

Preventive conservation in libraries and archives



“Our environmental conservator says that exposing the paper edges to the room stabilises the relative humidity”

This lecture appears to be about air conditioning but its purpose is to question the role and the education of preventive conservators.

I compare two archives, one is in Pierrefitte. It has been described by Bruno Bonandrini.



The other archive is the Suffolk Record Office in Ipswich, eastern England.

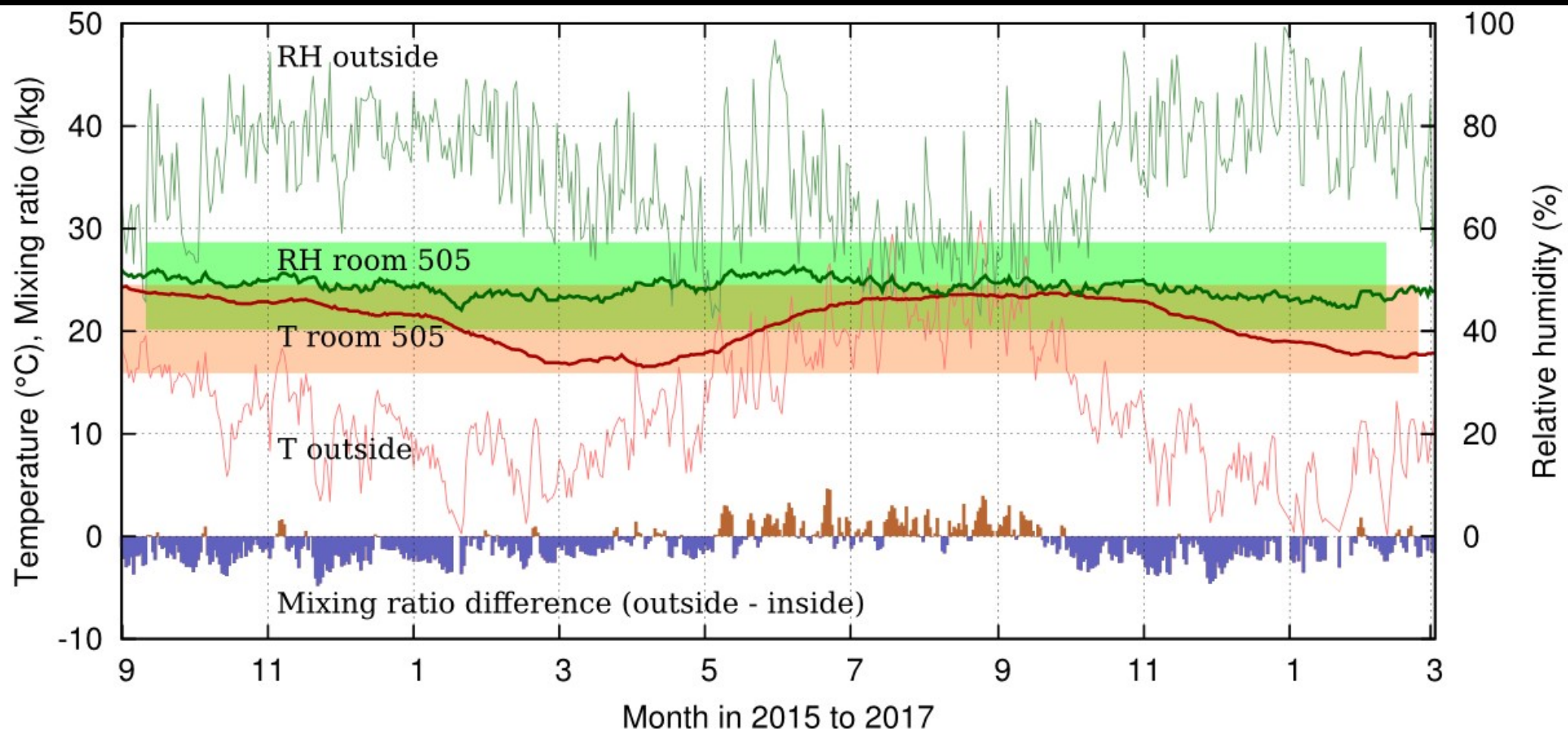
This archive, from 1990, was designed by Henk Pieksma. It follows the design principles of the “Cologne model” : massive construction with both thermal mass and thermal insulation, and with small and narrow windows.



Photo, Dominic Wall

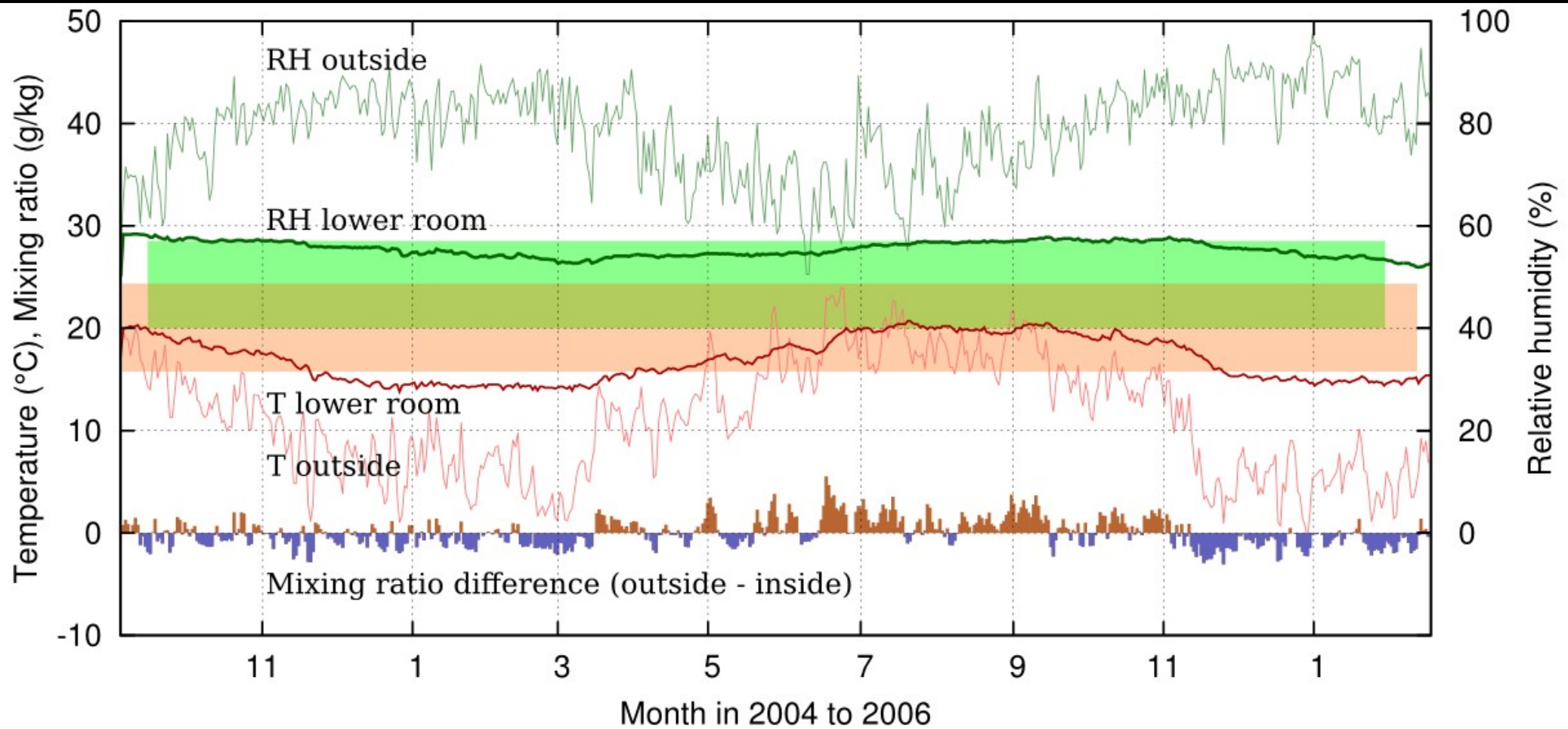
A section through the wall
of the Suffolk Record Office

After debate in a committee of diverse professionals, the climate specification for the Pierrefitte archive was set as shown in the coloured zones.



The measured performance of room 505 lies neatly within the specified limits.

The Suffolk archive has a relative humidity which fits close to the upper limit of the Pierrefitte specification, but is more stable from day to day.



The temperature is lower, but the annual span of 6 degrees is similar to the Pierrefitte room.

How do these two archives each maintain almost the same, and equally stable internal climate?

One gets a clue from the aerial views.



Pierrefitte shows an intricate network of ducts and condenser fans.



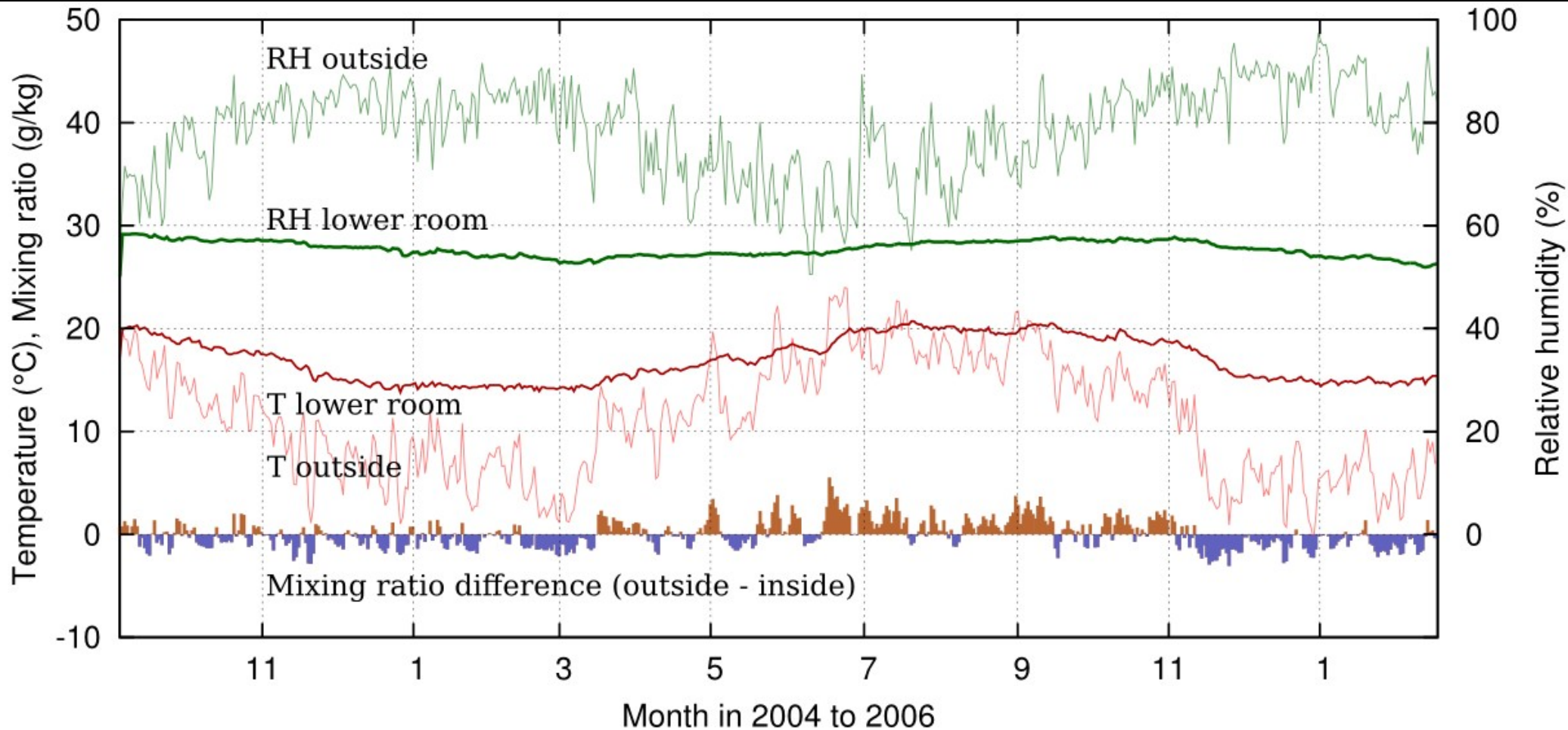
Suffolk has a plain pitched roof of reflective aluminium.

How does Suffolk attain a stable climate so discreetly?

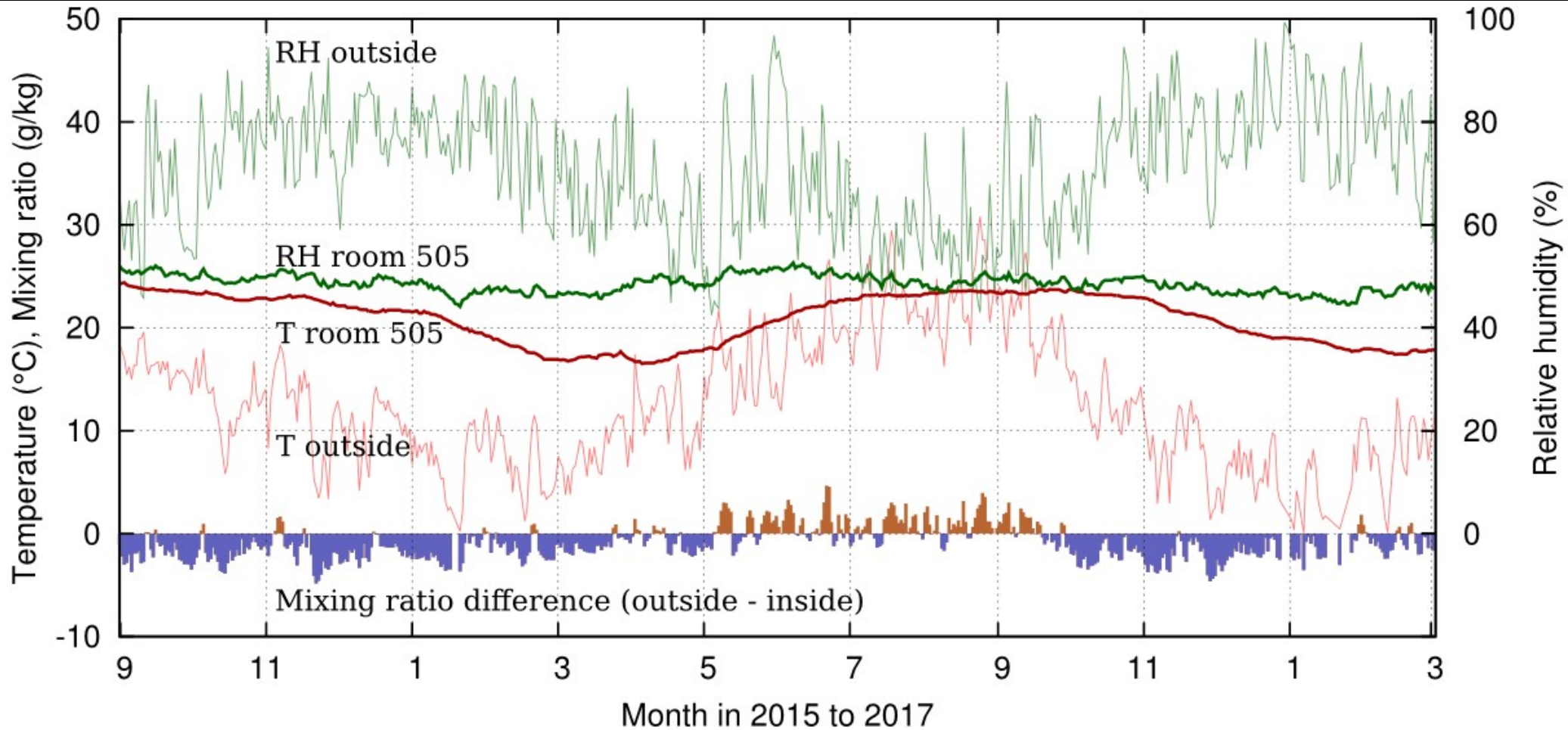


With a thermostat set to 15°C

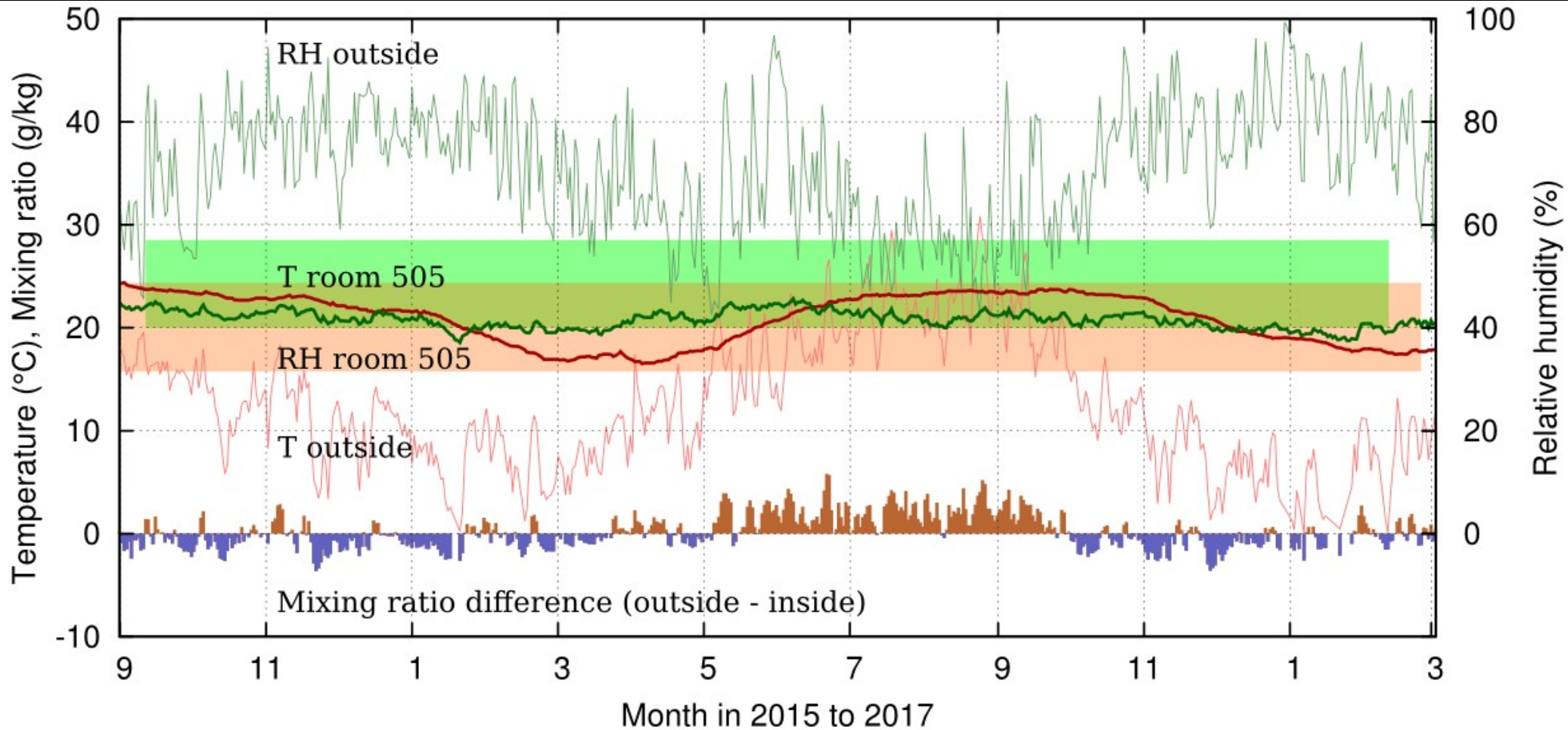
That is all - no building management computer and no explicit control of relative humidity; no ducts, no deliberate air exchange.



The graph for the Suffolk archive shows, at the bottom, the balance of water vapour concentration inside and out; the brown peaks representing a higher concentration outside, mostly in summer. As this air leaks into the archive the RH rises slowly, but not much. In the winter the RH falls back down as cold outside air of small water content leaks in. The buffer capacity of the archived material stabilises the RH to an annual 5% span.

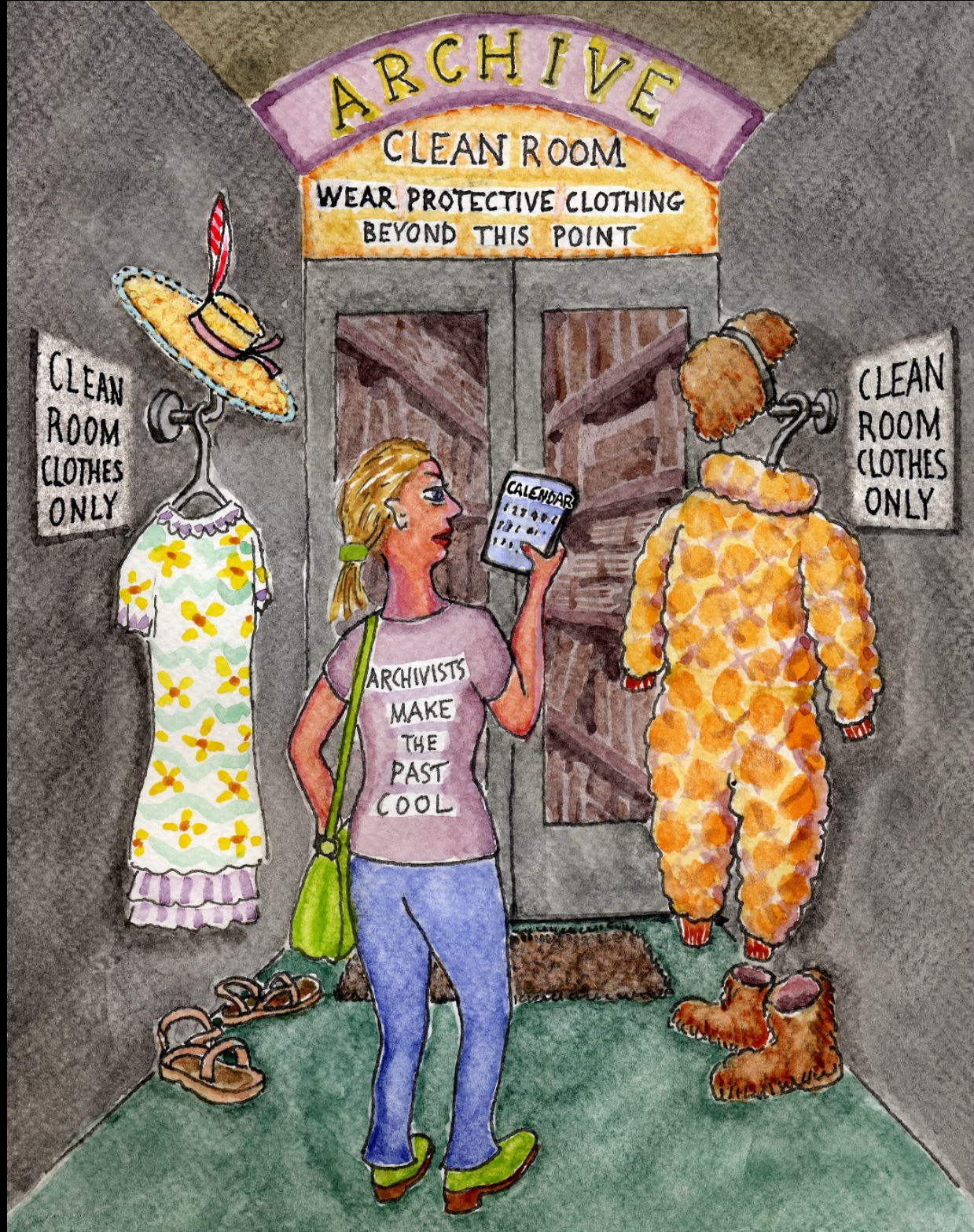


In this diagram for the Pierrefitte archive the demand for winter humidification (the blue area) is considerably greater than the demand for summer dehumidification (brown).



If the RH in Pierrefitte were set close to the low boundary at 40%, the need for humidification in winter would balance the need for dehumidification in summer.

Responsibility for RH control could then be transferred entirely to the archived materials, which were locked out of the calculation at the design stage.



It is a happy coincidence that the minimum temperature is set to 16°C, to shield the archivists from the chilly winter.

However, this is exactly the right temperature to ensure a yearly average RH around 45%.

It should therefore be possible for Pierrefitte to close down most of its air handling system, retaining only winter heating and slow recirculation of air through a filter to remove internally generated pollution.

Was this possibility debated among the preventive conservators engaged in the design?



Could it be that the various specialities involved in the decisions did not understand each others' technical jargon?

And did the standard setters study both the influence of the environment on the durability of artefacts and the influence of artefacts on their local climate?



Preventive conservation has long been preoccupied with quality control measurement and putting silica gel in showcase drawers.

On a larger scale, preventive conservators are confined by strict standards, while other conservation specialists are trusted to use their education and skills without strict rules.

Preventive conservation education should raise the profile and influence of the profession by tackling larger scale issues, of architecture and engineering, thermodynamics, physics, meteorology and properties of materials.

Obituary for a concept: The Suffolk Records Office is now air-conditioned, because the summer temperature in the upper room occasionally exceeded the limit imposed by the British Standard 5454:2000.

Obituary for a standard: BS5454:2000 was replaced by PD5454:2012, whose limits the Suffolk Record Office would have been within.

Durability of documents:
1 to 4000 years, depending on chemistry
and environment.

Durability suitable for an archive building:
around 300 years.

Life time of air conditioning equipment:
around 20 years.

Revision frequency of museum standards:
about ten years.

Duration of this lecture:
about twenty minutes.



The Notarial Archive, Valletta, Malta

Thanks to my colleagues:

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Suffolk climate data are from Dominic Wall.

Pierrefitte data are from Bruno Bonandrini.



Tim Padfield,
tim@padfield.dk
www.conservationphysics.org

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