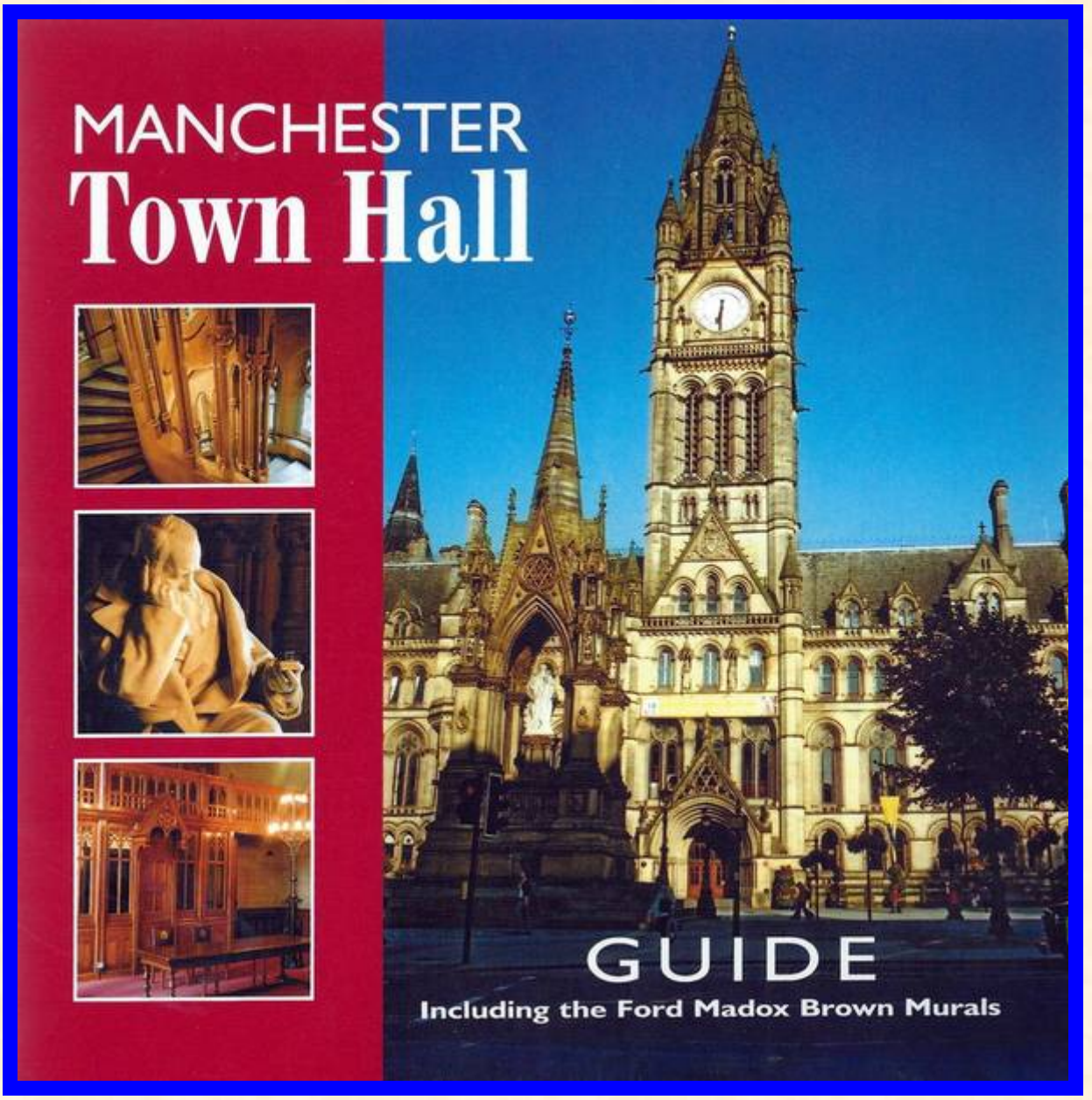
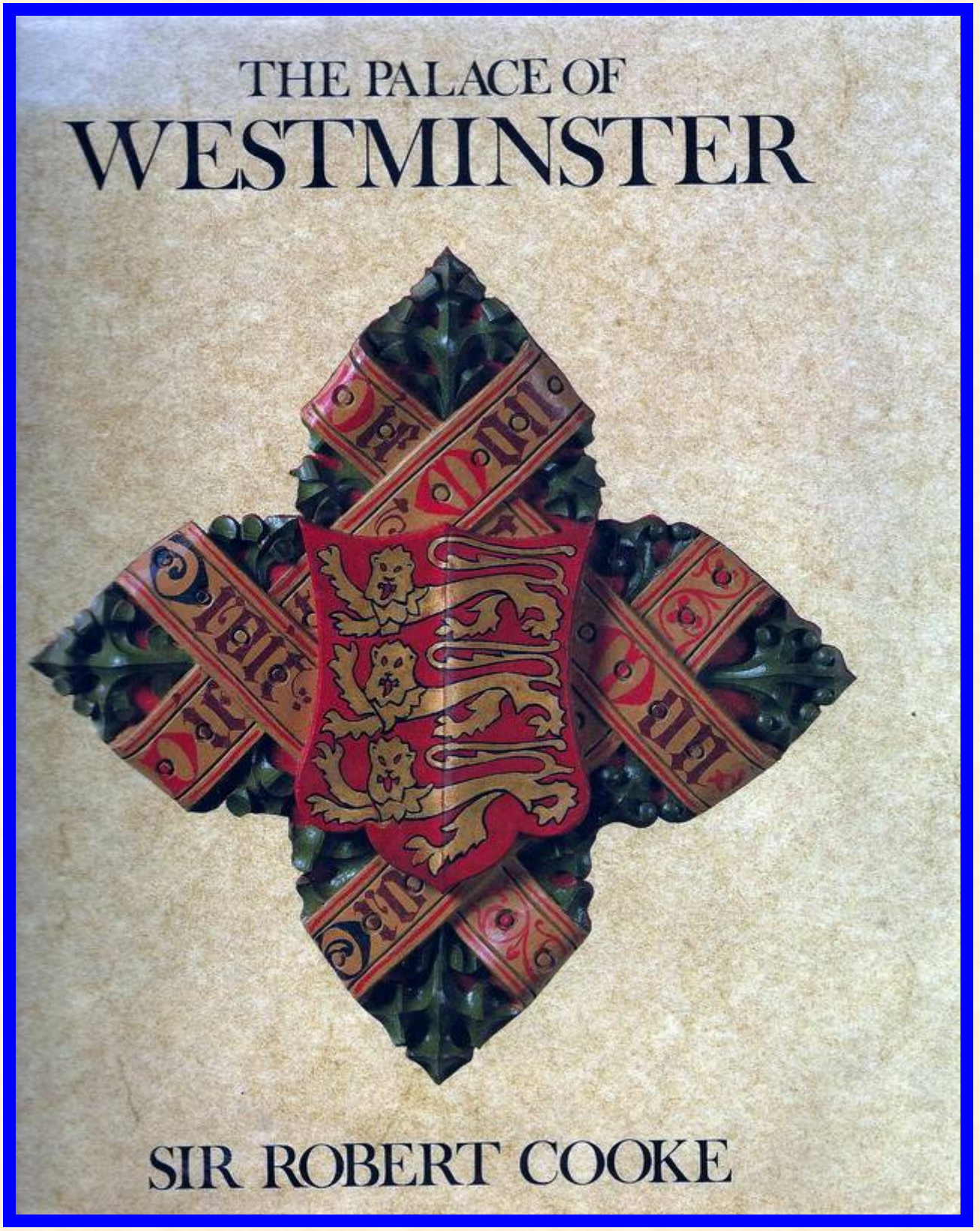
CIBSE HERITAGE GROUP

PUBLICATIONS WITH INFORMATION ON GOVERNMENT BUILDINGS

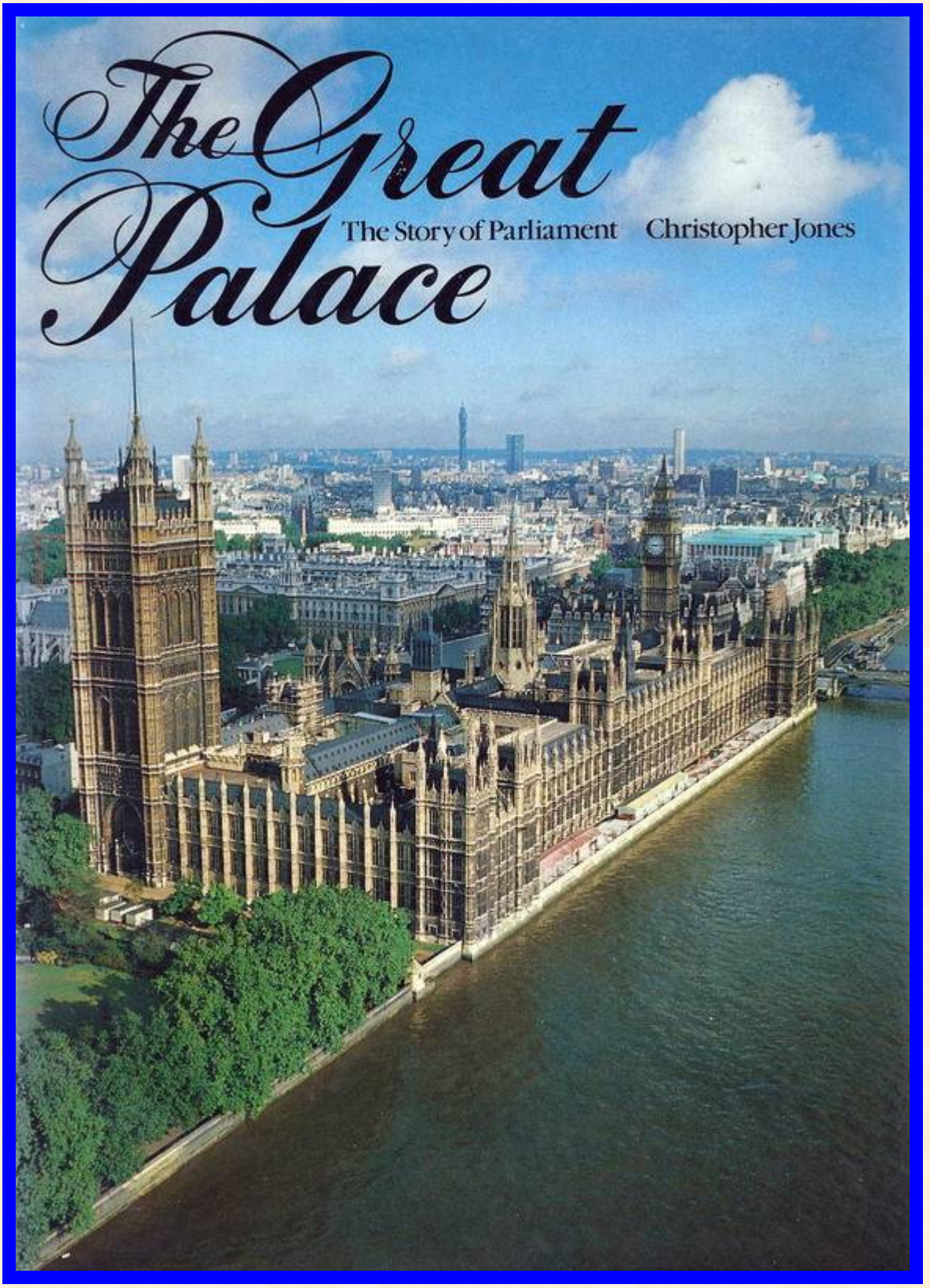
Including heating, ventilation & air conditioning



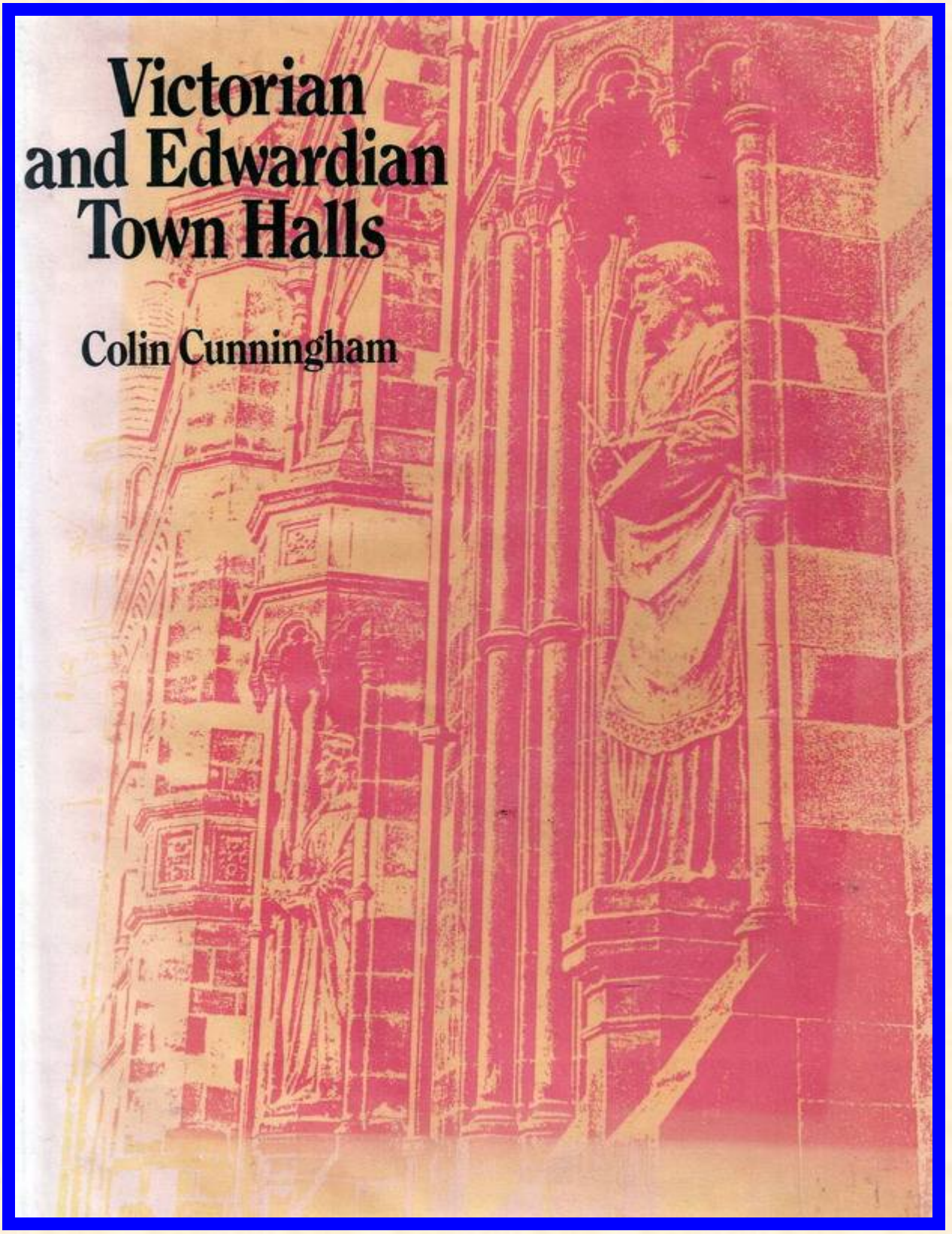
Undated: heating was provided by G N Haden & Sons Ltd



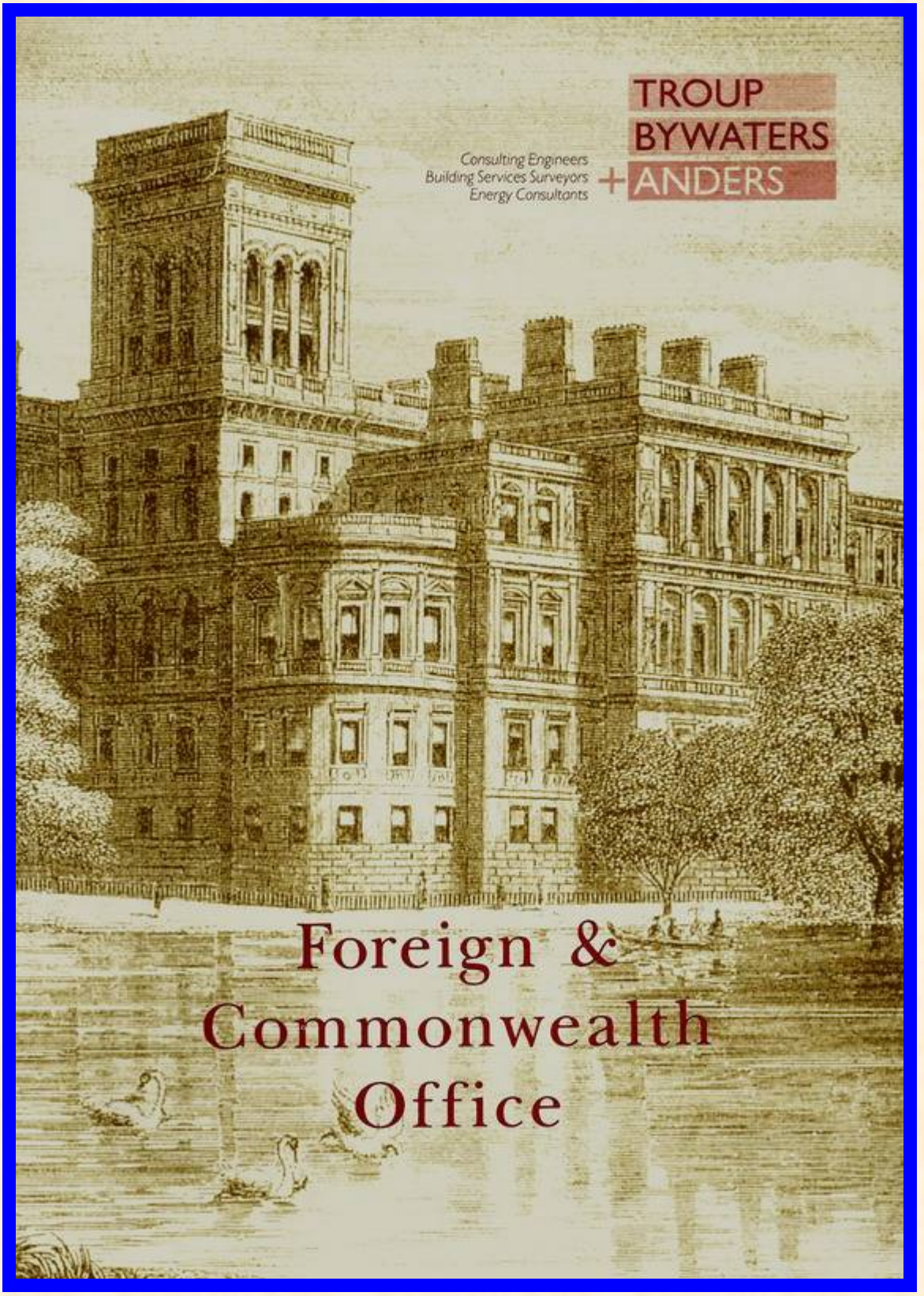
1987 includes drawings of Dr Reid's ventilation & acoustic proposals and drawing of Shone's sewage ejectors



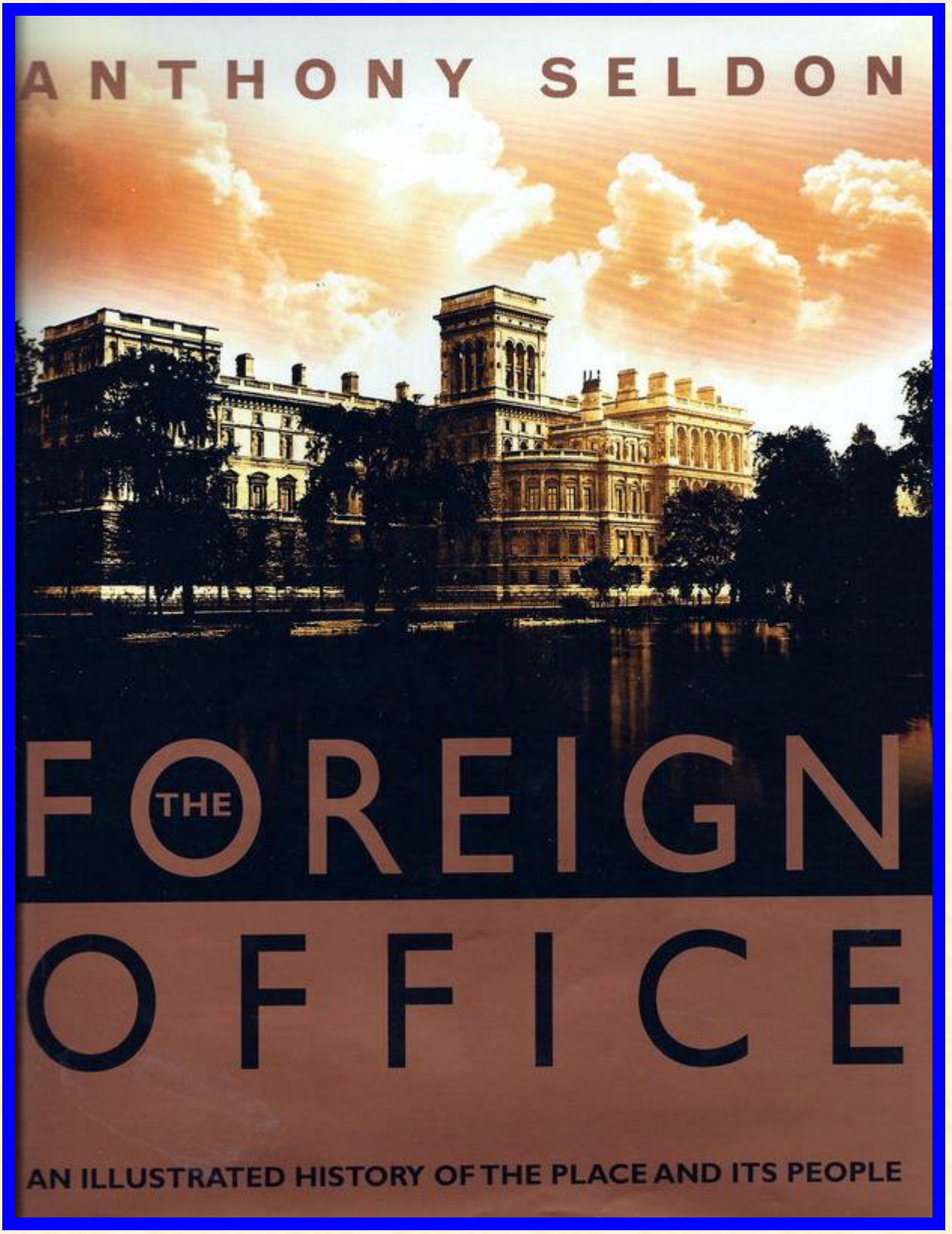
1983 Chapter 8 is "The Great Ventilators"



1981 Illustrations & information on some 100 Town Halls



1996 History & refurbishment



2000 An illustrated history

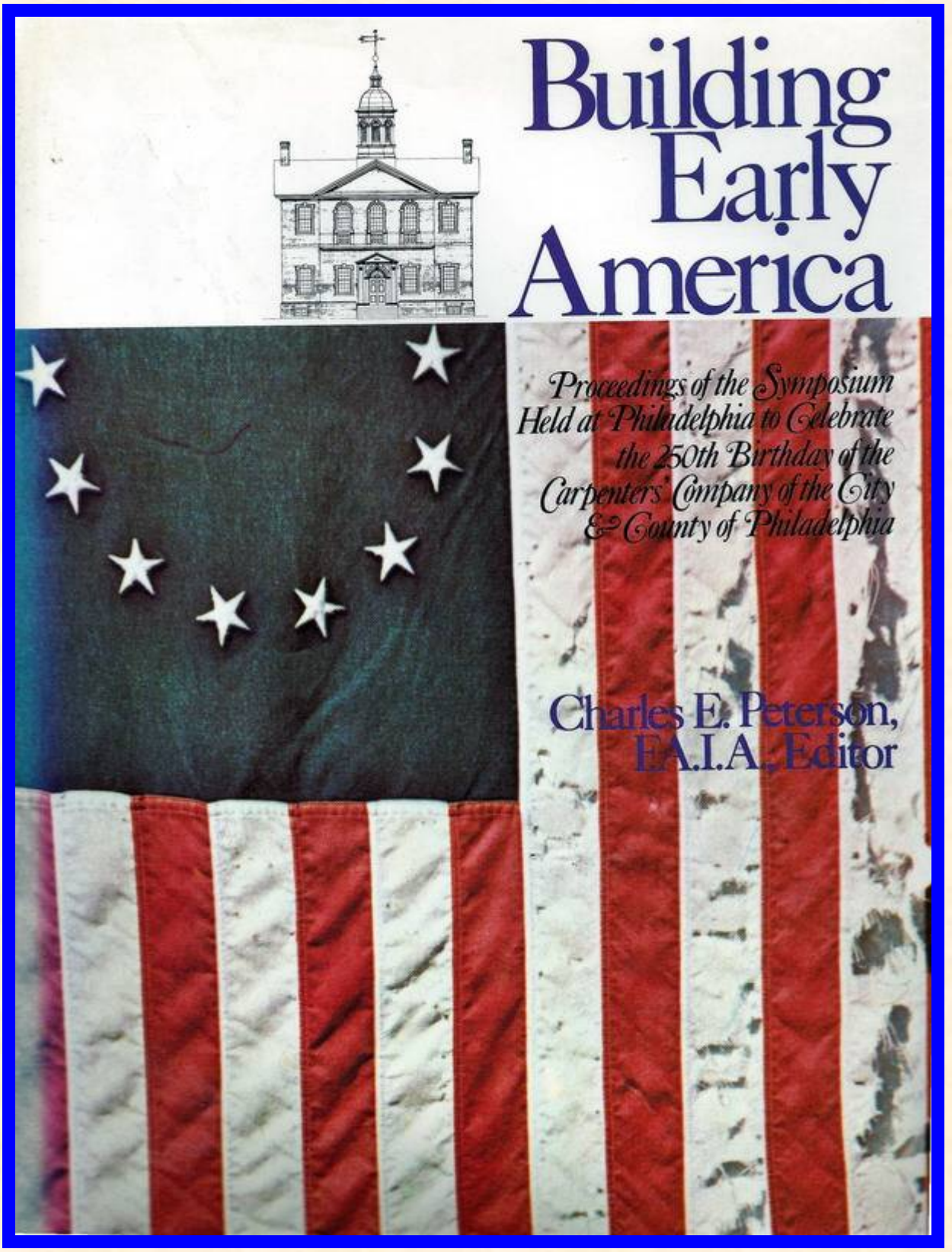
The Temporary Houses of Parliament and David Boswell Reid's Architecture of Experimentation

by HENRIK SCHOENEFELDT

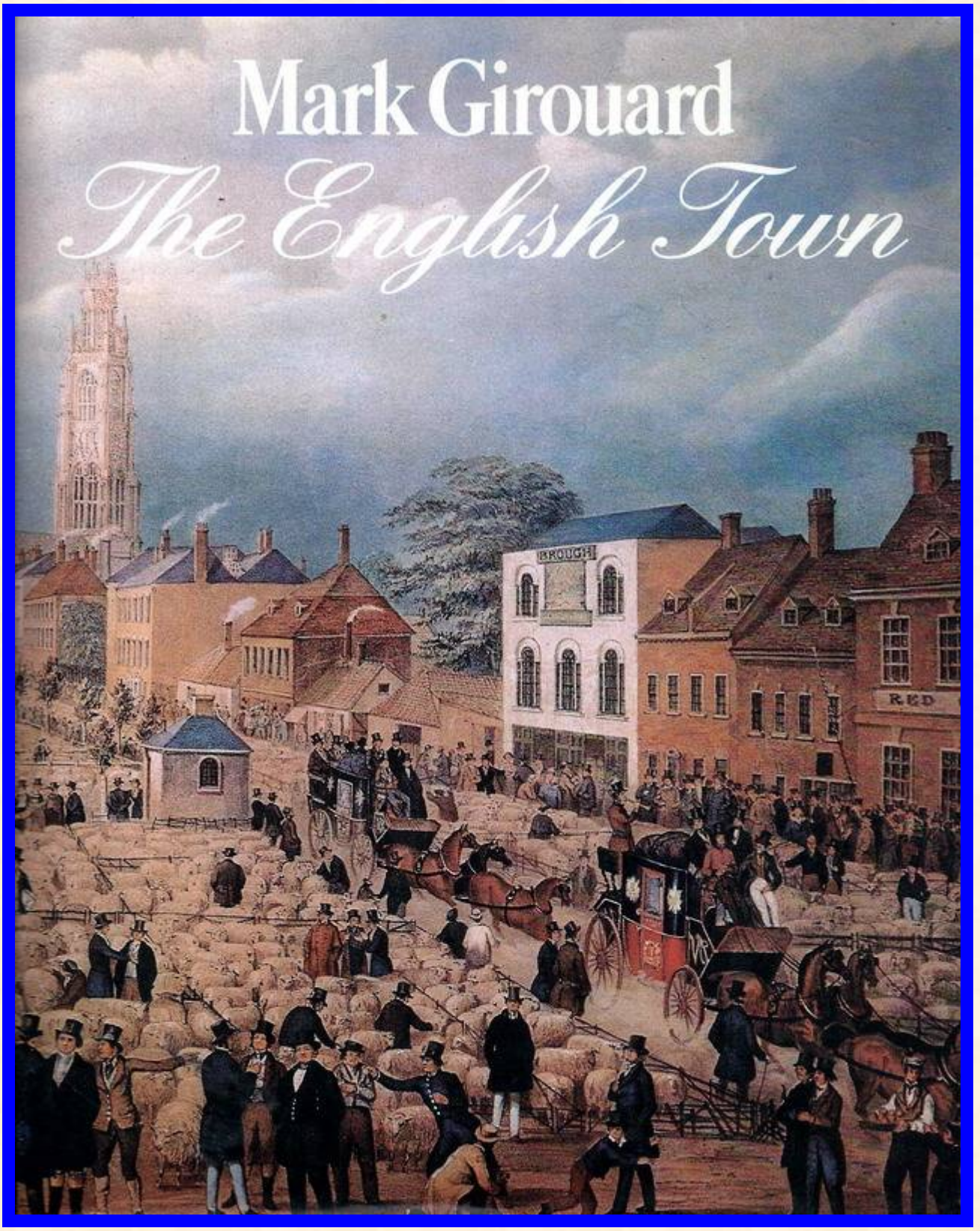
> what they may lose in dignity they will undoubtly [*sic*] gain in comfort and health.
> (*The Champion*, November 1836)

The heating and ventilation of the two debating chambers in the British Houses of Parliament occupied the minds of various Select Committees and some of the country's most renowned scientists and engineers during the nineteenth century.[1] Indeed, since the seventeenth century the chambers had been major sites for technical experimentation in the field of ventilation, which, according to the Victorian physician Neil Arnott, reflected the technological and scientific advances made during this period.[2] Nineteenth-century writers chronicled the design and testing of the numerous heating and ventilation systems that had been deployed.[3] However, the strategies implemented during the eighteenth and early nineteenth centuries were not entirely successful in generating a pleasant internal environment. The destruction of the ancient Palace of Westminster by fire on 16 October 1834 therefore provided an important opportunity to design completely new debating chambers from first principles.

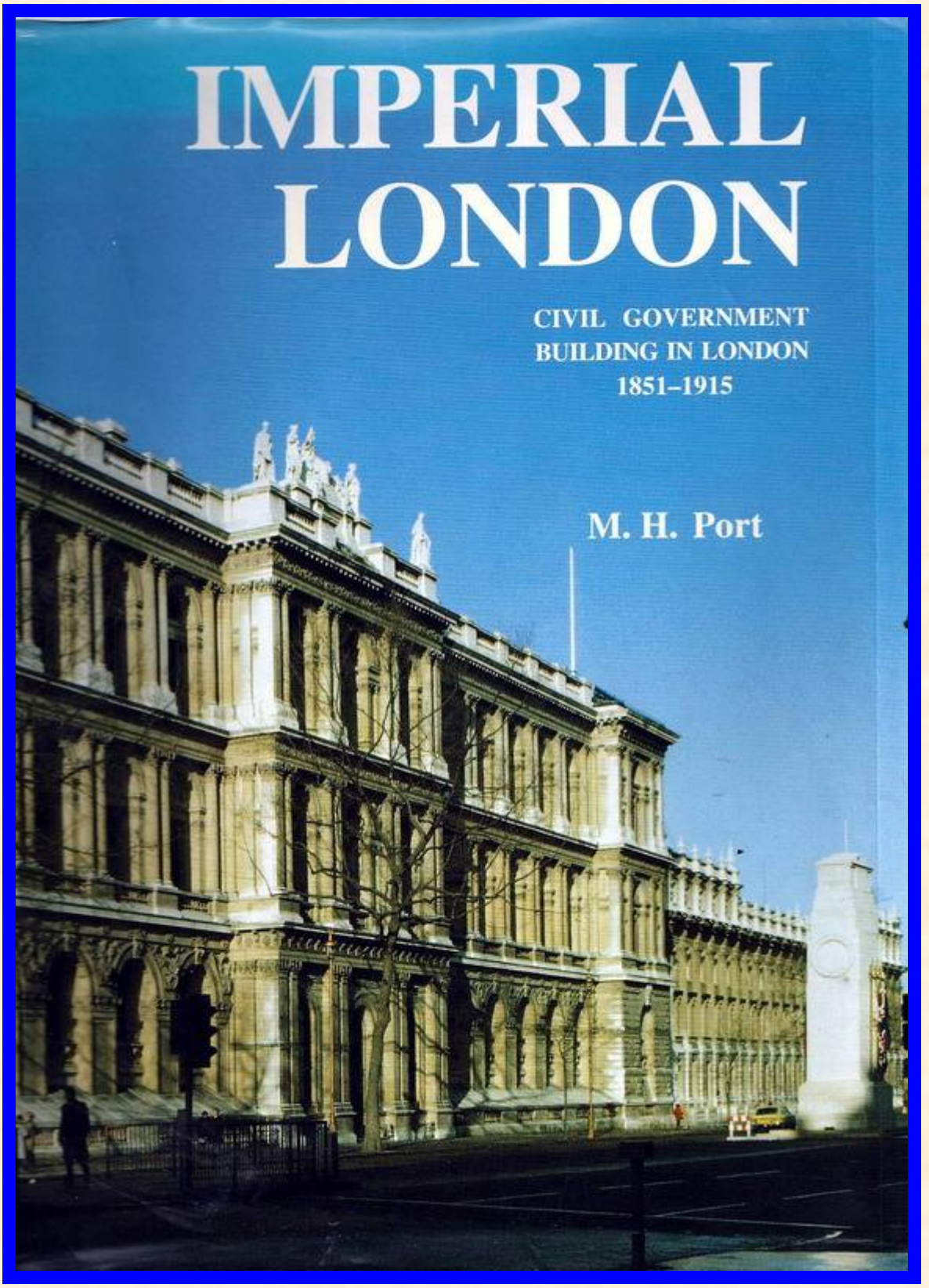
In the aftermath of the fire, temporary chambers were constructed to the designs of Robert Smirke, but planning was soon underway for a more permanent solution. Between 1834 and 1836 several committees were engaged in developing a comprehensive brief for a new, purpose-built Houses of Parliament, which included separate inquiries into ventilation, artificial lighting, and acoustics.[4] An architectural competition was held between August and November 1835 to procure a design for the new Palace, but a separate Select Committee was appointed in July of the same year to make a detailed examination of ventilation, lighting, and acoustics, and to recommend potential technical solutions that could be adopted in the Palace once a design had been selected. These inquiries were only the beginning of an extensive scientific endeavour that lasted fifteen years. The 1835 Select Committee on Ventilation consulted various scientists and technical experts, including Neil Arnott, Michael Faraday, William T. Brande and John Sylvester. However, David Boswell Reid (1805–63), the Scottish physician and Professor of Practical Chemistry at the University of Edinburgh, was the



1976 Includes "Building the Capitol" and "An Historical Sketch of Central Heating; 1800-1860"



1990 Has chapter on “The Town Hall”



1995 Information on London's Government Buildings

NIKOLAUS PEVSNER

A HISTORY OF BUILDING TYPES

THAMES AND HUDSON
LONDON

1976 With 4 chapters on Government Buildings

YESTERDAY IN PARLIAMENT

For two centuries the Palace of Westminster has been a testing ground for successive innovations in building services. *John Darwin* highlights the significant names and events.

Heath

Though the Palace of Westminster has been a seat of government for over 1000 years, it was only following the destruction of most of the Houses of Parliament in 1834 in a major fire that serious thought was given to its building services.

A competition was held for the design of a structure which would be in the "Gothic" style to harmonise with Westminster Abbey and Westminster Hall. It was won by Charles Barry. To look after the ventilation Barry asked the Minister for Woods & Works to appoint a practical engineer, and Dr David Reid who was undertaking a ventilation scheme for the temporary House of Commons was appointed (the Commons were sitting in the temporarily reroofed House of Lords). He was to be independent of the architect except on solidity or architectural character.

Reid had the firm notion that the only pure and clean air was at some 300 ft up. His ventilation scheme drew air in through the Victoria and Clock towers, ducted it under the basement and allowed it to pass through the Chambers and committee rooms finally to be drawn out by induction furnaces. Unfortunately he was not enough of a practical engineer to know that the machines available for moving air were inadequate for the task he envisaged. He used a kind of air machine like a barn door driven by a steam piston. To handle the amounts of air needed at such low pressures it was essential to have very large ducts.

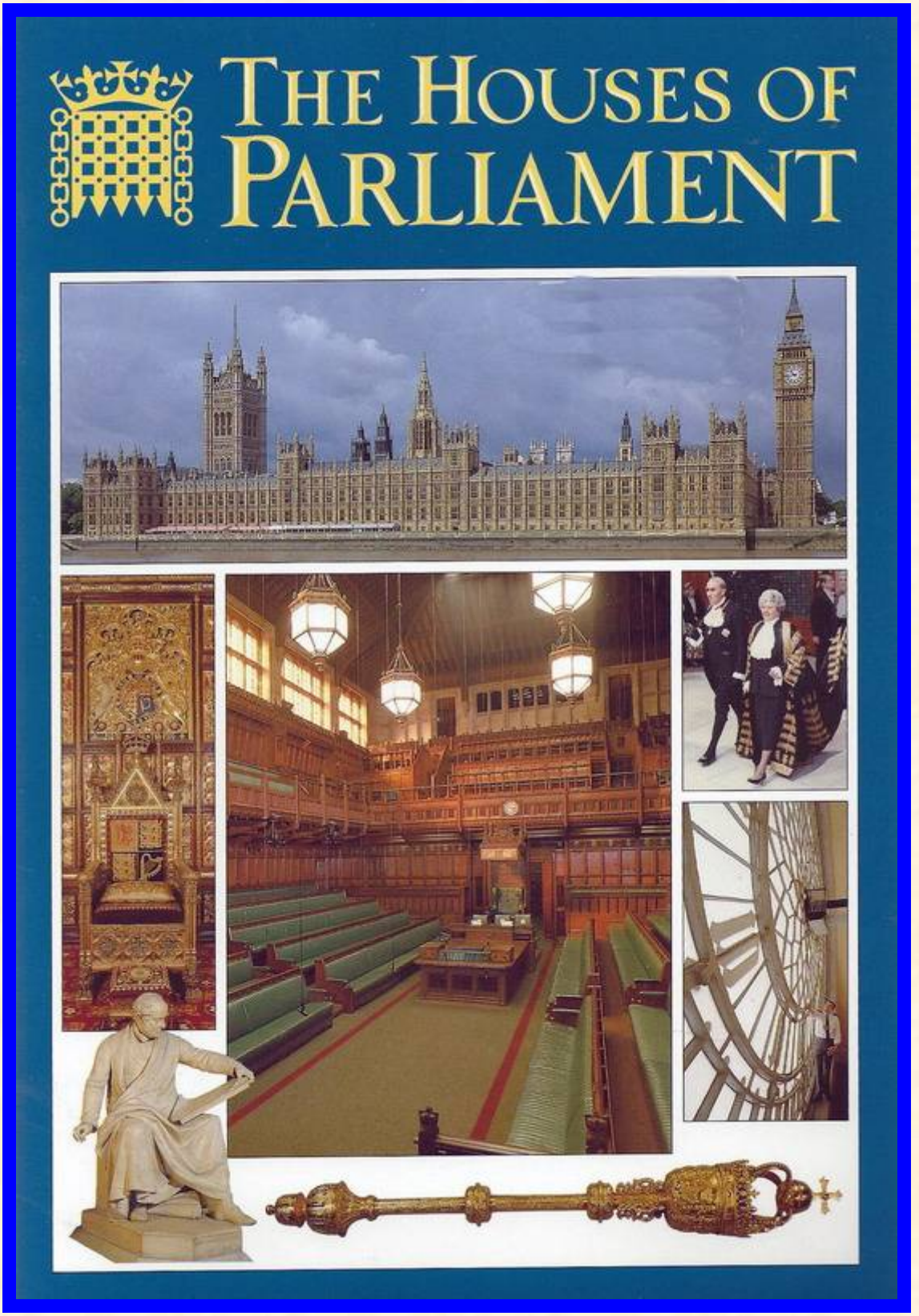
Reid's scheme also required a central tower some 300 ft high for the expulsion of the vitiated air, which was not in the original design. Barry and Pugin added the St Stephens Tower, the first time in history that the architectural style of building was fundamentally altered on account of the needs of the mechanical system. Reid rather overlooked the fact that in a smoky urban environment the air is not always pure even at 300 ft. On the other side of the Thames were a caustic factory and 11 adjacent dirt yards where household rubbish was burnt to make bricks. All these smells were drawn into the system.

The first change came as soon as 1847 when Reid's system for the House of Lords was replaced by one devised by Barry which brought in air from the Victoria Tower, washed it, heated it and pressurised it by a 20 hp fan to pass it into the Chamber at high level. The extract was taken from the centre of the ceiling by means of an induction furnace. This system was not ideal and various modifications were tried including air removal through the floor. Eventually the drawing of air from the Victoria Tower was discontinued.

Meanwhile in the Commons the Reid system continued with much of the fresh air brought in from the Clock Tower and ten other openings mainly on the roof tops. His later scheme was modified to include coarse filters and steam and water warming and cooling of the air. There was no washing of the air however and smells continued so that the Commons decided in 1852 to dispense with Reid's services.

Goldsworthy Gurney was then called in. He decided to reverse the direction of the

March 1980 CIBSE Journal



1994 Brochure

KC-84-08 No. 1

Nineteenth Century Heating and Ventilation—The Houses of Parliament, London, and the New York State Capitol, Albany

B. Donaldson
ASHRAE Affiliate Member

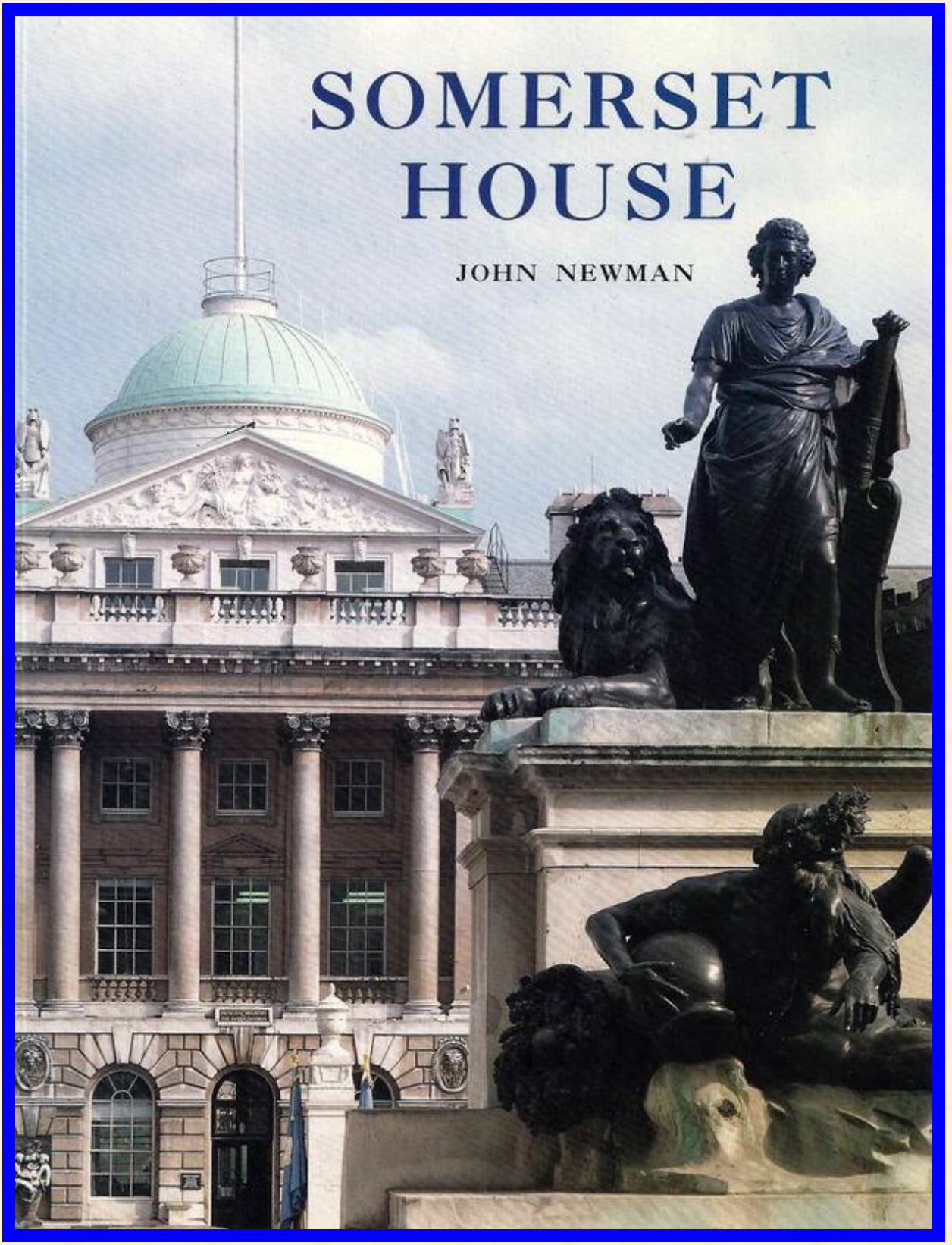
ABSTRACT
This paper discusses the early developments of steam heating and mechanical ventilation for the Houses of Parliament and the New York State Capitol in Albany. Historically, the study begins with the work of Dr. J.T. Desaguliers and Sir Humphrey Davy on the Houses of Parliament in the 18th and early 19th centuries. The primary focus, however, is on the work of Dr. Boswell Reid after 1834 on the House of Lords and House of Commons and later the work of Thomas Fuller and Isaac Perry on the New York State Capitol in Albany. The paper describes the design of steam heating, air-distribution systems, and filtration as applied to these two early examples of heating and ventilating technology.

BACKGROUND
The technology that has become common to the engineering of buildings today originated primarily with the theories and early developments in heating and ventilating that were developed throughout the 18th and 19th centuries. The experimentation and empirical studies of individuals such as Nicholas Gauger, Benjamin Franklin, Count Rumford, and James Watt contributed a great deal to the understanding of principles of heating and ventilating and created the foundation for the applied technology of the 19th century. Gauger, Franklin, and Rumford's work was primarily in ventilation and efficient stove design. Although steam had been used to distribute heat in 1745 by Col. William Cook, it was not until Watt's experiments on some of the earliest steam heating systems in the 1780s that significant advantages were provided over fireplace heating. In 1791 John Hoyle obtained the first patent for a gravity steam-heating system for greenhouses and churches.

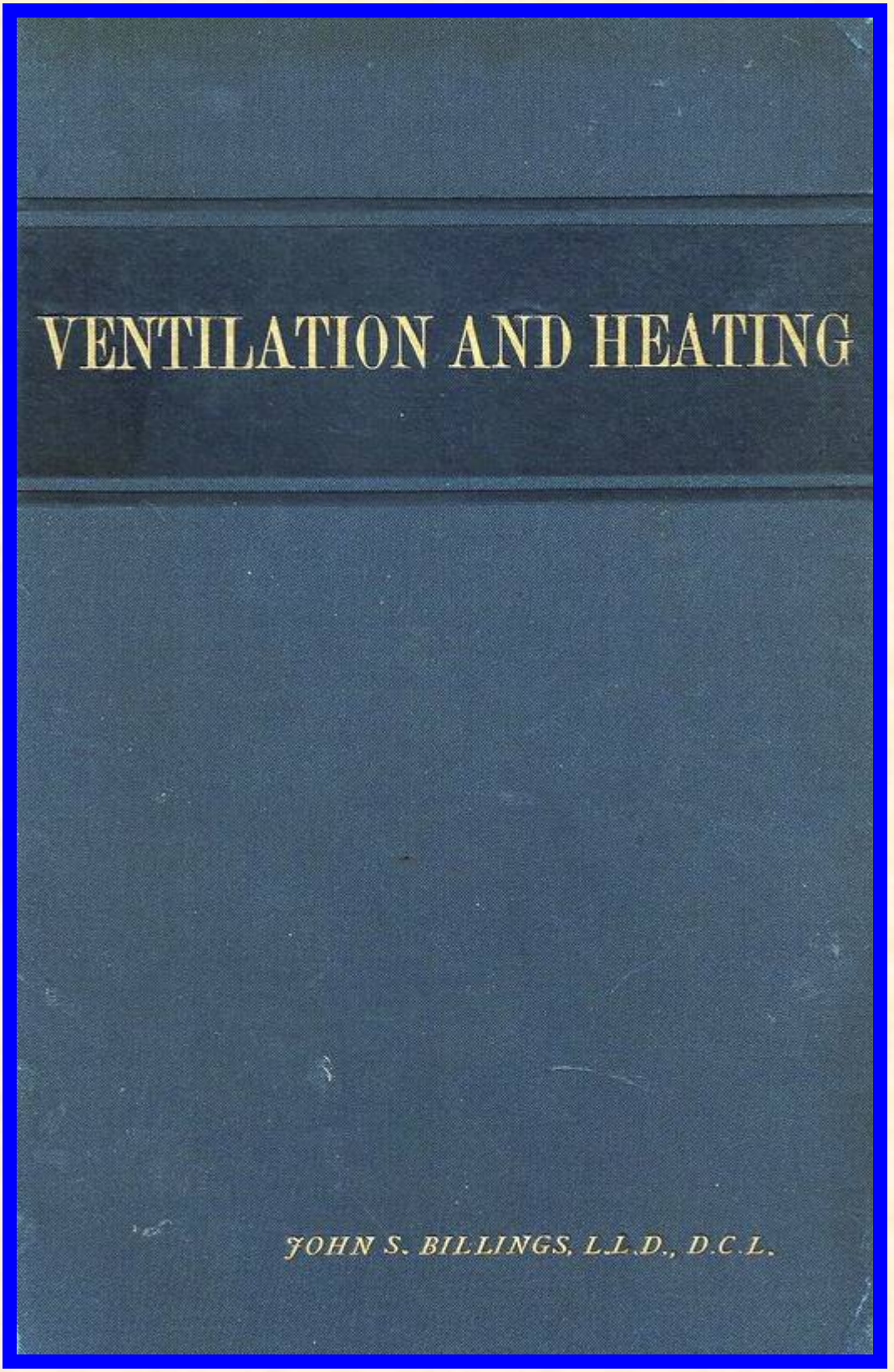
> Col. William Cook first suggested the idea of employing steam as a means of distributing heat, in 1745. Philosophical Transactions, vol. xiii. p. 370, or Abridgement, vol. ix p. 125. It has since been applied in various ways, most of which have been repeatedly secured by patents. The first of these was granted to John Hoyle of Halifax, in 1791, for a method of communicating heat to green-houses, churches, etc. His plan consisted in conveying steam in pipes or tubes, into, round, or through, the place to be warmed: the pipes being first raised to their highest elevation, and then descending with a gentle declivity to a cistern for the condensed steam: the supply of water to the boiler to be regulated by a ball-cock. Repertory of Arts, vol. i. pp. 300-303, old series. This scarcely differs in any thing from Col. Cook's plan, which had been known forty-six years sooner. In 1793, a patent was granted to Joseph Green, whose mode of application was different, and has had the honour of being adopted, with slight alteration of form, by a number of later projectors. His method consisted in passing fresh air through a worm or pipe, immersed in hot water or steam, by which means the purity of the air was to be preserved. When the heat was to be conveyed to a distance, he says, "I inclose the pipes through which the warm air is conveyed in large pipes, to which the steam rises from the

Mr. Barry Donaldson
Assistant to President
Tishman Research Corporation
New York, New York

Trans.ASHRAE 1984



1990 A History



1896 Chapter XV describes, with drawings, the ventilation of the U S Capitol & the Houses of Parliament

THE PIONEER WHO RID *Parliament* OF HOT AIR

In the first of a series of articles looking at the influence of pioneering engineers and buildings, **Dr Neil Sturrock**, chairman of the CIBSE Heritage Group, profiles **David Boswell Reid** – probably the first true building services engineer

David Boswell Reid – the 'grandfather' of air conditioning

Dr David Boswell Reid is considered to be the 'grandfather' of air conditioning engineering, and was also a pioneer in acoustics and lighting design.

He is perhaps most famous for his involvement with the design of the UK Houses of Parliament, in Westminster, a project for which his official title was 'Ventilator'. He is very often unfairly blamed for the failure of the system to provide satisfactory environmental conditions for the building, which he always argued was down to the lack of cooperation afforded him by the architect, Charles Barry.

Reid argued that Barry frequently acted without authority in making alterations that affected the large-scale air movement required for his system to work. Barry, on the other hand, was determined that Reid's grand ideas should not be allowed to control the architecture.

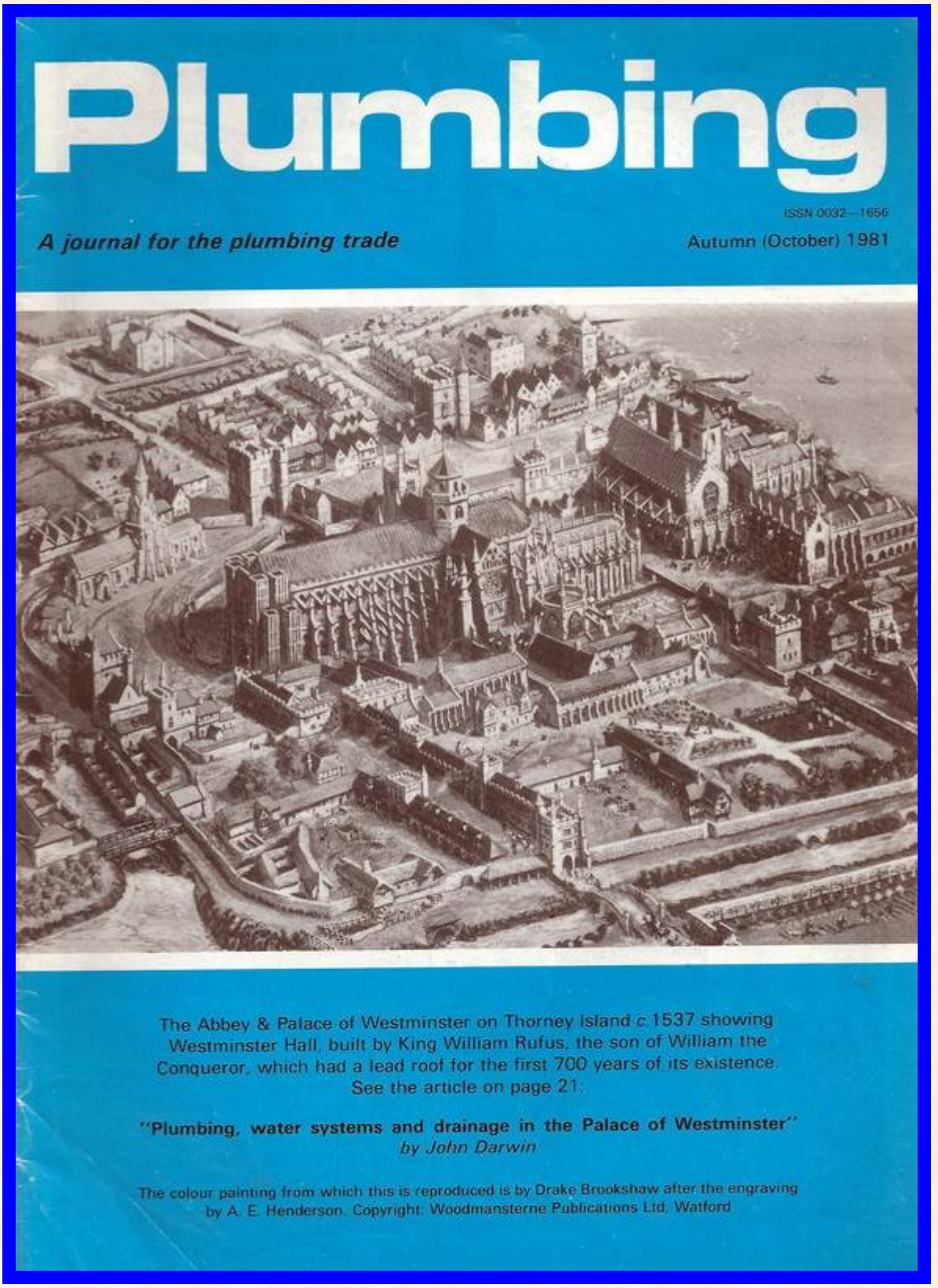
What is rarely reported is that Reid – having been dismissed by the government – was exonerated by an enquiry in February 1852, and awarded more than £3,000 in compensation. He was then allowed to make more than 30 alterations to the building to try to improve matters, but it was never wholly satisfactory, despite the varied attempts of other engineers over subsequent years.

Reid's fascination with ventilation had begun after a fairly circuitous journey through the world of academia at Edinburgh University.

He initially went there to study medicine, following in the footsteps of his father, Dr Peter Reid – who lectured in the Department of Medicine – and his older brother. However, his main interest was in chemistry.

Reid was disappointed to discover Edinburgh offered no classes in practical chemistry, so, in around 1826, he started his own, in some outbuildings at Edinburgh High School. His reputation quickly grew and, in 1828, he was asked by Professor Thomas Hope to help teach chemistry at the university.

January 2015 CIBSE Journal Paper by Dr Neil Sturrock, Chairman CIBSE Heritage Group



Plumbing

ISSN 0032–1656

A journal for the plumbing trade

Autumn (October) 1981

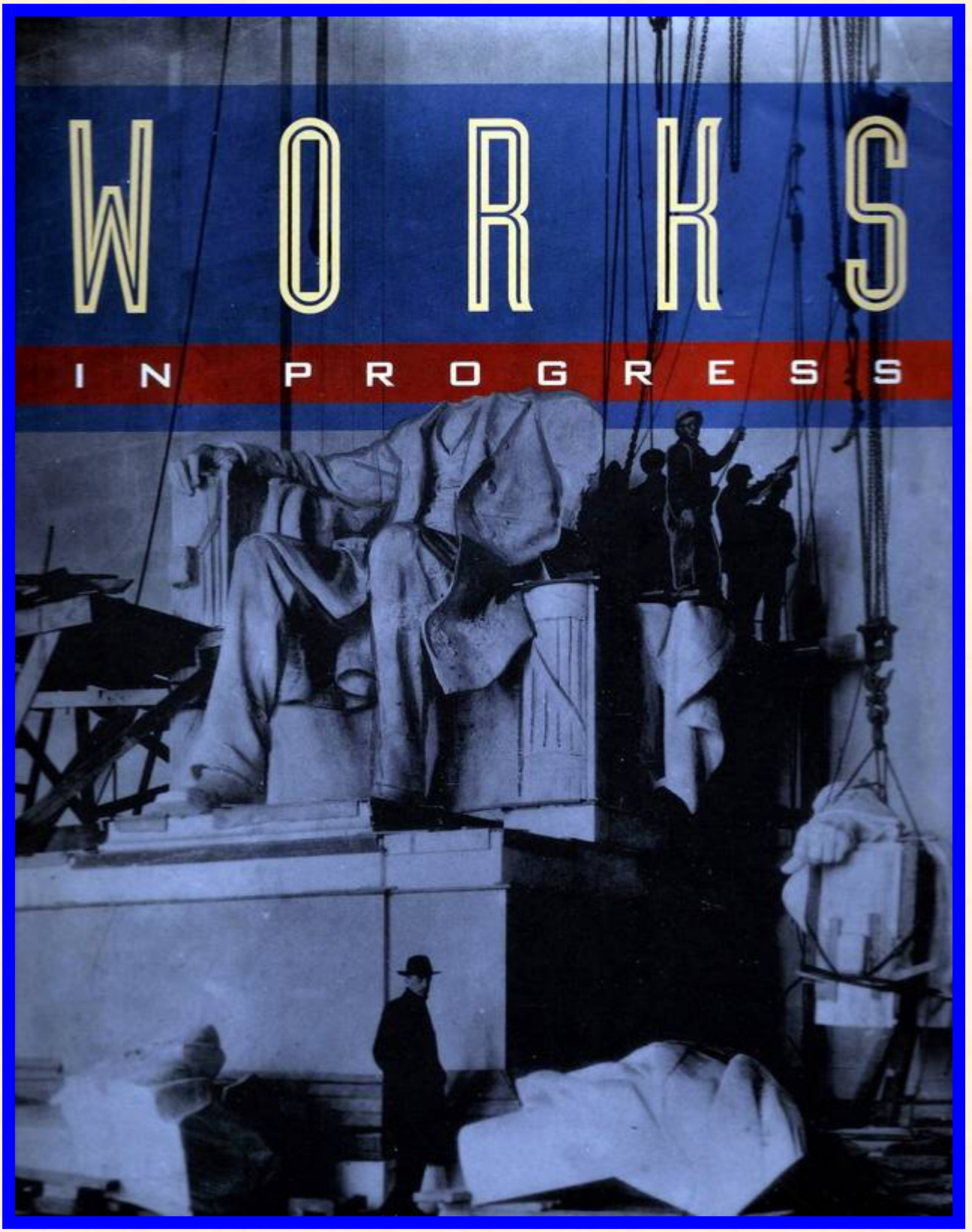
The Abbey & Palace of Westminster on Thorney Island *c* 1537 showing Westminster Hall, built by King William Rufus, the son of William the Conqueror, which had a lead roof for the first 700 years of its existence. See the article on page 21.

"Plumbing, water systems and drainage in the Palace of Westminster"
by John Darwin

The colour painting from which this is reproduced is by Drake Brookshaw after the engraving by A. E. Henderson. Copyright: Woodmansterne Publications Ltd, Watford

1981 "Plumbing, water systems & drainage in the Palace of Westminster"

1973 Has sections on "National Buildings" & "Civic Buildings"



1994 Shows construction photos for U S Capitol, Treasury & Pensions Buildings