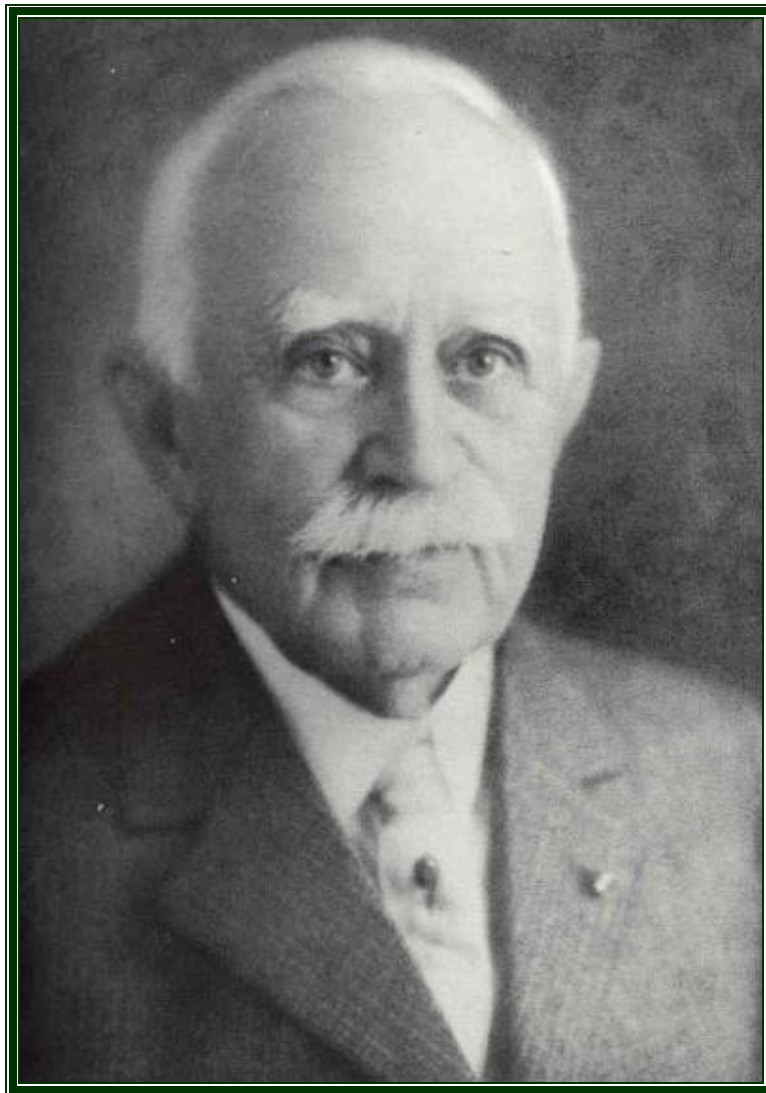




**WILLIAM PENN POWERS**  
**Active 1890's**



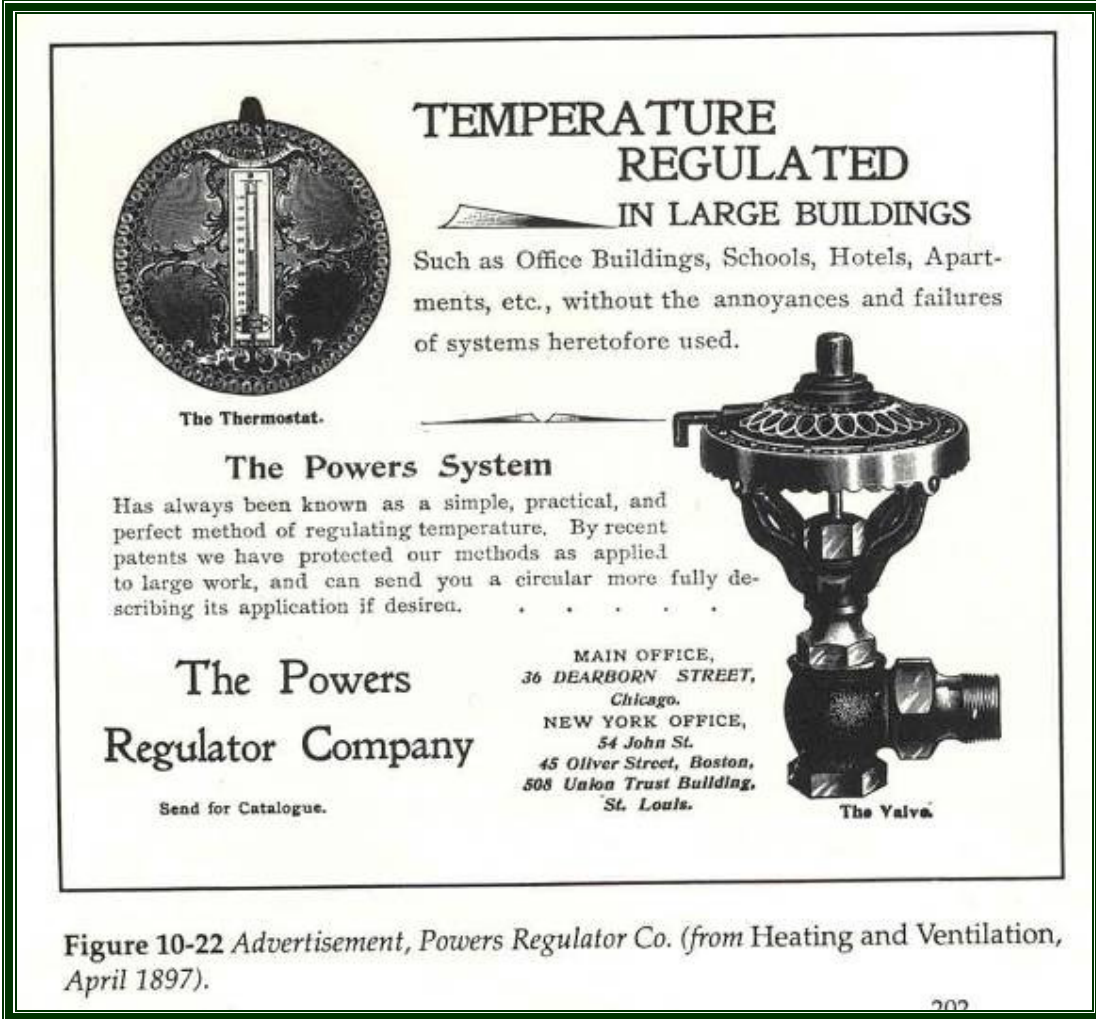
*Pioneer of automatic controls*

**[131] William Penn POWERS**

**c. 1890**


American businessman. Started W.P. Powers & Co. in LaCrosse, Wisconsin (1867). Later became interested in automatic controls and established the Powers Regulator Co., Chicago (1890). Its first thermostat design was round (15-in. diameter) and used in a church, being connected to a large diaphragm motor that controlled double mixing dampers on a fan heating system (1893). The company grew and prospered: two of its most famous control installations (c. 1930) were for New York's Chrysler and Empire State buildings.

*(Mini-biography from "The Comfort Makers," Brian Roberts, ASHRAE, 2000)*



**TEMPERATURE  
REGULATED  
IN LARGE BUILDINGS**

Such as Office Buildings, Schools, Hotels, Apartments, etc., without the annoyances and failures of systems heretofore used.



**The Thermostat.**

**The Powers System**

Has always been known as a simple, practical, and perfect method of regulating temperature. By recent patents we have protected our methods as applied to large work, and can send you a circular more fully describing its application if desired. . . . .


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NEW YORK OFFICE,  
54 John St.

45 Oliver Street, Boston,  
508 Union Trust Building,  
St. Louis.



**The Valve.**

**Figure 10-22 Advertisement, Powers Regulator Co. (from Heating and Ventilation, April 1897).**

202

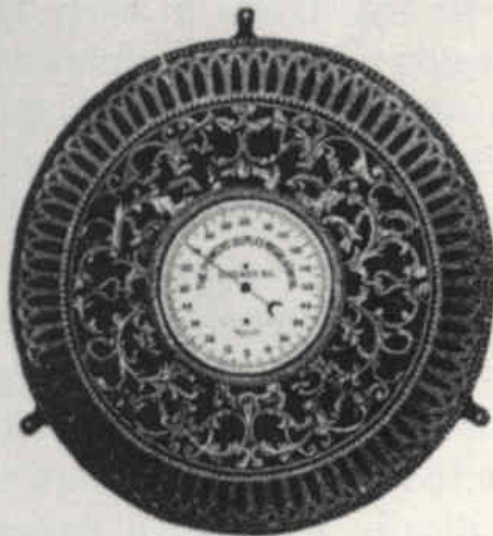
William Penn Powers (Figure 10-18) formed the firm of W.P. Powers and Company in LaCrosse, Wisconsin, in 1867 to manufacture pumps, shingles, and, later, a chain belt for sawmill operations. In a letter titled "The Result of a Dull Sermon," published in October 1918, Powers describes how, in 1887, he became interested in the field of automatic temperature control:

One Sunday during the sermon—which may have had some dull passages—the idea occurred to me of utilizing the relative boiling points of water under different pressures to control the draft. I could hardly wait for the benediction in my anxiety to consult the encyclopedia and verify my conception as to the effect of pressure on the boiling points.<sup>41</sup>

Powers went to Chicago in 1890 and formed the Powers Regulator Company. In 1893, the company installed its first thermostat in the First Congregational Church in Nashua, New Hampshire, and exhibited at the Chicago World's Fair that same year. The first thermostat design was round and relatively large, measuring 15 inches in diameter (Figure 10-19). It was connected to a large diaphragm motor that controlled double mixing dampers on a fan heating system.

During the early years of the twentieth century, the Powers Regulator Company manufactured a full line of controls (Figures 10-20 through 10-23) and installed temperature control systems in a number of large projects including many government and institutional buildings and schools. It installed the system in the Minnesota State Capitol and the City Prison ("The Tombs"), the Empire State Building, and the Chrysler Buildings in New York City.

*(Text and pictures from "Heat & Cold: Mastering the Great Indoors,"  
Barry Donaldson & Bernard Nagengast, ASHRAE, 1994)*



**THE POWERS**  
**Temperature Regulator**

For controlling Automatically the Temperature of Residences, Schools, Churches and public buildings.

Particularly adapted to

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Five Thousand in Use!!  
Simple, Durable and Effective!!  
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218 AND 220 THIRD ST., LOUISVILLE, KY.

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Jersey City, N. J.

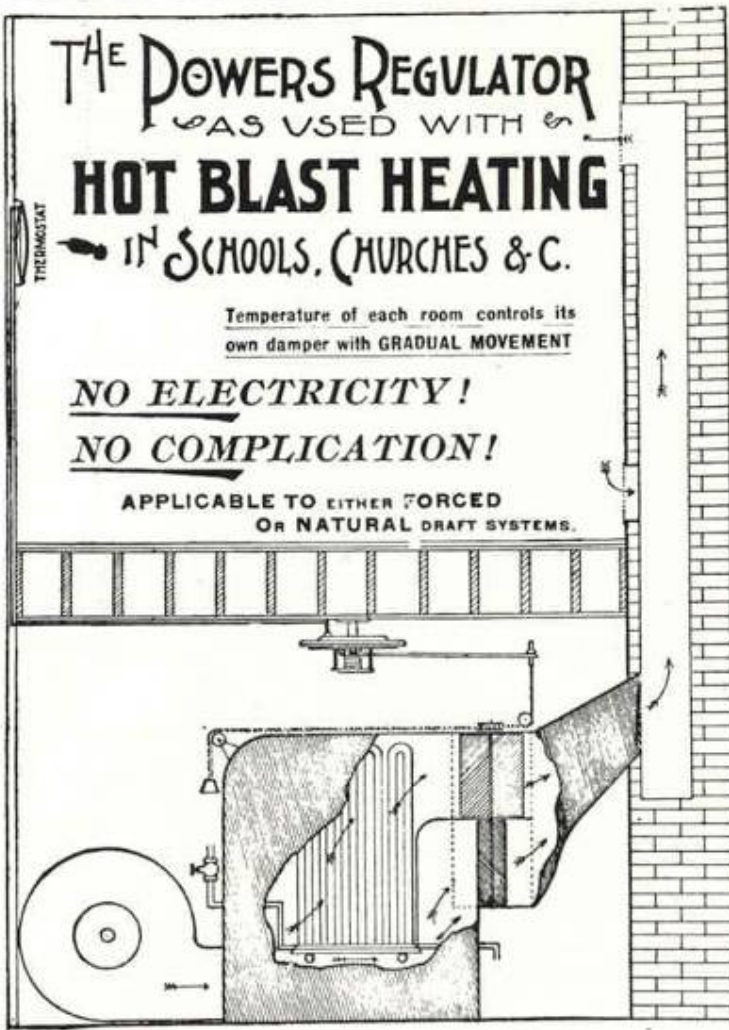
Figure 10-19 Advertisement for Powers thermostat (from Heating and Ventilation, May 15, 1895).

THE POWERS REGULATOR  
AS USED WITH  
**HOT BLAST HEATING**  
IN SCHOOLS, CHURCHES & C.

Temperature of each room controls its  
own damper with GRADUAL MOVEMENT

**NO ELECTRICITY!**  
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APPLICABLE TO EITHER FORCED  
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Figure 10-20 Advertisement, Powers Duplex Regulator Co. (from Heating and Ventilation, December 1894).



*The Chrysler Building in New York City under construction, 1929  
(The Chrysler Building," David Stravitz)  
The automatic controls system was provided by Powers Regulator Co*



*The Empire State Building in New York City under construction, 1930  
("The Empire State Building," a photographic essay by Lewis Hine)  
The automatic controls system was provided by Powers Regulator Co*



**J ROGER PRESTON**  
**1878-1949**



*Leading consulting engineer*





**[217] J. Roger PRESTON**

**1878-1949**

English contractor, then consulting engineer. Apprenticed to firm of A. Seward, Lancaster. Won first prize at IHVE Assistant's Competition two years running (1906-1907). Awarded Saxon-Snell Prize (1907) of Royal Sanitary Institute for his paper, *Suggestions for Improvements in Sanitary Appliances for Use in Workmens' Dwellings and Labourers' Cottages*. Later, won RSI Special Prize for *Heating and Ventilating of Public Buildings*. Worked for Walter Jones [240] of Jones & Attwood, Stourbridge, helping him with his researches. Then joined (1910) Maguire [241] at Maguire & Gatchell, Dublin, taking charge of the heating department. Later, became a director of Mumford Bailey & Preston, London. Set up (1924) as a contractor, later (1926) turning the firm into a consultancy practice. He developed an electric air speed meter (1907), a double-duct air-conditioning system (1909), and a *Heating Main Calculator* slide-rule. Preston was President IHVE (1929).

*(Mini-biography from "The Comfort Makers," Brian Roberts, ASHRAE, 2000)*

# The First Fifty Years

Gerald Benning



**J. Roger Preston & Partners**  
1926-1976

*(CIBSE Heritage Group Collection)*

When J. Roger Preston set up a consultancy business in 1926, he could hardly have imagined the amazing growth and diversification that 50 years were to bring in his chosen field; nor, ambitious though he was, could he have foreseen the contribution which his own Partnership was to make to such developments.

His career began conventionally enough. On leaving the Friends' School, Penketh, near Warrington, he was apprenticed to the firm of A. Seward & Co, then one of the oldest firms of heating and ventilation engineers in the country.

His fertile imagination, however, quickly led him in new directions that inevitably brought him to wider notice. He was still in his twenties when, in 1906, he won his first prize in the Assistant's Competition promoted by the Institution of Heating and Ventilation Engineers.

He also appears to have been the very first person to give a practical demonstration as part of a paper read to the Institution. A letter in the Institution archives, written by the-then Secretary Arthur Taylor and dated July 1906, contains the following passage: "We never had anything in the shape of a practical demonstration at any of the papers read before the Institution and I am delighted

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INCORPORATED

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" 1894. JMS. S. PALMER  
" 1895. GEORGE CRISPIN  
" 1896. W. NELSON HADEN

REGISTERED OFFICE:

99 FONTHILL ROAD,  
FINSBURY PARK,  
LONDON, N.

June 28th 1907.

Dear Sir,

I have pleasure in informing you that the Council of this Institution have awarded you the first prize amounting to £10. 10. 0. in the Assistants' Prize Competition for the past year, for which I enclose cheque. Your receipt at your convenience will oblige.

The Council have decided to reprint your paper in the Proceedings of the Institution, and would like to know if you would be willing to read it, and be prepared to answer the discussion thereon at any of the forthcoming meetings, of which I will give you due notice.

Yours faithfully,

*pp A. Taylor*  
Secretary.

J. Roger Preston Esq  
Lancaster.

to think that you will be the first to start what must materially add to the value of our Institution.”

Mr Taylor had occasion to write again in July 1907, this time informing him that he had again won first prize in the Assistant's Competition and enclosing a cheque. The amount was £10.10.0. (ten guineas) which, 70 years ago, was a not inconsiderable sum of money.

In 1907 J. Roger Preston also entered the annual Saxon Snell competition organised by the Royal Sanitary Institute, sharing the first prize of £25 for a Paper entitled 'Suggestions for Improvements in Sanitary Appliances for use in Workmen's Dwellings and Labourer's Cottages'. (That there was indeed a distinction between the two is a pointed reminder that we are dealing with the very different world that preceded World War I).

In his Paper – part of which, as can be seen, he reproduced as advertising material – Preston made a major issue of the economy of his apparatus. (That, at least, has a modern ring!) As he pointed out “Rents have to be kept as low as possible, and the most benevolent person or municipalities are not disposed to build cottage property at a loss.”

The all-inclusive estimate for this

installation was £5 per dwelling “with the advantage of being quite safe against explosion and very little risk of burst pipes.”

Preston was particularly interested in the quality of the air we breathe and wrote several papers on the subject of air analysis and measurement. For one of his prize-winning papers, he invented an electric recording air speed meter.

In 1910 Preston was appointed to take charge of the heating department of Maguire and Gatchell Ltd, Dublin (whose

chairman, incidentally, was President of the Institution of Heating and Ventilating Engineers in 1901).

In the Autumn of 1924, when a director of Mumford Bailey & Preston a firm of heating and ventilating contractors, he broke away to start his own contracting business. He took with him just one member of the staff, a man he had personally recruited – Leonard Copeland Watts.

Thus were sown the seeds of the present Partnership.

While still working as contractors, Roger Preston's new firm started advising on the design of heating, ventilating and other mechanical engineering services in buildings, including restaurants such as Verreys and Oddeninos in Regent Street and Gatti's in the Strand.

In 1926, Ashley & Newman, the architects for the new Masonic Peace Memorial in Great Queen Street, recommended J. Roger Preston as consulting engineer. This appointment (which necessitated disposing of the contracting side) effectively saw the start of the present consulting practice.

Both Preston and Copeland Watts were Quakers and that same year they were appointed to design the mechanical services at the Headquarters of the Religious Society of Friends at Friends House in Euston Road. (It is worth noting that the Quaker presence in the Partnership continues to the present-day through Peter Copeland-Watts, who joined his father as a Partner in 1956).



*The Masonic Peace Memorial, London*

## **J. ROGER PRESTON,**

M.I.Mech.E., M.R.S.I., F.I.Arb.

### **President, 1929-30**

THE PRESIDENT OF THE INSTITUTION OF HEATING AND VENTILATING ENGINEERS FOR 1929-1930 was born in 1878 in a small village on the borders of Westmorland. He was educated at the Friends' School, Penketh, near Warrington, and on leaving school was apprenticed to the firm of A. Seward and Co., Lancaster—one of the oldest firms of heating and ventilating engineers in the country—and at the same time he continued his education at the Lancaster Municipal College. In 1906 and again in 1907, he won the first prize in the Assistants' Competition promoted by the Institution, and in the same years he won conjointly the Henry Saxon-Snell prize of the Royal Sanitary Institute, following this with a special prize of the same Institute for a paper on "Heating and Ventilation of Public Buildings." On leaving Lancaster, he joined the staff of Jones and Atwood Ltd., Stourbridge, and assisted the late Mr. Walter Jones in many researches of a technical nature. In 1910 Mr. Preston was appointed to take charge of the heating department of Maguire and Gatchell Ltd., Dublin (whose Chairman was President of the Institution of Heating and Ventilating Engineers in 1901) and later took up a partnership in London, afterwards practising on his own account as a consulting engineer. In this connection it is of interest to note that he is consulting engineer for the Masonic Peace Memorial at present in course of erection in London. Mr. Preston joined the Institution in 1906 as the result of his success in the prize competition. He is very keen on maintaining the prestige of the Institution, and is a great advocate of suitable examinations. He is a member of many Committees, the author of several Papers, was elected to the Council in 1921 and became Vice-President in 1926.

(JIHVE)



Against the background of today's computerised technology it requires a considerable effort of imagination to recall that, in the early days of the Partnership, design was only just beginning to emerge from the 'rule of the thumb' era, indeed,

it has often been said that those were the days when buildings were measured, and calculations made, in terms of 'cubic umbrellas'.

Preston's office, nevertheless, was one of the first to use the newly published heat transmission coefficients and the pipe friction tables of losses based on Rietschel's experiments.

The first few years saw a succession of increasingly important contracts, with a corresponding growth in staff.

In April, 1936, Roger Preston took Adria Buchanan (who had joined him in 1925 to handle secretarial detail) and Leonard Copeland Watts into partnership: the firm then became J. Roger Preston & Partners.

A great deal of the early work carried out by the firm was in General and Mental Hospitals with particular emphasis on the remodelling of existing hospitals, many of which had been built in the middle of the preceding century or even earlier.

It was appropriate, therefore, that the Partnership be appointed to handle one of the only two completely new general hospitals to be built between the wars—the St Helier Hospital, Carshalton, for the Surrey County Council. This was the Partnership's largest job to that date, the tender for mechanical services being £153,500.

In addition, work was done on a number of new mental hospitals and the so-called mental deficiency colonies. At this time steam was widely in use for kitchens, laundries and sterilising, so the design and lay-out of steam plant in central boiler houses was commonly required, including the distribution of steam and the return of the condensate.

This was the era of considerable municipal development and the Partnership had its share of public building contracts such as swimming baths, slipper baths, washhouses, even turkish baths (including all the ancillary services such as steam baths and medical



*St Helier Hospital and Foundation Stone laying plaque*

baths). Leonard Copeland Watts vividly remembers testing the Turkish Baths at Londesborough Lodge, Scarborough, in mid-Winter when the temperature outside was 28°F and that of the hottest room 220°F.



*Leonard Copeland Watts*

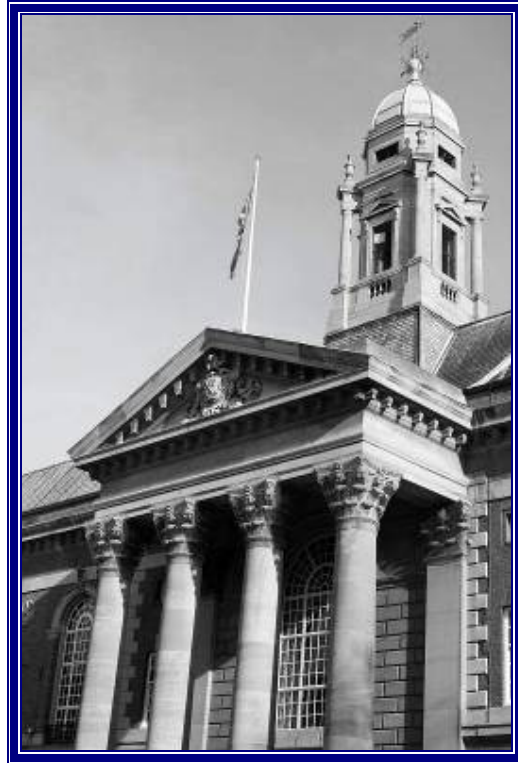
The Partnership also worked on a number of notable civic buildings, including Peterborough Town Hall, Poplar Town Hall and the Southampton Civic Centre.

By 1939, the number of contracts carried out to plans and specifications prepared by the firm amounted to some 400, of which 95 were hospitals, sanatoria and poor law institutions, 50 were civic buildings and 40 school and university buildings.

Also, at this time, Roger Preston, who was a Fellow of the Institute of Arbitrators, was selected by the Courts and by private companies to arbitrate in a number of disputes.

1939 saw Roger Preston in failing

health and, at the outbreak of war, he returned to his old home in Yealand, leaving Leonard Copeland Watts to run the business with the help of Adria Buchanan.



*Peterborough Town Hall*



*Poplar Town Hall*



*Southampton Civic Centre*

Roger Preston returned to the office for a short time after the war, finally retiring in 1946. One of his last acts was to engage as a junior designer one of the present Partners, Deryck Thornley.

Unfortunately, Preston had only three years in retirement before his death.

*(Text extracts from "The First Fifty Years")*

## OBITUARY

MR. J. ROGER PRESTON.

It is with much regret that we record the passing of another Past President in the person of J. Roger Preston who died on June 13th, 1949. Mr. Preston was one of our earliest members, having joined the Institution in 1906.

After an apprenticeship with Swards of Lancaster, he worked with Walter Jones at Stourbridge, and then was for a time in Dublin with Maguire & Gatchell. He came to London just as the methods of design were evolving from rule-of-thumb to the more scientific methods employed to-day, and Mr. Preston was particularly insistent that the scientific method of taking off heat losses was used instead of the older methods which had been in vogue.



Mr. J. ROGER PRESTON

After a few years in London as partner in a firm of contractors, Mr. Preston opened an office of his own and founded the consulting practice by which he was chiefly known. At this time there were not many consultants specialising in heating and ventilating, and Mr. Preston's reputation in this branch of engineering rapidly increased. Although he was not a Freemason, he was appointed as consultant for the Masonic Peace Memorial in Great Queen Street, and he also acted for many hospitals, municipal buildings and similar projects.

During his business career Mr. Preston was always keen to try new ideas, providing he was satisfied that they had been properly thought out and developed. He was proud of the reputation he had for designing a good scheme without extravagance and particularly appreciated the recommendations which he got from the trade largely because of the reputation he had for fair dealing. In recent years his health was poor and he was unable to keep in contact with Institution affairs; in fact his last appearance at an Institution meeting was at Scarborough in 1946.

(JIHVE, July 1949)



**JOHN WILLIAM STRUTT  
RAYLEIGH  
1842-1919**



*Acoustics Pioneer*



**John William Strutt RAYLEIGH, 3rd Baron**

**1842-1919**

English physicist. Studied mathematics at Cambridge where he was head of his class (1865). Elected Royal Society (1873). Director of Cavendish Laboratory, Cambridge (1879/84). Specialised in the study of wave motion of all varieties, including electromagnetic, black-body radiation, water and earthquake waves and sound waves. Wrote (1877) in his famous *Treatise of Sound*, "It appears that the streams of energy required to influence the ear and eye are of the same magnitude..." Secretary Royal Society (1885/96). Awarded Order of Merit (1902). Became Chancellor of Cambridge University (1908).

*(Mini-biography from CIBSE Heritage Group Records)*

Lord Rayleigh's first researches were mainly mathematical, concerning optics and vibrating systems, but his later work ranged over almost the whole field of physics, covering sound, wave theory, colour vision, electrodynamics, electromagnetism, light scattering, flow of liquids, hydrodynamics, density of gases, viscosity, capillarity, elasticity, and photography. His patient and delicate experiments led to the establishment of the standards of resistance, current, and electromotive force; and his later work was concentrated on electric and magnetic problems. Lord Rayleigh was an excellent instructor and, under his active supervision, a system of practical instruction in experimental physics was devised at Cambridge, developing from a class of five or six students to an advanced school of some seventy experimental physicists. His *Theory of Sound* was published in two volumes during 1877-1878, and his other extensive studies are reported in his *Scientific Papers* - six volumes issued during 1889-1920. He has also contributed to the *Encyclopaedia Britannica*.

*(From nobelprize.org)*

THE  
THEORY OF SOUND.

BY

JOHN WILLIAM STRUTT, BARON RAYLEIGH, M.A., F.R.S.  
FORMERLY FELLOW OF TRINITY COLLEGE, CAMBRIDGE.

VOLUME II.



London:  
MACMILLAN AND CO.  
1878

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