

# CIBSE HERITAGE GROUP

*Newsletter No.31 December 2014*

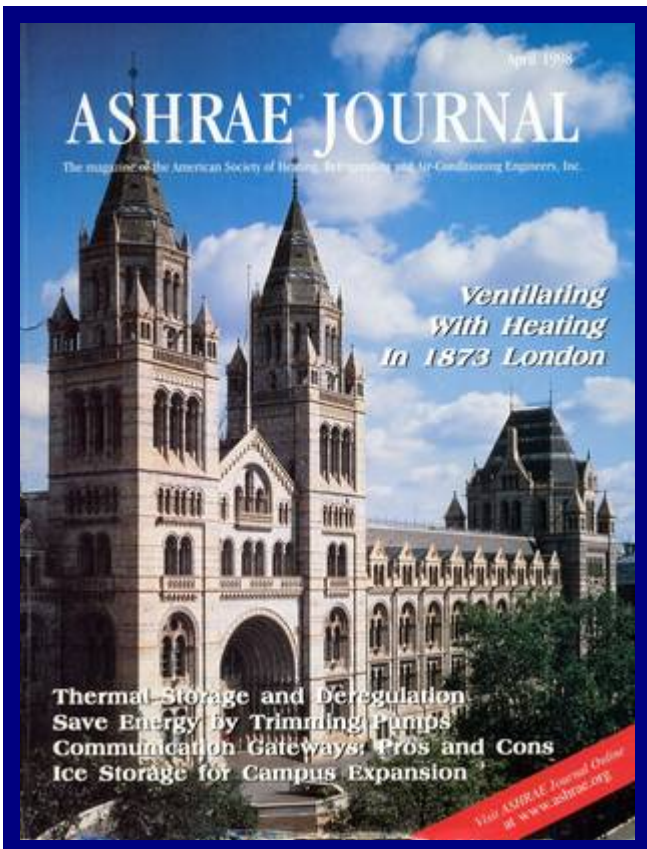
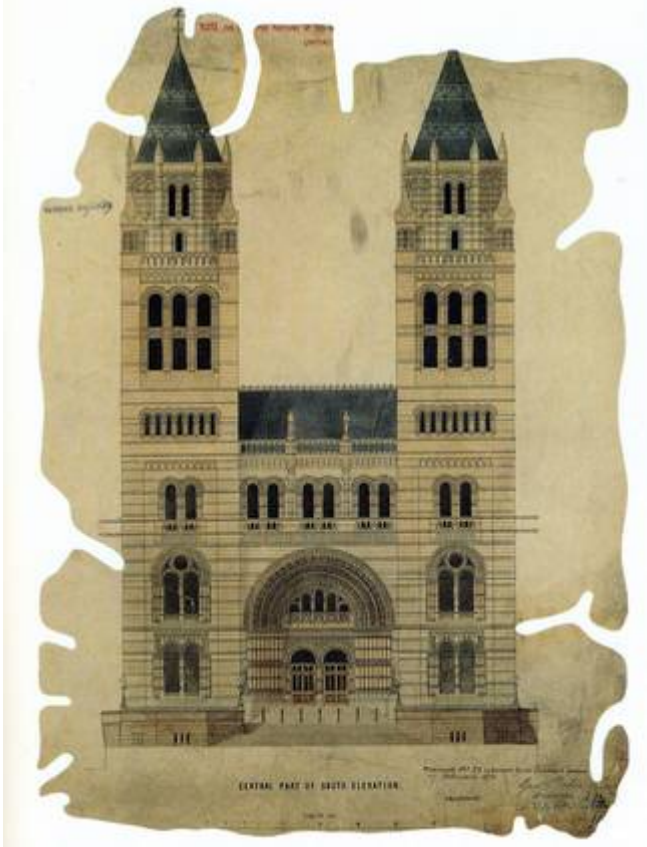
**Congratulations to Frank Ferris of the Heritage Group on the award of the CIBSE Silver Medal. Frank has been a member of the Group since 1998 having set up our Website and the Newsletter. He serves as a consultant to the National Trust his particular area of expertise being Victorian and Edwardian heating boilers, radiators and heating systems. Frank has surveyed and photographed many early installations in churches and National Trust properties and these may be viewed on our Website under *Buildings with Historical Equipment/Heating*.**



*Heritage Chairman Neil Sturrock, Frank Ferris and CIBSE President Peter Kinsella*

# THE NATURAL HISTORY MUSEUM

The Summer Meeting and Visit of the CIBSE Heritage Group was to London's Natural History Museum. For more information on the Heritage Group visit [www.hevac-heritage.org](http://www.hevac-heritage.org) or contact our Hon.Secretary Mike Barber [www.mbarber647@aol.com](mailto:www.mbarber647@aol.com)



***A technical paper "Designing Ventilation with Heating" appeared in the April 1998 ASHRAE Journal, from which extracts on the following pages are taken. The author of the article was the late Jeffrey Cook AIA MASHRAE, who was Regents' Professor of Architecture at Arizona State University and a Member of the CIBSE Heritage Group.***

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ENGLISH HERITAGE



**Architect Alfred Waterhouse 1830-1905**

## The Architect Compares Systems and Engineers

The Public Record Office at Kew holds a document from the architect, Alfred Waterhouse, to the client "The Right Hon. The First Commissioner of H.M. Works." (PRO WORKS 18-18/3 p.15 ff)

"... Messrs. Haden propose to warm the entire building by hot water circulation from four boilers each 18 ft x 6 ft 6 in. Mr. Phipson proposes to warm the building by Hot Water too, but the water would be heated not by the boilers direct but by Steam Heaters supplied with Steam at low pressure from three boilers each 15 x 5 ft. In each case two boilers would be sufficient for performing the Work, the remaining one, in Mr. Phipson's case, or two in Messrs. Haden's, being a reserve to meet the Contingency of repairs to those in use. My impression is that one such spare boiler would suffice.

"To warm the Basement Story, Messrs. Haden propose to carry their Flow pipes under the Ceilings of the Rooms in that Story and the Return pipes under the Floors. To warm the top-lighted Galleries in the rear, they propose to place batteries of pipes under the floor, with iron Gratings above. The Front Galleries on the Ground and First floors, they propose to warm by the method adopted by them for many years past with much success, in connection with Gaols [jails], namely, by taking up Flues in the walls from the Basement and discharging warmed fresh air into the various rooms on both Stories, near the floor. To warm the Second Floor, Messrs. Haden would arrange Coils and Pedestals in the positions shown.

"Mr. Phipson keeps all his pipes in the Basement, bringing warmed air up through the walls, in the case of the front Galleries, and through the floors in the case of those in the rear. Except in the British Natural History Museum & Index Museum, in which latter place he has coils of pipes, like Messrs. Haden, under the Stairs and near the Entrance.

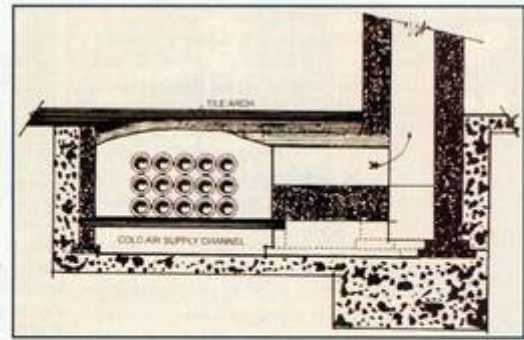
"Mr. Phipson Estimates that his System would renew the entire bulk of air in the various Museums, three times per hour. Messrs. Haden have not given me a corresponding Estimate with regard to the system proposed by them. The temperature to which Messrs. Haden propose to bring the Air of the Museums is 56°F and the Workshops 60°F, assuming the External Air to be 32°F. Mr. Phipson would give a maximum temperature to the Workshops of 56°F and a minimum temperature of 51°F. And the Index Museum, max: 58°F min: 52°F; Galleries, max: 60°F, min: 54°F.

"... Mr. Phipson ... has informed me that he has every reason to be satisfied that his Steam boilers are practically as safe as Hot-water boilers since they are worked at so low a pressure; and he considers them much more economical in working. He has informed me also that he could convert his System into one of ordinary Hot water Circulation, without the introduction of Steam Heaters, and reduce his Estimate to £4815, but in such case he would want a greater depth for his boilers by 2 ft. Which, in consequence of the level of the drains, I fear we could not by any possibility give him. The boiler-space is now arranged 5 ft below the level of the Basement floor and as it is, it will be only just practicable to drain it thoroughly.

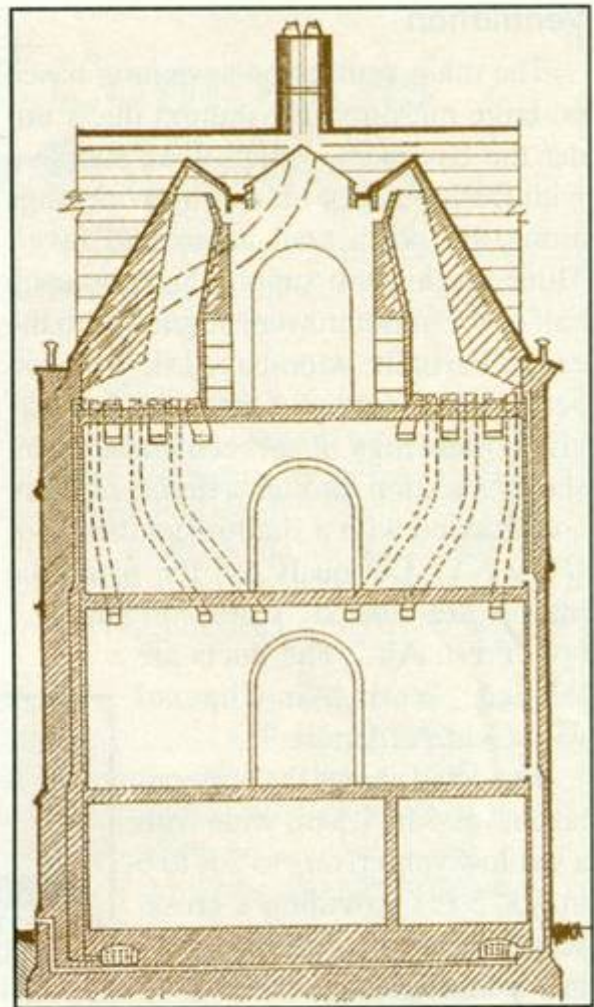
"I may remind you in conclusion, that, having taken Counsel of Mr. Galton during the preparation of my drawings, I have made my plans to suit the System proposed by Mr. Phipson, as it was necessary to make them conformable to one or other of them in order to get the needful builder's work included in the Contract.

I am, Sir,  
Your Obedient Servant,  
Alfred Waterhouse"

This thoughtful and respectful communication by the architect Alfred Waterhouse continued throughout the eight-year construction period. Despite a low budget, high profile job with a stingy client, the mechanical engineer was always an equal if not pivotal in resolving issues. On the other side, the contractor/engineer, Mr. Phipson was equally deferent, such as his statement to the architect concerning "Escape of the Vitiated Air:" "I am of the opinion that the arrangements shown on your drawings will meet all requirements." Apparently, the architect had done his job well.



**Figure 5: Air supply tunnels in section from the construction drawings. The warmed air tunnel is dimensioned 5 ft wide by 2 ft 6 in. (1.5 m x 0.75 m) to the top of the shallow vault, and contains a battery of 15 steam pipes. The separated cold air supply beneath measures 5 ft wide by 9 in. high (1.5 m x 0.23 m). Elsewhere the cold air supply drawings show 4 ft wide by 2 ft high (1.2 m x 0.6 m).**



**Figure 7: Diagrammatic vertical section shows how fresh air is supplied in brick tunnels with batteries of steam pipes under the basement. The warm air flows up risers within the brick walls, skipping the basement floor to grilles at other floor levels. Exhaust grilles at the ceilings connect with brickwork ducts in the cross walls to exhaust plenums under the roof, and then to towers in towers and pavilions.**



*The Heritage Group touring London's Natural History Museum (photos Chris Sugg)*