugden, took over a Halifax business which was to become one of Britain’s leading manufacturers of commercial and small industrial boilers. A strange combination, the Colonel was a colourful local figure who rode to the office on a white horse, while Sugden was a lesser known character of humber origin.

The original boilers were made of wrought iron plate fabricated by a process known as fire-welding. It was a hard and unhealthy work and the life expectancy of boilermen was poor, but soon after Messrs. Hartley and Sugden took over, cast iron boilers were added to the company’s products and a foundry was opened in Albert Road. Castings were delivered by horse and cart to the Atlas and Premier works three quarters of a mile away. As the business grew the company expanded, taking over a Primitive Methodist Chapel and part of the Halifax cattle market and fairground which is the site of the present foundry.

Hartley and Sugden have had three changes of ownership since then. In 1959 they were taken over by the Francis Industries Group. In 1973 Midland Aluminium acquired them in order to complement their domestic boiler company, Glow-worm. Finally, in 1975 Midland Aluminium joined T.I. Domestic Appliances Ltd.

Major changes in the 1960’s meant that the boileymakers now did everything except install the boiler. New designs in both cast iron and steel boilers were introduced and Hartley and Sugden developed their best selling boiler the SCP fired by oil or gas. This simple design soon changed the emphasis from hand-made boilers to batch production. The present company, led by a Managing Director who started as an office boy in 1916, now produce boilers fired by gas, oil and steam. They are still expanding into other areas— atmospheric boilers; closer links with foreign manufacturers; and the possibility of extending their operation idea to include installation.

Hartley and Sugden have provided two HYE Presidents: Mr. J.E. Hartley (son of the founder), in 1913, and Mr. Sam Fox in 1931.

Binns and Speight

Another name, again almost contemporaneous with the Institution is Binns & Speight Ltd., which was founded in 1898 to operate as boiler makers, coppermiths and ironfounders. Wrought iron and steel boilers were produced along with copper boilers and cylinders with small cast iron boilers and rainwater goods in the foundry. This continued with quite advanced techniques in the welding of boilers, firstly by welding on open fires where the seams were hammered and fused together, and later by oxy-acetylene and as early as 1916 by electric arc.

During the World War I some boiler production continued, and equipment for Field Hospitals and kitchens was a big part, the main however was the making of shell tubes and towards the end of the period anti-aircraft shells. In 1922 the first welded steel sectional boilers were produced and copper lined domestic boilers were widely used and produced before the advent of the indirect cylinder or calorifier.

There was then the slump period, and general strike, which lasted until the early 1930’s and in 1933 the production of underfed automatic coal stokers was started, which was very successful. This continued up to 1940 when, apart from work on boilers for RAF stations and again steam jacketed pans etc., for kitchens and steam boilers for emergency hospitals, the main output was the production of 4000 lb. and steel blast bombs and this continued until the end of the Japanese War.

The Binns & Speight Coronation boiler

They reverted to their normal trade and now make steel sectional boilers and calorifiers and supply cast-iron sectional boilers, the copper and iron foundry being discontinued. The business is in charge of the third generation of the Binns family.

Beeston

Another well known name in boilers is Beeston. The Beeston Boiler Co. (Successors) Ltd., has its origins in a firm of horticultural builders in Beeston, Nottingham. This firm began to produce the heating equipment for its greenhouses and conservatories in the second half of the 19th century. In 1892 a separate company, The Beeston Foundry Company, was formed and a new foundry opened specifically to manufacture cast iron heating equipment. Starting with one-piece boilers and hot water heating pipes, the company quickly expanded to include
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sectional boilers and radiators in its range of products. In 1923, the name was changed to The Beeston Boiler Company, by which time the range of heating products was appreciably expanded, including sectional boilers.

Development and expansion continued, interrupted only by World War II. In 1946, the first of the mechanised foundry units was installed, followed in 1952 by a specialised radiator production unit. During the two decades up to 1970, the product range was radically altered by the introduction of new designs, and by the development of existing ones, so that a more economic boiler could be produced. To match this product development, a new automatic moulding plant was installed for the production of large cast iron radiator sections. In January 1977, the company was acquired by Ley's Foundries & Engineering Ltd., and assumed its present title of The Beeston Boiler Company (Successors) Ltd. The new company will continue to manufacture the range of boilers which are the result of 75 years of continuous development in the cast iron boiler field.

Sir Louis F. Pearson of Beestons was IHVE President in 1903.

Robey of Lincoln

More than 120 years of experience lie behind the current success of the Robey Lincoln and Linthorpe boilers. In 1854 Robey produced their first steam engines and as steam raising requires boilers, so Robey started to develop their own technology. So successful were they, in fact, that they added boilers to their product range. Their early products were modelled on the Lancashire and Cornish boiler designs, but they introduced a two-pipe return tube Economic boiler as early as 1890 and gradually concentrated on the production of these models after World War I. Ironically, it was due to the multiplicity of work they had to undertake for the war effort in World War II that led them to gradually phase out their boiler manufacture so as to be able to concentrate on heavy engineering and use the machine tools purchased for the war effort.

About five years ago, however, Thompson-Cochran closed their old Ruston boiler works in Lincoln and a team from Ruston's suggested re-starting the production of boilers at their Canwick Road works. The directors agreed and the success story that followed is a matter of record. The company now produce the Lincoln and Linthorpe range of three-pass wet-back packaged boilers. Sixty-five per cent of the total factory output is now in the production of these packaged units, which have been installed in companies that are household names. The export market has not been neglected and the Robey reputation for reliability has been winning friends for the UK industry in dozens of different countries from Australia to Zaire.

Craddock

The Craddock Boiler Company have been making boilers since 1875. In the early years they were the main manufacturers of the renowned vertical cast-iron boiler which supplied steam to the world over. Craddock still manufacture a range of vertical multi-cylinder boilers and vertical multi-tubular boilers. These can be supplied packaged, or dismantled for installation on site. Their principal product is now the "Steamack" automatic oil and gas fired packaged boiler—one of the first all-British designed package boilers which entered the market in 1954. The packaged unit is complete; it only remains for the purchaser to supply and erect a suitable chimney, connect the steam main and usual services before setting to work.

W. G. Allen

The Allen Yarns Boiler Company provide yet another example of a modern firm which has a very long history. It is part of the W. G. Allen Group, the origins of which go back to 1850 when William George Allen, who was a working blacksmith, set up business in the out-house of a pub, the Rising Sun in Tipton, Staffs. Allen himself gave up his employment and became a self-employed manufacturer, his wife and children taking it in turn to work the bellows. The product surprisingly, was buckets for wells. As time went on other products were introduced and soon the Allen family made their first
The boilers are in service in many countries, supplying steam or hot water for brewing, papermaking, chemical, textile and rubber industries to name but a few of the hundreds of users.

In recent years the company has carried out some very heavy fabrication work for the offshore oil industry.

HADEN CARRIER
One close-linked association between a £15 million sports complex in the Arab Emirates, the most sophisticated of ocean liners, a massive Russian ferry factory, and a famous (or infamous) opera house in the Antipodes is Haden Carrier.

Haden Carrier, an international group with a 10,000 strong work force, constantly supplies a variety of services to projects as diverse as the Zayed Sports City at Abu Dhabi, the QEI2, the Kame-fury, ferry factory complex in the UK, and Sydney Opera House. So much for the present. What of the past?

The origins of the parent company go back to 1816 when two brothers, George and James Haden, provided West Country mills with motive power. This, in turn, led to extending heating principles and business accelerated from the moment George IV ordered a warm system for Windsor Castle. By the turn of the century stately homes, institutions and schools, followed by literally hundreds of church congregations, had been quick to appreciate the benefits of Haden heating.

In the 1920's Haden expanded overseas and soon gained a reputation for the design and installation of heating, ventilation, fire protection and air conditioning plant within every type of building.

In 1989 G. N. Haden & Sons amalgamated with electrical contractors Troughton & Young to form Haden Young and the following year were joined by Carrier Engineering to establish the Haden Carrier Group of companies.

Carrier Engineering brought a great deal of expertise to the 'family' concern, particularly in the area of air conditioning, and considerable metal finishing accen in the motor car industry. In fact, as early as 1921 the first of many Carrier Engineering air conditioning installations at Vauxhall car paint finishing from 36 hours to eight.

Other Carrier technological achievements have included Rotodip, a 400-ft machine in which car bodies are rotated through seven successive dip and spray applications, and its successor, Hydropin. With the inclusion of AID (Air Industrial Developments) (British) a complete range of industrial finishing equipment is available, from individual spray guns to highly sophisticated spray booths.

In 1974 Haden Carrier set up their UK Building Engineering Services Division, consisting of Haden Young and Carrier Air Conditioning. Other divisions in the group include Carrier Dryways, principally concerned with overseas metal finishing contracting; Carrier Engineering, who undertake numerous UK paint finishing applications and electrical installations; Carrier Ross Engineering, specialists in paper process work; and Dryways King Conveyors, unit handling systems.

For their part Haden International undertake a variety of projects on a worldwide basis, particularly in the Middle East, and, last but not least, product companies, Ferguson, Armacl, etc., supply, different types of heated and cooled ceilings, louvres and lighting fittings, and air conditioning refrigeration plant in the UK.


The Audacious Innovators
With the founding of Carrier Engineering Company came the introduction of scientific air conditioning to Europe in 1921. The name itself came from one of the four original directors, Dr. Willis Haviland Carrier, the American engineer acknowledged all over the world as “the father of air conditioning.” The founder was Stanley Lawrence Groom whose first experience of the heating and ventilating business was gained with the Sturtevant Company, Queen Victoria Street. In 1913 at 26 he left with a colleague named Sanderson to set up a subsidiary of Buffalo Forge in London, established to carry on hot blast heating, ventilation and drying plant. In that same year through Buffaloe, Groom had met Carrier and made what was to be a life long friendship. Moreover he returned full of enthusiasm for Willis Carrier’s work as he saw the potential of the new area of air conditioning in Britain. World War I delayed the formation of the London Company so that it was not until 17 March 1921 that the first Board Meeting took place, the four directors were Dr. Carrier, J. Irvine Lyle (Carrier’s friend and partner in Carrier Engineering Corporation of USA), Stanley L. Groom as Managing Director and Arthur William Sanderson as Secretary.

With the benefit of Carrier patents and apparatus the Company was able to concentrate on humidity control problems. The earliest installations were simple air washers such as the plant in the Newington Session House completed in 1921 and these when
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combined with refrigerating equipment formed the basis of the first complete Air Conditioning System. The Daily Mail plant commissioned in 1924 for air conditioning the Press Room was of particular interest as it was the first to use centrifugal refrigeration developed only three years before by Dr. Carrier.

Installations for the confectionery and printing industries had those early lists, followed closely by the requirements of the then rapidly emerging 'Super-Cinema' with a simple plant for Stratford Broadway in 1922 and a plant complete with the 4 in. Carrier centrifugal in UK installed in 1924 in the Carlton Theatre. By 1923 offices had been set up as far apart as Bournemouth and Paris. The control of humidity was the key to the improvement of many industrial processes.

In 1929 Carrier Continental was established in Paris and Carrier Ross in London. In 1935 Stanley Groom bought out the American-owned shares and in 1936 Carrier Engineering became a Public Company with a factory at Wembley. From that date, Carrier London developed independently of the American Carrier, the latter concentrating on manufacture to become world leader while the British gained widened renown in new applications of air conditioning and, in thermal engineering, under the Drysys name, to become a leader in its specialist field in the automobile industry. The friendly relationship, cemented by certain licence agreements, however, continues today to be maintained between the two Carriers.

CONTRACTORS OF VARIOUS KINDS

"Designed upon Roman lines, Astoria, London's supreme cinema, at the Oxford Street end of Charing Cross Road, is a noble example of Pompeian style at its best period. A generous five-storied frontage of white York stone contrasts Charing Cross Road, the main entrance being flanked by a range of shops. To the Renaissance

Danco Hall there is an equally imposing entrance. An exquisite scheme of interior decoration has been followed. The latest system of concealed lighting has been adopted, atmospheric lighting being one of the features. Every seat is of the new tub style, giving ample knee and elbow room. The stalls floor is built with a generous rake, and no column will interrupt the view. The same seating mode is seen in the circle, which is approached from a luxuriously appointed foyer, and in which saloon seats and light refreshments may be obtained. The heating and ventilating system ensures constant fresh air to every part, which will be cool in summer and warm in winter. The theatre accommodates 2000 persons, all with a clear vision of the screen."

This is from the London Evening Standard of 12.11.1927 and represents one of the more notable of the achievements of J. Jeffreys & Co. Ltd, who supplied the building services. This article states that the project was built and completely equipped in 8 months. One wonders if it would be possible to achieve the same programme of works today!

J. Jeffreys was established in 1881 and its first premises were at Baron's Place in the Waterloo Road, London. These premises were retained as workshops when the company moved into its new offices in St. George's House next door in 1928.

From St. Georges House, J. Jeffreys moved to their present address in Teddington in 1965 and were amalgamated with the Baillie Kilpatrick, BICC group in 1973, but the original name and a large number of long serving members of staff were retained. J. Jeffreys has provided four Presidents of the Institution: E. Herdman (1919-9), P. M. B. Grenville (1924), John W. Cooling (1932), and his son, J. Michael Cooling (1975).

Rosser and Russell

Another contracting firm which has its origins as far back as Hadens is Rosser and Russell Ltd. It began with Charles Sylvester who was born in 1774. In the early 1800s Sylvester took out a number of patents, one of which was concerned with 'galvanised metal'. It 1819 he produced a treatise The Philosophy of Domestic Economy as Exemplified in the Mode of Warning, Ventilating, Washing, Drying and Cooking. In 1826 Sylvester moved to London and he continued his work as a heating engineer and chemist. After his death in 1828, his son John carried on his business. With the death of John Sylvester in 1852, the operation of the business was taken over by Samuel Fegan Rosser who had previously been Sylvester's managing clerk. After 1856 the firm was known as S. F. Rosser, engineer and heating apparatus manufacturer.

Rosser took out a number of patents and extended the range of the firm to include hydraulic and mechanical lifts. More important in 1866 he took into partnership a young marine engineer called Joseph Russell and the firm Rosser and Russell was born. Joseph Russell lived to 1927, and his son Nelson, whom he had taken into partnership, became President of the Institution in 1902.

During its long history Rosser and Russell have been responsible for the services in a wide variety of installations but they have a special record for large public buildings such as the Bank of England, the Stock Exchange and, to jump many years, the headquarters of the National Westminster Bank with its 600 ft tower in the city of London. Apart from J. Nelson Russell, Rosser and Russell have provided two other Presidents of the Institution, R. Dunstan Wallace (1959) and Ian H. Duff (1968).

Crown House

Crown House Engineering was formed in 1975 by amalgamating four companies that had for some years been members of the Group known individually as Wheeler, Crittalls, Berry and Ross. Each Company had a long and successful history briefly described as follows:

- E. H. Wheeler & Co. Ltd., commenced trading as electrical engineers and contractors over 60 years ago from offices in Victoria Street SW1. In those days electricity was just beginning to come into general use for lighting and power. Over the years the firm grew in size and reputation and became one of the largest companies in the industry.
- They were responsible for some of the largest electrical installation contracts carried out in recent years including numerous power station projects, the Shell Centre and Spencer Steelworks for Richard Thomas & Baldwins Ltd.
- Richard Crittall & Co. Ltd., was founded in 1884 and during the early years contracts included churches and country houses. Subsequent development included new designs for radiators, heating buildings with embedded hot water pipes; complete engineering services for the Ritz Hotel London; air conditioning of the Haymarket Theatre and pioneering use of off-peak electricity for heating.
- R. G. Crittall was IHVE President in the difficult war years (1939-45) and in addition J. L. Mason (1971) and W. R. Cox (1977) were also with Crittalls.

Z. D. Berry & Sons Ltd. originated as a one-man business in 1810 with workshops in Regency St. London, W1. Some fifty years ago the company designed and manufactured heavy
kitchen equipment and patented heating systems for swimming pools, rapid water heating calorifiers and many other heating appliances. Over the years the company developed from a relatively small engineering business and became prominent in the heating and ventilating industry.

In October 1967 Richard Crittall and Co. Ltd. amalgamated with the former Richard Crittall & Z. D. Berry Ltd. and in April 1969 the joint company merged with F. H. Wheeler & Co. Ltd. to form Wheeler Crittall Berry Ltd. In January 1973 Wheeler Crittall Berry merged with Furse Electrical Installations to form the present company.

The first of the Furse companies, W. D. Furse & Co. Ltd. was founded in 1893 with headquarters in Burton Street, Nottingham, and moved to Traffic Street, Nottingham in 1899. In 1919 two associate electrical contracting companies W. J. Furse & Co. (Manchester) Ltd and W. J. Furse & Co. (London) Ltd were formed. Throughout their history, starting with many country house generating plants, the Furse companies have been engaged in projects at power stations, chemical process plants, steelworks, collieries, gas plants, universities, hotels, paper mills, tobacco factories and sports arenas and have worked for most principal commercial and industrial companies in the country.

**Gas Engines and Heating**

Queen Victoria had been crowned only seven years when in 1845 Mr. Henry Warner commenced trading in Ipswich as a whitsmith (a worker in tin goods) and a bell-hanger in private houses. From such a modest acorn grew the present day East Anglian heating and ventilating engineering family business of Henry Warner & Son Ltd of Ipswich, Suffolk with the associated company in Kings Lynn, Norfolk, Norfolk of H. Warner (Kings Lynn) Ltd.

Steady progress in the business was maintained in the mid-nineteenth century and eventually a son, Alfred Warner, joined his father at the age of 14. Late with the invention of the internal combustion engine the firm became agents for the Crossley gas engine. Early steps in heating engineering were also undertaken with the advent of cast iron "caulked pipes and saddle" type boilers mainly used in greenhouse and church heating, also the larger country houses.

Mr. Fred Warner, Alfred's elder son, joined the firm in 1897 and eventually became a partner as by then he was a specialist in gas engines. He had also developed a special interest in water and irrigation engineering in addition to continuing with the expansion of central heating work. Fred Warner became one of the earliest members of the Institution.

One of his brothers, William, commenced a separate company in Kings Lynn in 1912 to cover the northern half of East Anglia and this arrangement still continues to the present day.

Surviving the vicissitudes of World War I when they became engaged on munitions work, Warners reverted to their normal business of heating and water engineering and became members of the HVCA in 1920. Fred Warner later conceived the principle of a special delayed action ball valve which later went into production on a commercial basis. Today these patent 'accretion' ball valves are used in Buckingham Palace, 10 Downing Street and many high rise buildings all over the world. Fred Warner's son Harry followed in the business after the last war and his son Michael is now a working director so that the firm is in its fifth generation of Warners.

The two firms have always prided themselves on the quality of their work giving 'personal' attention to each contract and have always firmly believed in providing the best possible after-sales service for all their mechanical services installations. Such a policy has ensured their steady growth in business with a confident outlook for the future.

**Pipework without Fittings**

J. Crossley and Son (Ashford) Ltd was founded in 1883 and became a family business commencing in small works through the turn of the century up to World War II. The war gave an upturn in trade. Little central heating as we know it today was installed in the early days and the company's activities revolved mainly around replacement of boilers and kitchens ranges within schools and churches. In addition they installed dozens of tube wells as there was a limited supply of mains water in the area and most householders had to fill their tanks daily via a semiotics pump. In fact Ashford Manor Golf

Examples of Richard Crittall's combined lighting and ventilating fittings (c. 1920)
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Clubs requested them to install 18 sink wells and pumps on each of the 18 greens to enable watering to be carried out.

The second generation J. Cooksey was asked to demonstrate the 'new innovation of bronze welding by BOC who actually come to the workshop to photograph him.

After this J. Cooksey became famous for his pipework installations using little or no fittings. The original house and small office which together cost £996.11d are still standing and are occupied by a fourth generation of the family.

After the war the company settled into mechanical service installations generally up to present day where it handles contracts up to £500,000 for a variety of local authorities and private clients. Such figures would no doubt cause some surprise to the founder of the firm if he could see them!

Drake and Scull

The story of Drake & Scull Engineering Ltd., is a story of two companies, Drake and Gorham and Arthur Scull and Son. Bernard Mervyn Drake was born in 1859. When he was 23 he joined the Brush Electrical Company where his ability was recognized by rapid promotion. But in 1884 after three years with Brush he was appointed managing engineer with the Electrical Power Storage at the comparatively princely salary of £300. It was at this company he met Marshall Gorham, the firm's works manager, and after two years they both left to set up Drake & Gorham in 1886, an electrical contracting company.

Arthur Stanley Scull was born in 1860 and at the age of 14 years was apprenticed to G. & T. Tuckey, a master plumber who had been established in Bristol for 36 years. Plumbing in those days was mainly concerned with lead work, i.e. gutting and flashings on roofs and covering boxes with lead for cisterns and sinks.

When Scull started work only one house in three had water laid on, and water closets were rare. Even in 1894 the installation of water closets in Manchester was unusual. He received his indentures in 1881 and with the 10 guineas he had saved during his apprenticeship, set up on his own in Mill Street, Bristol.

But Scull recognized the growing importance of sanitation and so his nameplate carried the title 'Sanitary Engineer'. Within two years he was employing two plumbers and their mates and extending his activities to include piping for gas supplies, bell hanging and hot water supplies.

In 1925 Arthur Scull retired at the age of 67, left the firm, and died a year later. In the same year the family firm was created a limited company with a capital of £15,000 with Anthony Scull as chairman and managing director and William Rudman also on the board of directors. Anthony Scull sat about enlarging the scope of the company's operations with the formation of a central heating department.

March 1962 saw the formation in Bristol of Scull Electrical to design and install lighting and electrical heating systems and from the very start it proved an unqualified success. The new company also undertook defrosting work, fire alarm systems and other specialist work in hospitals, factories and boiler houses.

A merger was agreed upon in 1964 between the two sons of the founders, and Drake & Gorham Scull became a holding company with the two companies operating independently until May 1964. They then were integrated to form Drake & Scull. At this time the new company engaged in providing packaged engineering services contracts for the growing industrial building market. By July 1965, one year after the merger, the order book stood at £121m and the next year had risen to £186m. In 1965 the group took over Sturtevant Engineering, adding another 250 employees to its payroll, and expanding its activities to the manufacture and installation of all aspects of air and gas handling, including electrostatic precipitation. Sturtevant also had other companies within its own group which joined the Drake & Gorham Scull empire, including E. Reader & Sons Ltd of Derby.

In 1966 Sturtevant was split into two, Sturtevant Air Treatment Ltd. to dovetail in with Drake & Scull's activities and Sturtevant Engineering making its own fans and air treatment equipment.

When the two services companies merged in 1964 the directors had in mind the advantages offered by a multi-services approach to building services. Advantages not only to the contractor himself, but also to architects, local authorities and property and industrial developers. Planning and organising all the work under a multi-service contract is carried out under the guidance and control of a single man, the project manager. He co-ordinates all the various trades so that the installation proceeds smoothly and quickly without the frustrations that can accompany sites where several contractors are working side by side.

Cash from Auntie

Way back in the 1880's, the late Lewis Hill, with the aid of some cash borrowed from his Great Aunt, formed the new fangled heating company known as 'Lewis Hill'. In 1904, Lewis Hill became one of the Founder Members of the Heating and Ventilators Contractors' Association.

The Company continued under this name until 1956, concentrating solely on the heating and ventilating of public buildings throughout the United Kingdom, encompassing, for instance, Naval Dockyard Premises at Devonport and the R. A. F. Establishment at Cranwell. In 1941, on the death of Lewis Hill, the company was taken over by his nephew, Eric Gordon Hill, who only retired fully in 1975. By 1950, the scope of work had been increased to cover all building services and it was decided that the name of the company should be as at present. Donald W. Hill, son of E. Gordon Hill, is the present Senior Partner.

In 1940 the premises then in use were vacated and the first day of work under a new building contract was completed in 1950. Over the years, they have executed all manner of heating systems, from dozens of small offices to the large six-storey building now in place.

The building houses the offices of the present modular form of boiler house. In closing, over a period extending nearly 100 years, there have only been three 'Chief's', all from the one family, but "in a hell of a lot of good Indians", so they can truly call themselves a 'Family Firm'.

REFRIGERATION AND AIR CONDITIONING

The principal of preserving perishables by storing in cold environments was
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Known to the Romans, and many of the country houses of Tudor times and earlier had an ice pit in which food was stored for long periods. It was not until the turn of the 18th century, however, when other means of producing cold storage (i.e., mechanical refrigeration) began to occupy men’s imagination—Richard Trevithick, the famous 19th century pioneer of the industrial revolution and an employee of John Hall, founder of J & E Hall, had written about his concept of a ‘cold machine’ in the 1820s but the papers were put aside with so many of his other revolutionary ideas.

By about 1850, however, many of the obstacles of early mechanical refrigeration were being overcome, and at the Great Paris Exhibition 1877 one Mr. Giffard exhibited his ‘Cold Air Machine’—at the time one of the most advanced concepts of refrigeration. This machine was acquired by the then owner of J & E Hall and brought back to the U.K. for development and exploitation. It was just 100 years ago this year when a small engineering works in Dartford Kent, already world famous for marine engines and boilers, paper machines and milling machinery began its association with refrigeration. By the 1930s the cold air machine had been superseded by CO₂ machines and the cold revolution was well under way with J & Hall & Co. (the forerunner of Hall-Thermotank) to the fore.

In the 1890s in Glasgow three brothers were working for the John Brown shipyard on the building of the early transatlantic liners. They were engaged in the design of the heating and ventilating systems for the passenger quarters, the design of which was the subject of a patent taken out in 1898 for improvements in ventilating and heating or cooling apparatus. There was such a demand for these systems, that the brothers set up shop in Glasgow and the Thermo-tank company was born. One of the first jobs was for installation of heating, air conditioning and process refrigeration equipment. The present company is now an affiliate company with the American Signal Group of Companies, which includes the Garrett Corporation and Mack Trucks Ltd. The head offices and manufacturing facilities of the British company, Dunham-Bush Ltd., are concentrated at Portsmouth and the production staff there are also responsible for the supervision of production at the German factory at Raunheim, near Frankfurt.

West-Beynon was incorporated in 1909, becoming Messrs. Ernest West and Horler. A byproduct of West was the son of H.J. West, who was one of the pioneers of the refrigeration industry in Great Britain.

West-Beynon initially manufactured a range of, either, ammonia and CO₂ machines, some of which are still in use and later, a range of Trojan compressors were introduced. The company effectively ceased manufacture of compressors in the late 1950s although machines for specialist applications were manufactured until the early 1970s.

During the war, a wide variety of refrigeration equipment was installed on board HM ships and to this day West-Beynon continue to provide specialist equipment for marine use.

The company is currently actively engaged in the design, installation and servicing of all aspects of refrigeration and air conditioning. Recent applications range from a suite of environmental test chambers for a research station in the Middle East, air conditioning of an X-ray Department in a London Hospital and a cook-freeze installation for a Police Authority.

Ernest West & Beynon Ltd. also specialises in supplying ultra low temperature cabinets and all types of storage equipment for medical research.

**HEATING AND VENTILATING**

A well known manufacturing firm with a very long record is Keith Blackman Ltd of Tottenham. Its history goes back to 1823 when James Keith, tinsmith and gas fitter began business in Archibald. It is claimed that the James Keith Company was responsible for the introduction of both the sectional boiler and the sectional radiator to the British Isles, and it had an unusually enlightened labour relations policy which included a reduction of the working week—most uncharacteristic of those times.

In 1909 James Keith amalgamated with the Blackburn Air Propeller Ventilating Co., Ltd., which in 1883 had introduced a range of belt-driven ventilating and exhaust fans. At the time these were
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described as “contrivances for moving any quantity of air with a minimum of power”. The Keith Blackman Company (as the combined company became known) is famous for combining the twin industries of heating and ventilating, and can therefore be said to be truly one of the first heating and ventilating manufacturing concerns.

The company now manufactures a very wide range of centrifugal fans for both ventilation and industrial processes work, bifurcated fans, high pressure blowers and special purpose axial fans, also low noise level fans for packaged air conditioners and air handling units.

As a pioneering gas man, James Keith would approve of the present day activities of Keith Blackman’s industrial gas division, which supplies standard products from gas burners to switches and controls.

“Matthews & Yates Ltd—ventilating, heating, lighting and sanitary engineers, and plumbers and glaziers”—started business under this banner at the Todd Street Works, Long Millgate, Manchester in 1880.

Today, almost 100 years later, Matthews & Yates are one of the country’s leading centrifugal fan and central station air handling unit manufacturers exporting agricultural equipment, air conditioning, heating and ventilation plant and industrial fans all over the world.

The firm was first formed as a partnership between William Matthews and Joseph Yates. At this time their specialised range of products included feed water heaters, air propellers and radiators.

Before the turn of the century, Walter Yates, son of the co-founder, joined the Company and it was he, perhaps, who contributed most to the early successes of the organisation. At the time of his death in 1953 he was managing Director of Matthews & Yates. He had been an active figure in the fan engineering field.

Throughout the years Matthews & Yates have manufactured a very wide range of products. Whilst generally related to heating or air movement, they have been as diverse as shirt dryers for commercial laundries and oxy-acetylene welding equipment, from bottle drying apparatus to electric vacuum cleaners. Matthews & Yates were, at one time, quite prominent electric motor manufacturers. But throughout its history the manufacture of fans has been the company’s principal activity. Early catalogues list the prominent buildings incorporating Matthews & Yates equipment. These include Buckingham Palace, The Carlton Hotel, St Thomas’ Hospital, and, fully described in a paper read before the IHVE in 1907 by Walter

The old...

...and the new
Yates, "The Ventilation of the House of Commons".
In 1909 the Company became part of the
Peck Engineering Group, now known as
the Doulton Engineering Group, a
subsidiary of S Pearson and Son Ltd.
Walter Yates was HVE President in
1909, and Oswald Scott in 1926.
When Standard and Pochin Ltd. of
Leicester began life back in 1919
it is hard to believe but there was no
such thing as a unit heater. Legend has
it that this massive section of the H & V
industry began when an office boy at S
& P was sited too far from the radiator.
The enterprising youth placed a fan
behind the radiator and the unit heater
was born.

 Originally part of a company which
manufactured boat and shoe machinery,
S & P developed a range of fan, dust and
fume removal systems. Later with the
development of heating appliances, the
company ceased to be an offshoot and
became an important part of the H & V
industry.
The first unit heaters were called
Stanlocks and were manufactured by
S & P from the early 1920s. Customers
included such great names as the
Birmingham Carriage Co., London
County Council Tramways, the Lan-
cashire and Yorkshire Railway Com-
pany and the Imperial Japanese Navy.
Quite why the Japanese Navy needed
them is lost in fading memories.
Some of the very first Stanlocks are still
in operation more than 50 years later
and a much modernised version of the
S & P 1930's Collier heater is still being
produced by S & P and is much in
demand.
Up to 1973 the company was part of the
privately owned Standard Engineering
Group of Companies but in that year
it was taken over by Halma Ltd., who
with Argosy Fenton Ltd., The Power
Equipment Company and Secomak Air
Products already had a large stake in
the H & V world.
Now Standard and Pochin manufacture
a vast range of fans, coils, air condi-
tioning equipment and refrigeration
units. Even though everything is on a
much larger scale these days, the
company say they still retain the
personal touch. On a day-to-day basis
they receive requests for fans from 20-
40 years old and they say they might
even be able to find spares for a Stanlock
heater if ever a repair became necessary.

Stanlock units leaving the Standard &
Pochin factory in 1921.

DUCTWORK AND
PIPEWORK
An example of a firm that has kept its
name and product during the whole of
the HIVE is J. Gardner & Co., Ltd.
The company was founded in London in
the year 1873 by John Gardner,
the grandfather of the present Chairman,
P. J. Gardner, VC, MC. In 1889 it
moved to Monument Iron Works,
Dockhead, SE, and was incorporated in
1913. Owing to the need for expansion
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in 1922 the site of the old Beckenham Brick Works was purchased and a start was made to develop the factory that exists today. The company started as sheetmetal workers and manufacturers of general horticultural equipment and in 1952 were also manufacturing 'Ventilation Tubes'.

Stanley Gardner started with the company in 1897 and obtained the City and Guilds Certificate for Metal Plate Work in 1901. With the growth of heating and ventilating he worked closely with the Buffalo Forge Company of USA and was soon changing the production of the company to the manufacture of sheet metal ducting for the ventilating and dust collecting industry and was probably the first manufacturer to be made an Associate of the IHVE in 1911.

With the formation of the Carrier Engineering Corporation of USA in 1914 they were invited to manufacture air ducting, air washers and many engineering products associated with their business especially in relation to the 'Automobile Industry' and became their main supplier up to about 1933 when they opened their own factory in Wembley.

On the death of Stanley Gardner, Philip Gardner was appointed Chairman and Managing Director. He has now appointed his cousin, John Gardner, to succeed him as Managing Director while he continues as Chairman and also Chairman of the parent company J. Gardner Holdings Ltd.

Throughout all these years Gardner's have served the heating, ventilating air conditioning industry, and still rank among the most prominent and well-known manufacturers in the industry.

Deeds not Words

Another highly respected ductwork firm is Henry Hargreaves of Bury. Henry Hargreaves, founder of the firm, was born in 1851. At this time his father owned a clog makers shop in Ramsbottom, and above the door was a motto: 'Deeds not Words'. Later the family moved to Bury. Henry Hargreaves 'served his time' with a Mr. Ward, a joiner in North Back King Street. Incidentally, it is claimed that the sheet metal industry began in Bury, and the first 'tinkerers' (or 'tinsmiths') had originated in this area many years before.

Prior to 1890 a workshop was acquired in Heywood Street, this being subsequently taken over by Shaw and Starkey, provision merchants and grocers. In these premises Henry's father made loaf tins to sell in the shop and in the old Bury market at the weekend: also glass boxes for lawn mowers. In 1892, premises were acquired in Silver Street. There Henry remembered making a Deed Box for a Bank. 'As large as a coffin!' It was here too that Henry Hargreaves and Sons set up the business of assembling and selling bicycles and Henry became known as the 'Cycle King'. All the family participated in the
With the advent of the motor industry, Henry Hargreaves decided to make a decision of vital importance to the future of the Hargreaves family. He sold the cycle business to concentrate wholly and solely on sheet metal work.

During the 20th century, Hargreaves established themselves as one of the leading manufacturers of ventilators and roof turrets. These were manufactured in all shapes and sizes. Some with elaborate ornamental designs (constructed of copper) which still grace many eminent buildings in this country, and in very large quantities, roof ventilators made principally from galvanised steel.

Mr. Gordon Hargreaves has recently commented: "Whilst reading through our History of Hargreaves produced for the 1972 Centenary, it is surprising how soon that has become out of date during the past five years. I noted that our turnover was just in excess of £1M and we employed 500 people; we now have a turnover of £3.5M and employ over 700 people!".

W. H. Capper & Co., the Warrington-based pipework fabricators, celebrated their 40th anniversary on 7 March 1977. The founding company of the £50 million Capper-Neill Group, W. H. Capper fabricates pipework mainly in the 75mm (3in) to 600mm (24in) diameter range, in complex 3-dimensional configurations, often embodying oblique-angle junctions of unequal pipes and compound machined components in a variety of materials.

Works fabricated pipework has always been the backbone of W. H. Capper's operation. Where site fabrication is required, such as the piping-up of plant or the installation of flexible small bore pipe, the support of associated site construction companies is available.

W. H. Capper & Co. is the original company around which the Capper Group of Companies was formed under the name Capper Holdings Ltd. From an initial workforce of 10 the number of employees at Capper Holdings had grown to 800 when the present works of W. H. Capper was opened at Woolston in 1960. Norman Wilkinson, the company's managing director who

bicycle and ironmongery business, together with running the Cook Street business. The works in Heywood Street were also maintained, making principally grass boxes, and it was about this time that Hargreaves made their first roof ventilators, used on churches and schools.
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joined W. H. Capper as a trainee works manager in 1954, was appointed to his present position in April 1975. In 1964 Capper Holdings commenced negotiations to acquire the publicly quoted Wm Neill & Son (St Helens) Ltd by means of a reverse take over bid. It was through this merger that Capper Neill Ltd was formed in 1965.

As a leading subsidiary, W. H. Capper manufactures pipework to a wide range of technical specifications including Lloyd's, ATOC, ASME, API, BS 2633 and BS 2971. Products include coils, coolers, heat exchangers, internally lined fabricated pipework, headers and tube assemblies.

CRANE AND IDEAL

Crane Ltd, a subsidiary of Crane Company of USA—founded in the mid-nineteenth century and now a large international concern with worldwide manufacturing and selling facilities—serves world industry with specialised products, particularly those related to fluid handling and control.

The history of Crane in the UK commenced in 1906 when James B. Bennett set up in business as a coppersmith and shortly after began importing American pipe fittings, valves and tools from Crane Co. The business developed to such an extent that in 1919 Crane Ltd of Montreal—the Canadian subsidiary of Crane Co.—purchased the assets of F. Bennett & Sons Ltd. and formed Crane-Bennett Ltd. with the ultimate object of manufacturing in England. A 42-acre site was purchased at Ipswich, and in 1921 the corner stone of the new works was laid. In 1932 the company simply became Crane Ltd.

During the 1960's the company acquired several businesses whose activities were compatible with its own. Today, in addition to the Ipswich complex, Crane UK has the 45-acre Glenfield & Kennedy plant at Kilmarnock, the Blackett Holland foundry at Guisborough, Yorkshire, as well as a substantial pumps manufacturing plant at Stockport, Cheshire, and a large modern central distribution warehouse at Northampton. The business is structured into three operating divisions, each with its own manufacturing, marketing and sales facilities, all supported by head office control division. The total number of employees exceeds 4000.

The origins of the Ideal Company lie in the year 1894, when the American Radiator Co. became interested in the possibility of marketing its product in Europe, and, in 1895, it set up business in a small office in Victoria Street, London, with warehouse space at Bankside, Southwark, and an opening stock of radiators imported from the U.S.

The company expanded rapidly and large offices were acquired at Shoe Lane, London, and a warehouse built in the East End. Within a decade demand for radiators and boilers grew to such an extent that it could no longer be satisfied by importation alone and manufacture began in England.

In 1903 a new company, the National Radiator Company, was formed to take over all the assets and liabilities of the London branch of the American Radiator Company and work on factory and office accommodation began at Hull in March, 1906. Nine months later the furnace was lit and the first radiator cast.

Following World War I the Company had its first major change, it ceased production of American units in favour of boilers and radiators specifically designed for the UK. This was the first appearance of the well-known Ideal domestic boiler, the forerunner of over one and a half million similar appliances to be produced by the company up to the present day.

New designs of radiators completed the modernisation programme and so passed into obscurity all the patterns and designs which had been imported from America. Gas and oil-fired appliances were introduced in the 1930's and although the company diversified into other products the range of Ideal boilers has retained its identity to present day.

Steirad Group, a British Company with strong European outlets, acquired Ideal Boilers in 1976. As part of Steirad, Ideal Boilers will continue to prove their hard-won reputation for product innovation and technical expertise.

MANUFACTURING AND CONTRACTING

In the early days it was quite common for contracting firms to manufacture their own equipment such as boilers, cast-iron socket and spigot pipe, water-to-water calorifiers for heating purposes and steam-to-water calorifiers. Many of the early jobs were carried out in cast-iron socket and spigot pipes which can today be seen in old churches and other public buildings.

One such firm is C. Stewart & Co., Ltd. The firm was established by Charles Stewart in Lancaster in 1869, but its origins go back to his grandfather, who was born in 1775. A range of built-up tubular boilers with a brick firebox was developed and patented called The Duplex Tubular Boiler. This range of boilers enabled the firm to take on contracts for bigger buildings and work was undertaken over a large area. A depot was opened at Douglas in the Isle of Man and central heating was installed in the House of Keys, the Governor's house, many churches and later in some of the large amusement centres which were built along Douglas seafront including the Derby Castle and the Palace Ballroom. Also about this time work was carried out in Northern Ireland.

Conyn Ching is reputed to have started in the early 18th century—some say 1688. The name changed over the years but Ching first appeared in 1847 and Conyn Ching & Co. Ltd. was registered in 1902. Mr. R. Conyn Ching was President of the IHVE in 1934 and also founded the Benevolent Fund. "Ironmongery" covered a wide field in the early days and the firm established a high reputation in the 18th and 19th centuries for all forms of art metalwork which they kept up to the present day. Conyn Chings would never subscribe, because too great in 1963 when regrettably this side of the business closed. All Conyn Chings had to be supplied by Ching's, with art metal work. They had a "clever invention" recorded in 1871 in "The Traveller". This was for...
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a hot water system that would "automatically supply (without risk of explosion) hot water from the highest point of the lowest point of the most extensive hotel, mansion, etc." (see illustration). Since then, heating and ventilating have been an integral part of the business. For many years they held the "Off the Wall" contract for gas and later electric lighting in public buildings and held the Royal Warrant under Queen Victoria and King Edward VII. During the First World War, the firm became involved in the manufacture of cast-iron boilers and radiators, and as a natural sequence commenced to install their manufactured products in buildings. So was born the internationally known company of Brightside Heating & Engineering Co. which, prior to the turn of the century, had established offices in Sheffield and Birmingham.

At a later date additional offices were opened in Liverpool, Newcastle-on-Tyne, Glasgow, and London, and at an even later date (1925) a new office building was constructed in Longmore Street, open to the public. The advent of World War II created a need to develop new equipment, particularly for the war effort. One particular development was that of an air filter to combat the possible use of poisonous gas. The new filter became a standard piece of equipment for air raid shelters.

**An Ozonair advertisement of the 20's**

After the war the development in products, particularly in the air filtration field, continued. The company took advantage of the potential in the air filtration field, becoming a major supplier of air-conditioning equipment. In 1929 the company opened its first factory in London and the office building was doubled in size. The company continued to grow, and by the 1930s it was one of the leading names in the industry. The year 1932 saw the introduction of the well-known E. L. Joseph filter which, in various forms, has remained a best seller to the present day.

By 1939 the fortunes of the Company were such that the Victoria Street premises could not cope with the demands of production. Consequently, by 1930 a new office building was constructed in Longmore Street to cope with the ever-increasing demands. The advent of World War II created a new need to develop activities more helpful to the war effort. One particular development was that of an air filter to combat the possible use of poisonous gas. These filters became standard equipment for air raid shelters.
The advent of licence agreements in the concept of high velocity terminal control system, packaged central plant, and supplementing of the existing air filter range with additional products from the Cambridge Filter Corporation of Syracuse.

Through this vast expansion more production space was vital and the premises were extended to a site at Aylesford Nr. Maidstone. By the middle of 1974 a corporate decision had provided for the closure of the Rochester plant to concentrate the entire production and administrative functions under the one roof at Aylesford.

In April 1976 Ozonair was acquired by the Senior Engineering Group Ltd and became a member of the Air Handling & Plastics Division along with Hargreaves & Sons Ltd, and Plastics Design & Engineering Ltd.

**Potterton**

Thomas Potterton Ltd was founded in the 1930's as a firm of general contractors; but it was under the founder's son, Thomas Potterton, that the company began pioneering the gas-fired boiler and concentrating on gas usage for fuel and bulk water heating. By 1944 the zig-zag flue for solid fuel ranges had been designed—a precursor of the secondary heating surface in modern boilers. The first ever gas-fired central heating boiler was introduced by Potterton in 1952—the "Victor" which was installed in four vertical banks in Eugene Sandow's Physical Culture Institute, causing a sensation in the heating trade. This was the forerunner of today's modular Diplomat.

Thomas Potterton, Jnr, was succeeded by his two sons, A. B. Potterton and T. F. C. Potterton. Then followed the introduction of large boilers like the celebrated Rex "D" series, a source of central heating and hot water in town halls, department stores and such.

In 1935 the "Diplomat" gas-fired boilers made their debut and the company entered the oil-fired boiler market with the introduction of the "DOA" series. In 1961 the first balanced flue appliance was introduced by the company, and in 1973 the gas-fired wall-mounted boiler—the "Netheath"—was introduced.

A. B. Potterton was HIVE President in 1936, and Ernest Brooks in 1949.

**PUMPS**

It was in 1868 that Mr. Frederic A. Pullen, the 27-year-old son of an Isle of Wight schoolmaster, started business in the City of London as an import and export agent for engineering products. His intention was that the products he handled and the service he offered should be second to none, and early in his business career he realised the value of specialisation, dealing mainly with pumping equipment for water supplies.

Mr. Pullen's business prospered, and his two sons joined the company at the turn of the century, both having served engineering apprenticeships, and both with them a wide range of experience and new contacts. At the time of Frederic Pullen's death in 1908, various sidelines in both sales and manufacturing had been adopted, and the business was showing a steady rate of growth.

The year 1912 saw a move to King William Street, and within a couple of years, Frederick A. Pullen & Co. found themselves deeply involved in the war effort. As was the case with so many firms, they found that meeting the demands of the War Office stretched their production capability to the maximum, and by 1916 they were installed in a factory in Vauxhall, with a labour force of 40 women engaged upon many tasks.

This move to the much larger premises was justified after the war, with an increased demand for pumps and pumping equipment. The Pullen brothers started the manufacture of a new range of centrifugal pumps to supplement their existing steam and vacuum pump ranges, thus establishing a close connection with the heating and ventilating industry. This connection was further strengthened by the decision taken shortly after 1925, when Mr. Percy Jones, the present Chairman, joined the company, to concentrate on pump manufacture.

World War II again resulted in the company working at fever pitch to meet military demands. The pump design and production programmes were vastly accelerated, and in addition the company diversified, producing such equipment as mobile dissolved acetylene gas plants, the famous "Wobblin Wheel Roller" soil compaction machine, and the prefabricated bituminous surface pilling machine used extensively in airfield construction and generally known as the "stamp tucker".

The post-war years saw a relaxation in building restrictions, enabling property developers to realise their plans for multi-storey office and apartment blocks. This in turn brought a call for more efficient and sophisticated fire protection, heating and cold water boosting pump equipment. Pullen's rose to the occasion with the wide range of pumps developed during the war, plus their new automatic cold water pump booster system.

In 1950, the Pullen brothers' partnership was dissolved, and Fredk A. Pullen & Co. Ltd. was formed with the brothers and Mr. Percy Jones as Directors. Shortly afterwards they were joined by Mr. F. T. T.
Having a mining background no doubt influenced the founders in taking up the manufacture of pumps. The initial idea of adding engineering to other interests was largely due to Edmund Howl, who had passed through an apprenticeship at Crewe. During the early years the company produced many items other than pumps, notably refrigeration plant. However, for many years, the sole interest has been in the manufacture of pumps, and over the years the range has been developed into one of the widest in the UK, ranging from small hand pumps to power driven units with outputs up to 3300 m³/h.

The company is fortunate in having many men who have worked for them all their lives, and there have been instances of three generations being employed. The present Managing Director and Chairman is Mr. O. B. Howl, a grandson of one of the founders.

London Waterworks

The origins of Worthington Simpson go back to the late 18th century. Although the earliest Westminster Directory shows that in 1826 there was an engineering firm in Eccleston Street, Pimlico, London, in the name of Simpson & Thompson it is known that as early as 1790 Thomas Simpson, the father of James, was working as an engineer in Westminster installing and maintaining steam pumping plant at various London Waterworks, and undoubtedly by this date he had established workshops for this purpose. It is also clear from the Westminster Directory that in 1839 Simpson & Thompson became known as Simpson & Co of Belgrave Road, and thereafter in 1842 the firm was known as William Simpson & Co of Belgrave Road; the latter moved to Grovenor Road in 1860.

The first indication of registration as a Limited Company was in 1886 when James Simpson & Co., Ltd. was formed to carry on the business of pump manufacturers and engineering contractors in a factory built in 1859 at 101 Grovenor Road, Pimlico, on the Embankment alongside the river Thames. The original buildings were demolished in 1926 to make room for the existing Pimlico Estate and they were still used by the firm up to this date, although new engineering works had been built at Newark-on-Trent, in 1901.

Association of James Simpson & Co. with the Worthington Pump Corporation of America in 1886 resulted in world-wide expansion of the British firms’ activities and the company became Worthington-Simpson Ltd in 1917. In 1969 Worthington Simpson Ltd was fully integrated into the Studebaker-Worthing Inc. international organisation.

Holden and Brooke Ltd was founded in 1883 and soon became established at Sirius Works in West Gorton, Manchester, where centrifugal pumps, heat exchangers and a vast range of steam auxiliaries were manufactured. The centrifugal pumps were the trade name 'Sirius' and included multi-stage 'High Lift' units of up to eight stages and 300ft heads.

A standard product made World War I has an interesting link with present day production. This was a single type of full-nylon accelerator consisting of a belt-driven and suction 'Sirius' pump mounted over a pipe to which it was connected and into which was fitted a non-return valve. This arrangement was redesigned in 1926 and the new unit given the name 'Selfix'. This was the first type of pump by any manufacturer in the UK to connect directly into the pipework and dispense with bedplate and concrete foundations. Holden and Brooke's current Selfix Six accelerator is a modern derivative of the basic idea.

Heat exchanger manufacture was transferred to a new factory which had been built at Sharston in 1938 thus enabling Sirius Works to expand production of centrifugal pumps to meet an increasing demand.

Shortly after World War II, the nearby firm of Frank Pears and Co Ltd was incorporated and the famous 'Pearl' reciprocating pumps became part of the Holden and Brooke range. Pears works now manufacture the 'Trima' series of high pressure, treble ram pumps.

Holden and Brooke at present offer one of the most comprehensive ranges of pumps and auxiliary equipment for the building services industry. These products are in use in many countries throughout the world where the experience and skills of so many years have earned a reputation for quality and reliability.

Valves and Fittings

Last year Royles Ltd celebrated their centenary. The business was started in 1876 by Mr. J. Royle in Great Bridgewater Street, Manchester, manufacturing steam traps, reducing valves and other steam fittings. Later in the last century, Mr. Royle was joined by O. M. Row, President of the
In 1911, the inventor of the indented tube, and the company commencing manufacturing heat exchangers incorporating the indented tube,—in fact the word calorifier was originated by Royles at the beginning of the present century, and it is now the accepted designation for all tubular heaters used for providing hot water supply or heating services in every type of building.

At the turn of the century the business had expanded to such an extent that it was necessary to seek larger premises, and new works and offices were erected at Ilminster, where the company still is.

New products were introduced, including pipeline strainers, for which the company now enjoys a world wide reputation.

In 1970 Royles took over the pipeline speciality section of Lancaster and Tonge Ltd., of Pendleton, Manchester, thus further expanding their range of products. In 1975 the company became a member of the Leeds based Fairburn Lawson Group and embarked upon a further expansion programme, introducing a range of valves designated primarily to meet the needs of the petrochemical, oil and associated industries.

Recently the company was appointed sole UK distributors for the Commercial Filters Division of the Carborundum Company. It has been said that the history of Hopkinsons organisation is also that of the progress of valve design and manufacture. The founder established from the outset the principles of technical competence and quality of product.

The Hopkins Engineering business started in 1843 by Joseph Hopkins and has grown to employ a workforce of around 2,000 people. Hopkins's business has divisions in the UK, Europe and Asia, where it serves the power and process industries worldwide.

One of the most striking characteristics of Hopkinsons is the completeness of direct control over the manufacturing process. Hopkinsons is one of the very few valve manufacturers to have not only their own non-ferrous foundry but also a steel foundry. The same concern for the highest standards of manufacture is reflected in the wide use of numerically controlled precision machining tools and the latest manufacturing techniques.

Hopkinsons view of testing is comprehensive. It extends from the closest examination of all materials through every stage of manufacture to final proving. Hopkinsons have the rare distinction of A.S.M.E.'N' stamp approval—internationally recognised as the highest possible rating for work in the nuclear field.

The supply of valves, controls, heat exchange plants and other auxiliary equipment for the heating industry has been an integral part of the service offered by the BSS Group of Companies since its foundation in 1899. Although the Group, which became a public company in 1962, is one of the largest organisations of its kind in the United Kingdom, it has developed on a broadly diversified basis, the heating engineer and contractor still account for a significant percentage of its turnover.

With head offices at Leicester and brand new central warehouse facilities at nearby Lutterworth, the British Steam Specialties Limited and its associated companies in the North of Ireland and Eire control a multi-million pound distribution network throughout the British Isles.

These companies offer a complete industrial pipeline and heating equipment service, covering both supply and technical back-up facilities from a network of over 20 depots strategically located throughout the country. All BSS branch warehouses provide a trade counter service for off-the-shelf or urgent collections by customers in addition to the normal prompt delivery service.

The comprehensive range of items carried in stock include tubes and fittings of all types including plastics, valves to suit all applications, steam and air traps, condensate pumping sets, pumps and pumping equipment, heat exchange equipment, instruments and...
meters for temperature, pressure and flow, strainers, filters, boiler mountings, heat emitters, powered ventilators and air conditioning units.

Cockburns Ltd of Glasgow have been manufacturing valves for over a century and their products are in service on land and sea throughout the world. Cockburns began in 1882 when David Cockburn, a marine engineer, conceived the idea that there was a demand for small boilers and tubular steel vessels. He opened a small factory in McNeil Street, Glasgow, having as his chief assistant his son, Robert Cockburn. During the early years the production of small boilers was abandoned and the value side of the business developed, from which evolved the Cockburns safety valve.

In 1899 Robert Cockburn took over the business of his brother, George Cockburn, also a valve manufacturer, and from that association emerged the company of Cockburns Ltd, of Cardonald. The demand for Cockburns valves steadily grew, pushing factory resources to the maximum. After World War II additional premises were sought and in 1953 a new branch works was opened at North Shields. Growth continued throughout the fifties with further production and sales facilities being opened in Holland in 1958 (Cockburns Nederland N.V.). In 1959 a further link in the development of the organisation occurred with the opening of Cockburns (Springs) Ltd, with premises adjoining the main Cardonald works.

Throughout the company's long history it has developed by virtue of several factors: reliability, special applications, and research.

Fifth Generation

For a family business to survive—let alone thrive—for nearly 180 years in the competitive and highly cyclical brass foundry business requires both consistent initiative and an equal degree of flexibility. So Meynell Valves of Wolverhampton are almost unique nowadays for the way the company is still very actively managed by the Meynell family themselves—the fifth successive generation to do so. To quote the present Deputy Chairman Hugh Meynell—"over the years our product range has steadily changed, and at any given time we have concentrated on trying to produce whatever England has required".

In 1798, as Boulton & Watt were still trying to develop their range of steam engines, "Meynell & Sons"—as they were then called—wisely hitched their star to the four-legged variety of horse power. The earliest surviving catalogue shows the simple, but very robust, pump for deep well operations—operated by a lone horse plodding steadily round and round. Later in the 19th century, in line with increasing standards of affinity, a range of ornate gas chandeliers was produced—the intricate and detailed designs being a lasting tribute to the skills of British brassfoundry men.

In war time as in peace, the diversity continued. In 1914 production was switched to provide equipment for mobile water carriers for the British Army in France. In the last war by contrast, Meynells provided both equipment for refuelling submarines at sea and for lighting fires on land.

Recently, a brewery in Oxfordshire highlighted yet another facet of the company by suddenly ordering items from a supposedly extint catalogue dating from the 1930's. In those years the firm used to make brass beer pumps.
A set of four such pumps, each topped by a handpainted porcelain handle and all mounted inside a precision made mahogany cabinet, cost just £2,100—and of course trade discounts were available!

After the last war a decision was wisely made to find areas where the firm could build its own viable future. The most successful of these efforts has proved to be in the area of mixing valves. Instead of importing foreign designs under licence, Meynell's concentrated on developing their own. Having a pattern shop, tool room, drawing office and foundry on site made this easier—but the real reason for the success lay in the way the company sought to find out what customers actually needed the valves to do. Before producing a thermostatic hot and cold water mixing valve for example, Meynell's deliberately went to the most critical user—the hospitals—to find out both what they needed and why.

The result has been the outstanding success of the ‘Safemix’ range of thermostatic mixers, and the ‘Blundamix’ range of manually operated blending valves.

**UNUSUAL APPROACH**

Another interesting example of a firm that has approached building services from a different direction is Hull & Kay Engineering Ltd. It was established as sheet metalworkers in Ashton-under-Lyne in 1878. In its early years its connections with the textile industry led it to supplying equipment for controlling ventilation and humidity in the local mills. “Air conditioning” in 1890 was not quite what we mean today, but it gave the company a start from which it has never looked back.

Today the firm has accumulated a vast store of knowledge in the design, manufacture and installation of air conditioning, ventilating, fume extraction, heating and other services, fire protection and electrical installation and instrumentation throughout the World, and has involvement in multiple services for airports, banks, chemical plants, computer centres, hospitals, hotels, mines, offices, steelworks, superstores, textile factories, universities and all forms of manufacturing plants.

An interesting example of a building services firm that has developed from the lighting rather than the heating side is Higgs & Cattle Ltd. The Company’s origin can be traced back to the period when the principal method of providing lighting and heating for industry, and lighting for commercial and domestic premises, was by means of gas installations.

At the turn of the twentieth century, the Company became involved in the electrical contracting industry and in 1903 was formed under the name of Higgins & Griffiths. This Company gradually expanded its activities to include projects both in UK and overseas.

After further changes, the Company was incorporated in 1934 as Higgins & Cattle Ltd. From this base, the Company continued to develop and broaden the scope of its operations to include undertakings involving the complete design and installation of electrical and mechanical services within projects at home and abroad. It gained experience in electrical transmission and distribution schemes and for the past decade has concentrated more and more on overseas contracts, thus acquiring a considerable store of expert knowledge in widely differing areas, quite apart from the contracting and commercial facilities available from foreign-based associated companies.

All aspects of overseas work—including estimating, financing and engineering—are handled by the Head Office U.K. Team which has overall responsibility for the contracts. Resident ex-patriate supervisory staff and local specialist labour is used on site.

An approach to building services through the gas industry was made by Humphreys & Glasgow Ltd, which began as a partnership in London in 1892 to exploit American gas industry knowhow in Europe. From modest beginnings the company rapidly reversed the trend, being responsible for many innovations incorporated in plant in the USA and all over the world. For many years the name of Humphreys & Glasgow was synonymous with the water gas process.

With the advent of natural gas, the company rapidly diversified into the oil, chemical and petrochemical industries and about the same time in 1967 formed HGS to exploit natural gas conversion. HGS grew swiftly, and as the peak period of gas conversion had over 1500 technicians and 900 vehicles with three schools for training conversion fitters.

Again when conversion work began to fall off, HGS moved into the field of mechanical services relating particularly to heating, ventilating, air conditioning, plumbing and boiler changeover. This was further extended to include property modernisation on a large scale with HGS providing all the necessary services, procurement and field labour but organising the whole scheme to give the minimum inconvenience to residents.

More recently HGS has been involved in North Sea Oil and Gas projects working alongside the parent company both onshore production platforms and offshore terminals. HGS with an annual turnover of £16 million is only ten years old but is a worthy offspring of the Victorian born parent, Humphreys & Glasgow.

**MAINLY DOMESTIC**

Domestic appliances are not expected to last 100 years, but ironically enough, the latest fuel cost figures show that one of the best performances in fuel conversion is turned in by a stove that has scarcely changed in design for almost this period.

It was in the 1830's that the family firm of Pither acquired the patents of a continental slow-combustion anthracite stove. Stoves on this principle have been made and marketed under the Pither name ever since.

The story of Pither’s survival into the last quarter of the twentieth century is a heartening one for people who regret the continuing disappearance of small specialist firms in monster mergers. For Pithers have been able to reverse the trend. They have twice been swallowed by larger firms but have managed to come out unscathed.
It is, alas, no longer possible to make the proud claim of the earliest surviving Pilkerton catalogue c.1890 that “The fireplace burns 12 hours without attention, trouble, danger, direct or waste at a cost of 10d”. But today Pilkerton claim that their small Studio stove will heat an average sized room for about only 1p per hour.

War and Peace
The Founders of Carron Company in 1759 at Falkirk in the midlands of Scotland were Dr. John Roebuck, of Sheffield, an eminent scientist and mineralogist, Samuel Garbett, of Birmingham, chemical manufacturer, and William Cadell of Cockenzie, merchant. The famous engineer, John Smeaton designed and built the water-powered forge bellows for Carron over two hundred years ago.

Incorporated by Royal Charter in 1773, the company’s strength has been due to a readiness to recognize the ever-changing demands of her customers, and to evolve and develop techniques to meet those demands. James Watt came to Carron for cylinders for his steam engine. William Symington, who has been called the father of marine engineering built at Carron the engines for the first steamship. The Duke of Wellington would have only Carron shot and Carron cannon. Lord Nelson had “Carronade” guns on Victory at Trafalgar. Major-General Henry Shirreff, R.A., chose Carron castings for his new shell.

In the arts of peace, Carron designs for domestic equipment were guided by John Adam, eldest of the four famous brothers Adam, who led the renaissance of English interior decoration. John Adam was one of the earliest partners in Carron Company and he, with the brothers William and Henry Haworth, designed a complete series of dog-crates, register-grates and surrounds for the discriminating taste of the day. At the present time baths, sinks, cookers, radiators are designed and made at Carron.

Drawings Non Existent
Hattersley Brothers Ltd. is the oldest or ‘earliest born’ of the UK Companies that constitute the Stedrad Group. Thomas Hattersley made the kitchen range in our picture with skilled moulders at Swinton, Mexborough, Yorkshire, more than 100 years ago, along with other cooking ranges and hot water boilers.

In those days drawings were non-existent. A pattern was made and then from it with green sand from Mansfield a mould. After enough modifications to make it a “good run” that was it. Over 100 different Yorkshire Ranges could be ordered with details such as “wrought iron grate” “wrought iron hand” “wrought iron crown”. You could also order Hotel, Restaurant or Mansion Cooking Ranges, Vegetable Steamer or Steam Ventilated Bathing Pans that eventually satisfied the appetite in the country’s largest hotels. The Yorkshire Range we show was only taken from daily use and put into a South Yorkshire Industrial Museum earlier this year.

Change has been successfully made from those days when coal was the king fuel and Hattersley’s 80 page catalogue included an article on the Art of Cooking well.

Now the main products are gas-fired Vulcan Continental and Verena Domestic Heating Appliances. These units have been developed completely by Hattersley, and their patented cast-iron heat exchangers have the advantage of a close grain porous free structure. This is the result of continuous line production from resin bonded cores. Vulcan Boilers are of course not intended for home cooking as were their earlier family but they give warmth throughout the house and lots of hot water that would delight the original Thos. Hattersley and no doubt get a nod of approval from him.

Radiation Group
In 1886 John Wright, a tinsmith from Essex, set up a workshop in two attic in Broad Street, Birmingham, to make gas appliances, considered a dangerous occupation at the time! By 1872 he had organised a hire service for gas cookers and was also making convector heaters. In 1879 he landed a new thriving business over to his two sons. Demand grew so much that production was transferred to the present site at Essex Works, Birmingham, which was named after John Wright’s birthplace. The company at the turn of the century had sold over $35,000 “Eureka” cookers, and were also making ornate gas fires in metal surrounds.

Left. A kitchen range made by Thos. Hattersley, well over 100 years old.
The Wright brothers sold out to young Henry James Yates, the first man to establish commercial laboratories with qualified chemists and physicists. It was he that persuaded five other companies to join with him to form **Radiation Ltd** in 1919. In 1964, the decision was taken to concentrate on making gas fires only, and the company became known as Radiation Gas Fires Ltd.

In 1969, new members of the Tube Investments Group, Radiation Gas Fires joined with other famous gas names—Ascot and Parkray, to form **New World Gas Heating Ltd.** In January 1977 New World Gas Heating and Glow-worm combined to form a new company called **T1 Gas Heating Ltd.**

In 1858, three brothers set up a small foundry in Queen Street, Belper, and, by 1882, their billheads announced the company's products as including 'stove grates, kitchen ranges and all kinds of castings to drawings or patterns'. By the turn of the Century, increased demand meant the Park Foundry Co. Ltd. moving to a new 13½ acre site at Derby Road, where it remains today. The clay on the site also proved excellent for brick-making and for some years, the foundry operated as a brick producer as well.

In 1929, the Park Foundry Co. Ltd., became part of Brut Colbran Ltd., which in turn joined the Radiation Group in 1936. Rationalisation in the post-war period saw the Park Foundry specialising in the manufacture of solid fuel appliances, taking over the combined interests of Wilson and Mathiesons of Leeds and the Eagle Range of Birmingham until they separate areas in the Group.

The Radiation Group was taken over by **Tube Investments Ltd.** in 1967, and today Parkray are entirely responsible for the Group's solid fuel appliance production. In addition the Park Foundry also undertakes work for other members of T.I. Domestic Appliances.

Since World War II, Parkray has done much to revolutionise the whole concept of solid fuel domestic heating, with the introduction of 'open fire' convectors, heaters and glass fronted solid fuel heaters.

In November 1934 Amos Whitman, his sons and six others left the Park Foundry—now Parkray—and set up the Derwent Foundry at nearby Milford. They paid £500 to an established London company for patterns and the right to use the Glow-worm trade name, and began manufacturing solid fuel boilers, wood burning cookers and combination grates. In 1937, entrepreneur Lionel King bought the company, and it proved extremely profitable, but in turn sold to the South Western Industrial Corporation in 1949. This corporation was split up a few years later, and a new company, **Midland Aluminium**, was set up including both Glow-worm and Tower Housewares.

The 1950s saw the development of a range of thermostatically controlled solid fuel boilers and the Thermoglow boiler, Glow-worm's first gas-fired appliance. Their real entry into the gas market however came with the acquisition of Sunfer Limited in 1960, who had patented a new heat exchanger design. This boom period meant expansion for Glow-worm, and they moved part of their operation to a new site at Belper, two miles away.

In 1975 Midland Aluminium became part of T.I. Domestic Appliances Limited, reinforcing Glow-worm's position in the gas central heating market with their domestic boilers and gas fires.

Electrical firms belong to the 20th Century but Creda can trace their origins back to 1898 when they were called Simplex Steel Conduit Ltd. Later the company changed its name to the Creda Co. and was based at Oldbury, near Birmingham. In 1909 Creda introduced their first electric cooker. Electricity was then still new and revolutionary and few people felt it would become an indispensable national fuel with considerable benefits. Creda became one of the founder members of Tube Investments Ltd in 1919. The Blythe Bridge works, in Staffordshire, was acquired in 1945, and remains the headquarters of the company today, producing a wide range of electrical appliances.

In April 1973 Jackson Electric Limited of Yate merged with Creda, taking over...
the production of the comprehensive home laundry range and some cookers. Also in 1975, Creda increased their hold on the electric heating market when they took over the marketing of the Sunhouse range of electric fires and heaters.

Creda continued to maintain their reputation as innovators today, with the modern electric cooker owing much to their research and development as do the heating and home laundry products.

**MISCELLANEOUS**

**Tubes and Fittings**

The history of some of the constituent parts of YLM Ltd., an IMI company devoted solely to the design and manufacture of copper and copper alloy tubes, plates and fittings, can be traced back almost 200 years. An organisation of six factories and subsidiaries, its £10 million manufacturing plant, is located at Leeds on the site of a 19th Century racecourse.

The first industrial use of the site dates from 1889 when Elmers End Copper Co produced tube by depositing copper on mandrels using a patented process of electrolysis. This company later became the Leeds Copper Works. The enterprise failed to prosper and in 1909 the Yorkshire Copper Works was incorporated to acquire the undertaking. After initial difficulties, the YCW began to make steady progress and demand for its products created by the 1914-18 war firmly established it.

The 1920's saw the company making a name for itself as a producer of high quality condenser tubing and from 1930 onwards the works. expanded rapidly as the use of copper for domestic plumbing became more widespread. This development was aided by the introduction of additional Imperial Metals Division and the formation of the Yorkshire Imperial Metals which we know today. Behind YLM, lies the accumulated skill and knowledge gained from years of experience working with copper and its alloys producing high quality products for the construction and engineering industries throughout the World. Products include—capillary fittings, compression fittings, micro bore heating components, stopcocks and valves, copper and copper alloy tubes.

**A Consulting Engineer in 1862**

Although consulting engineers are not considered to have entered the building services industry until World War I there is at least one exception.

In November 1862, Henry Lea, at the age of 23, started his career as a consulting engineer, and created the firm of Henry Lea & Son. He advised people to whom he thought that fact would be of interest by means of a letter, in copperplate writing, a copy of which appears here. It is interesting to note that even as long ago as 1862, he was concerned about the efficient use of fuel.

He was joined in the Partnership by his son Frederick, who took over the running of the practice in 1912 when Henry died. Frederick in turn took into Partnership Donald Lea in 1938, who was left in 1939 as sole Partner when Frederick died in that year. In 1939 Henry Lea & Son amalgamated with Edwin S. Hoare & Partners and formed the firm of Hoare Lea & Partners.

With the onset of war, the sort of work to which the Partnership had been accustomed mostly hospital and schools and all types of public building ceased almost overnight. At the same time many of the staff joined HM Forces.

However, the building of factories, extensions of airfields and similar war work became vital and extremely urgent. Of the remaining staff, some were deployed to work at airfields, etc. and after the bombing of Liverpool, they were employed on the provision of emergency housing for the bombed-out people. Others were engaged designing bond factories and similar essential works.

After the war, the firm became engaged again in the design of services for the peak school-building programmes of the 1950’s and 60’s, and followed this with a massive turnover of works for new and re-furbished hospitals.

With the current fall off in works in the U.K. the present Partners have enlarged their activities overseas, and also make regular trips to overseas markets throughout the year.

**Builders Merchants**

In 1903, a wholesale ironmongers premises at 49 Holdenhurst Road, Bournemouth trading as F. Betts, was sold to the shop manager and his traveller. These men were Richard...
Kennedy and William Trafford Clegg. Both came from the North of England—Richard Kennedy having been born in Ashton-under-Lyne in about 1870 and William Clegg, the son of a well known Rochdale writer and publishers, John Trafford Clegg. The business supplied building materials to an expanding Bournemouth which was fast becoming a fashionable holiday resort. It was not until 1912 that a private company was formed, Kennedy's (Bournemouth) Ltd. In 1937 the company opened one of the most modern builders' merchants premises in Southern England in Commercial Road, Southampton and also in that year the company opened extensive electrical goods showrooms at 167 Holdenhurst Road, Bournemouth. For most of the company's first 30 years it relied upon its good reputation for quality, style and competitive prices to the building trade and it was not until 1931 that the first general illustrated catalogue was introduced.

The second catalogue appeared 10 years later in 1961 followed by a third in 1967 and the fourth in 1975. A glance at the company's catalogues over the years shows the vast increase in sales of tools, paints and decorating materials.

Today Kennedy's (Builder's Merchants) Ltd forms the main trading arm of the Kennedy's (Builders' Merchants) Limited Group of Companies.

Chimneys

The scientific design of chimneys and flues is of comparatively recent origin. One leading firm, however, has a long history. **F. E. Beaumont Ltd**, the industrial chimney and air pollution control specialists, was established in 1876, when William G. Beaumont founded the firm of industrial painters and steeplejacks. After 'W. G.' died in 1924, the firm continued in operation under the direction of his sons Percy and Albert. A year later Albert founded F. E. Beaumont to extend the steeplejack work, and was joined in 1937 by his son Max. Just before the outbreak of the 1939 war the firm was engaged in traditional steeplejack work as well as the building of 240ft. and 360ft. high radar towers for the Air Defence of the UK. Later in the war the firm carried out the salvage of sunken shipping and also in the demolition of dangerous structures using high explosives.

In 1944 plant was purchased for the fabrication of steel chimneys and this grew considerably as the years passed. In 1958 a further factory was purchased and equipped for the fabrication of aluminium cladding for steel chimneys. By 1966 orders had outstripped the production capacity of the two London Works and a new factory of 30,000 sq. ft. was built at Mere in Wiltshire. This was the first factory in the world designed solely for the mass production of individually designed steel chimneys. Output from the Mere factory is now approaching 50 tons of steel chimneys each working week, and this year Beaumont's anticipate they will export and erect more chimneys overseas than in any previous year.

Max's two sons Nicholas and Michael joined the company in 1969 and 1971. Beaumonts have designed, manufactured and erected 350 ft. high self supporting and guiled chimneys, but continue to manufacture chimneys of all sizes above 1 ft. diameter.

Water Treatment

The company now called **Dearborn Chemicals** was founded in 1887, as a result of the initiative of a young American chemist named William Edgar, whose curiosity had been aroused when he chanced to see a scaled boiler being removed from a plant after only one year's service. He decided to work out the chemistry of the problem and to look for a way of solving it. Now a division of the Chemed Corporation, the Dearborn operation covers two contents. Its research laboratories are based in the U.S.A., Canada and Widnes, England. The U.K. field force of over 70 professional chemists and engineers helps solve the water treatment problems of thousands of industrial users.

The primary objective of the Dearborn field specialist is to maintain customers' plant at peak efficiency by the prevention of surface deposition and corrosion—whether the plant be used for steam generation, cooling process, air-conditioning, or general plant services.

Emphasis in recent years has moved towards realising the potential of water treatment technology in the sphere of energy and water-conservation. Boiler blowdown heat recovery systems, for

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instance, are now a standard part of the Dearborn range of services.

Instruments

Foster-Cambridge have recently moved from two separate premises in North London, into a new purpose-built factory located just off the A1 near to St. Neots in Cambridgeshire. Joining Foster-Cambridge in this move are Fielden Electronics and Metrowatt, creating one of the largest instrumentation companies in the UK, and bringing together expertise in electronic and mechanical process control instrumentation, level instrumentation, multimeters and portable test equipment, as well as other specialised equipment. The new factory is the latest development in the history of a company whose origins go back to the beginning of the 1890s. Over the last 85 years, it has developed from a small concern housed in a single workshop, into one of the largest manufacturers of temperature control instrumentation in the U.K.

In 1891 Robert W. Paul started an instrumentation business in Hatton Garden, London, and in 1897 he moved his instrumentation manufacturing facilities, along with other business interests, to premises he had erected previously in a field at Muswell Hill. In 1920 the company was amalgamated with the Cambridge Scientific Instrument Company and took the name of Cambridge and Paul, and in 1924 the company’s name was again changed to Limited.

In 1968 the Cambridge Group of companies joined forces with the George Kent Group to make the largest independent British manufacturers of industrial instruments. After reorganisation, the industrial companies were separated from those involved in scientific and medical products and the Foster Instrument Company of Letchworth was amalgamated with Cambridge Instruments to form Foster Cambridge Ltd.

BOOK REVIEW

BSRIA APPLICATION GUIDE 2/76—ESTIMATORS’ GUIDE TO LABOUR TIMES

by J. Webster
56 pages, BSRIA
£3.00 members, £15.00 non-members
37 Member Firms of BSRIA contributed labour schedules which were analysed to produce the data in this Guide. The source of the data was supplemented by interviews by estimators, published data and the results of previous studies.

Three different estimating methods are included; the unit labour rate, the counted fitting and the foot run method. The total prime cost of a project can be obtained by appropriate combinations. The schedules given in this publication are not intended to replace unchallenged a Company’s own information. They offer, rather, a frame of reference to more consistent and realistic figures particularly in areas where companies have little in-house experience or data.