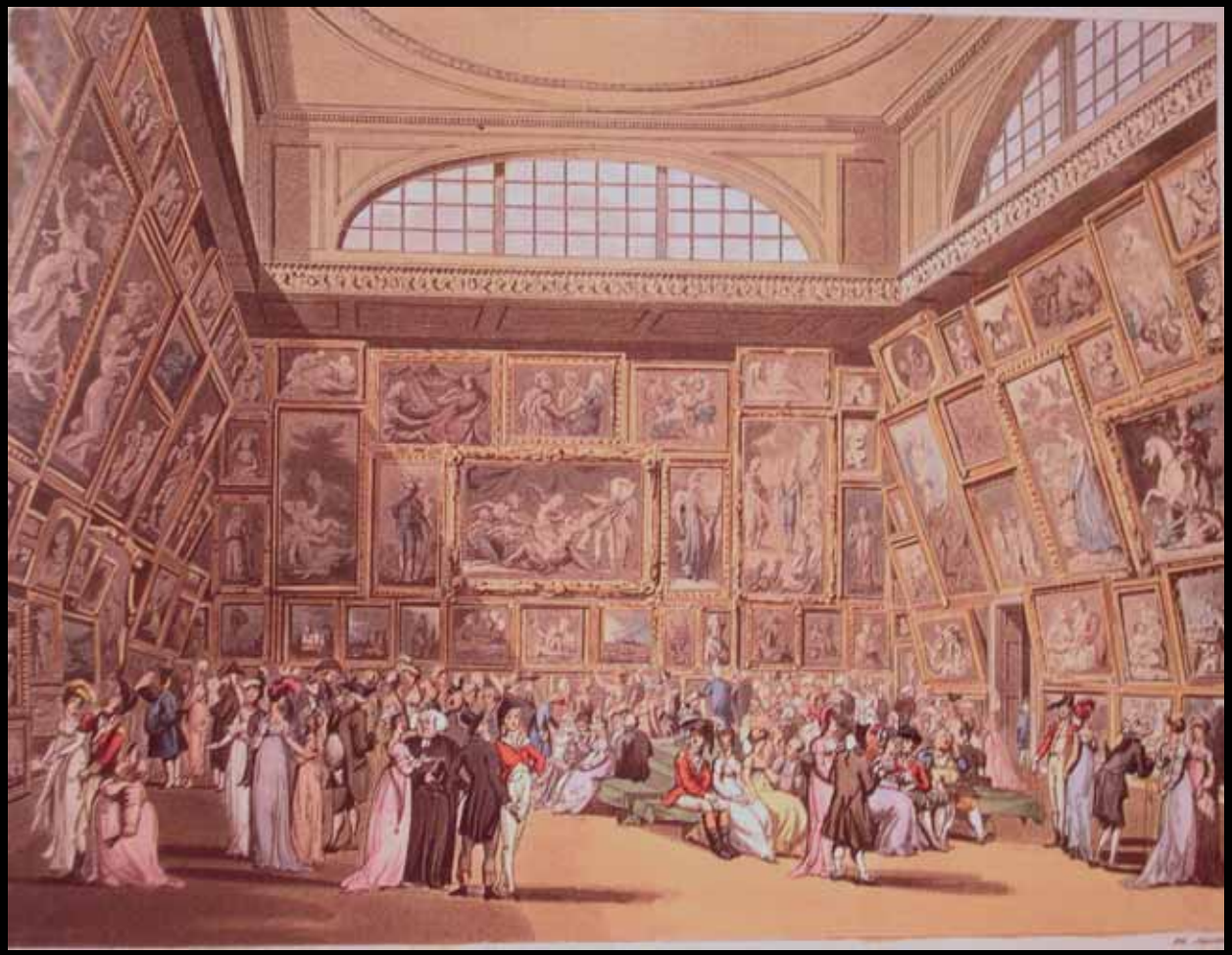
The Development of a Conservation Framing Policy at Tate

Stephen Hackney

Public exhibitions, The Royal Academy



As well as the exhibition of paintings, the display of vulnerable old master and contemporary drawings, prints, pastels and watercolours became popular in the late 18th century. These needed protection with glass.

1850 and 1853 Parliamentary reports on the National Gallery

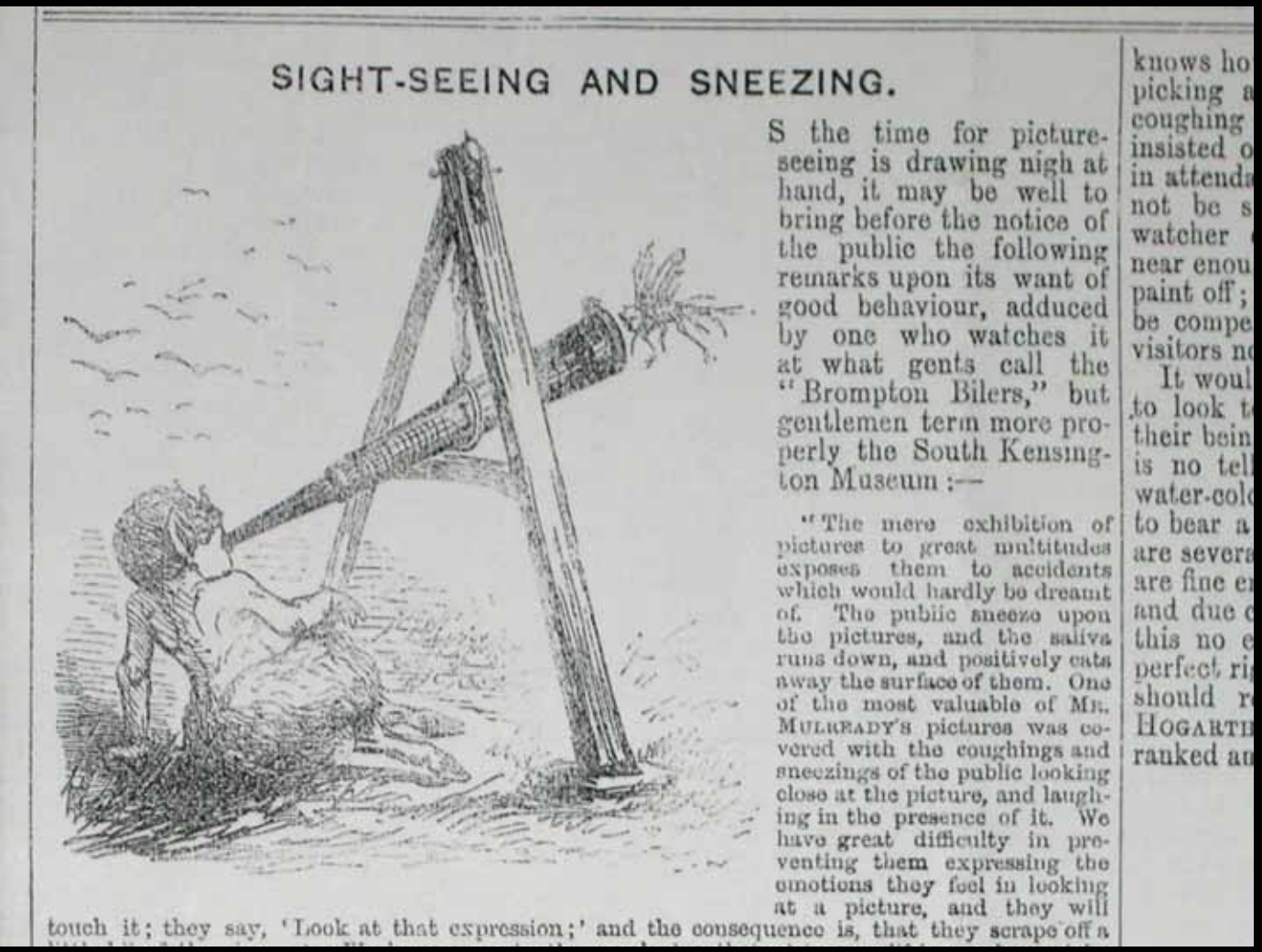
In 1850 Eastlake, Faraday and Russell proposed that glazing be applied to oil paintings on permanent display at the National Gallery

Seguier also suggested that tightly woven stretched textile be applied to the backs of frames as a dust seal. Since the paintings were angled to the wall considerable dust fell on the reverse

By 1853 Eastlake described glazing as “a great evil, but still it would be desirable to resort to that course [glazing] if the pictures remain in their present position”

He must have received criticism of the visual effects.

Punch magazine April 6 1861



SIGHT-SEEING AND SNEEZING.

S the time for picture-seeing is drawing nigh at hand, it may be well to bring before the notice of the public the following remarks upon its want of good behaviour, adduced by one who watches it at what gents call the "Brompton Bilers," but gentlemen term more properly the South Kensington Museum :—

"The mere exhibition of pictures to great multitudes exposes them to accidents which would hardly be dreamt of. The public sneeze upon the pictures, and the saliva runs down, and positively eats away the surface of them. One of the most valuable of Mr. Mulready's pictures was covered with the coughings and sneezings of the public looking close at the picture, and laughing in the presence of it. We have great difficulty in preventing them expressing the emotions they feel in looking at a picture, and they will touch it; they say, 'Look at that expression;' and the consequence is, that they scrape off a

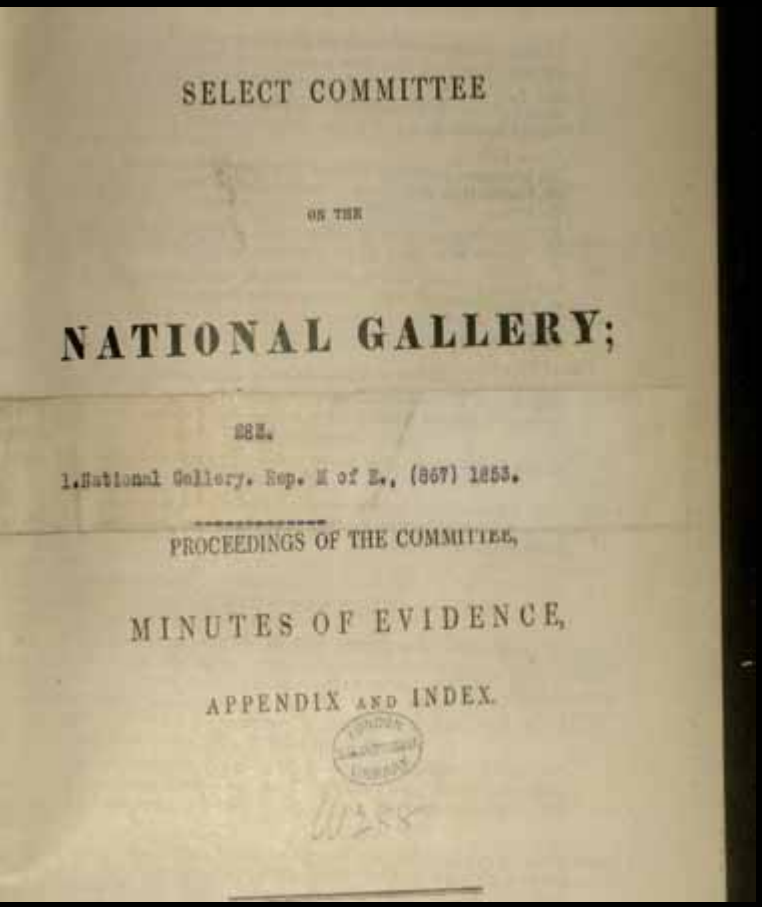
knows ho
picking a
coughing
insisted o
in attend
not be s
watcher
near enou
paint off;
be compe
visitors n
It woul
to look t
their bein
is no tel
water-col
to bear a
are severa
are fine e
and due
this no
perfect ri
should r
Hogarth
ranked a

Some of the criticism was satirical

"the works of Titian, Turner, Hogarth, Rubens, and Van Dyke are not exactly ranked among the things which may be sneezed at"

"and many a picture is too delicate to bear a burst of laughter daily without injury"

The 1853 Parliamentary report on the National Gallery


SELECT COMMITTEE

ON THE

NATIONAL GALLERY;

SEE.

1.National Gallery. Rep. H of C., (867) 1853.

PROCEEDINGS OF THE COMMITTEE,

MINUTES OF EVIDENCE,

APPENDIX AND INDEX.

- The 1853 House of Commons report on the National Gallery considered restoration practices, glazing and a new building in Hyde Park, then considered less polluted.
- Michael Faraday understood that a microenvironment had been created and that it was beneficial. His evidence with that of Russell ensured that Eastlake introduced glazing to the National Gallery.
- He also stated that it was not possible to make an airtight enclosure using glass. He likened the enclosure to a Wardian case, which though well sealed might not exclude all hydrogen sulphide pollution.

The Wardian case

Around 1829 Ward had invented a well sealed case for the transport of botanical specimens from their place of origin to plant collectors in Europe.
It provided good conditions because it relied on moisture transfer between leaves and air and excluded the vagaries of sea travel.

The Gallery frame

The gallery frame, based on a prototype in Dresden museum was a design to provide glazing and backing for a painting, allowing the glass to be removed from the front for inspection

Glass could be removed so that artists could copy paintings on a special day reserved for this activity at the National Gallery

W.S.Simpson

- An improved method for preserving paintings from atmospheric deterioration British Patent BP6556 1892
- Applied to *Venice from the Canale della Guidecca* by JMW Turner in the V&A Museum
- A partial vacuum was created within the frame
- It has never been opened since
- The painting appears to be in good condition, although chosen for protection because it was considered to be deteriorating

Reflections

Reflections were a problem acknowledged by Sir Charles Eastlake, as was the green cast of glass and its other drawbacks

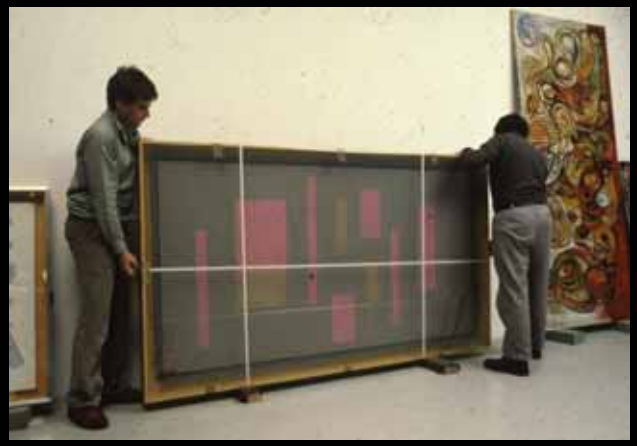
Without determination to maintain glazing and a recognition of the protection afforded, over the next 100 years much glazing was removed

Light coloured walls and diffuse lighting also creates problems

In modern museums the use of acrylic glazing can be visually disastrous

Anti-reflecting coating is now essential for acceptable displays

One hundred years later much of the nineteenth wisdom had been lost



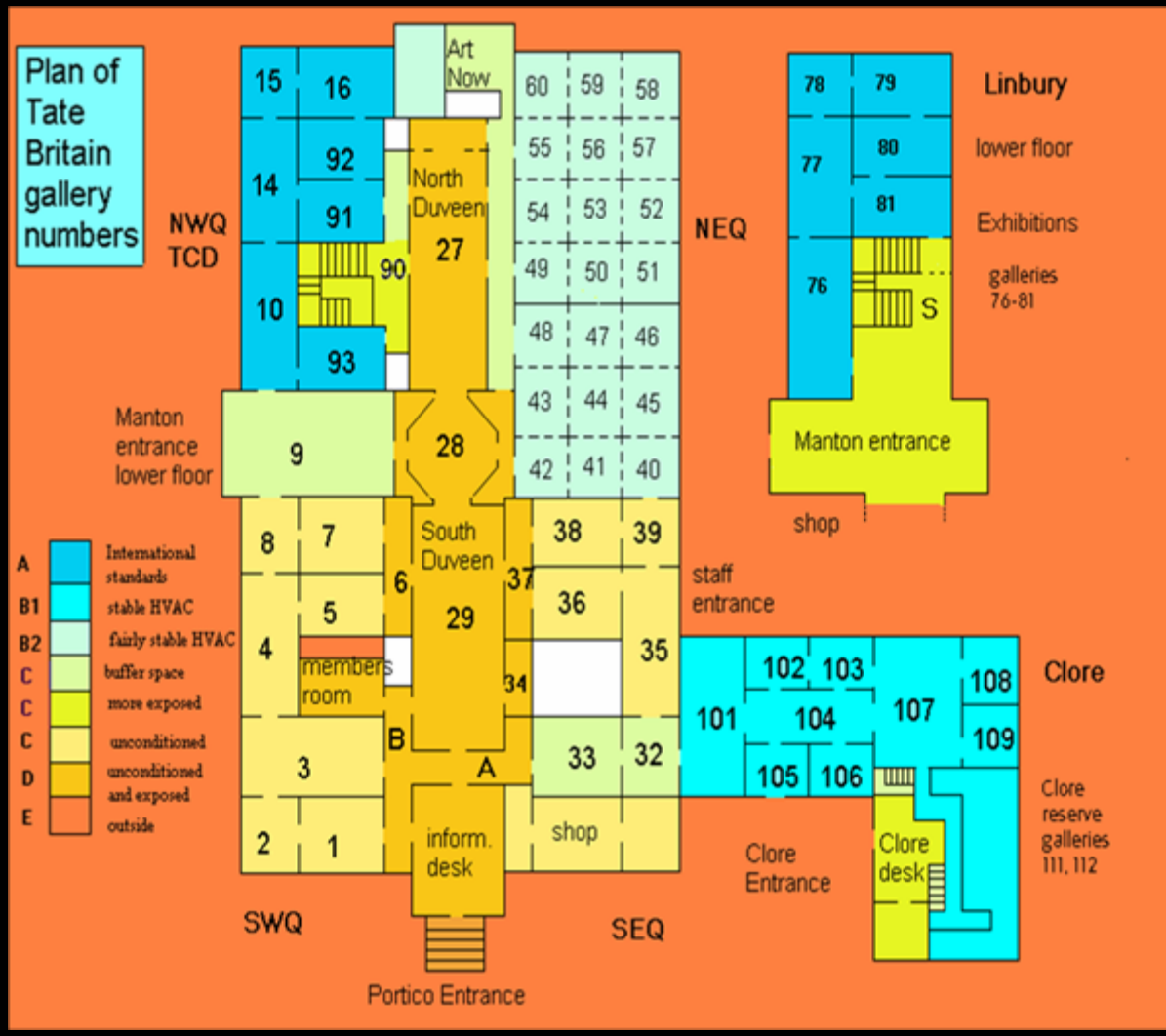
- The needs of a contemporary collection allowed the concept of preventive conservation to be establish at Tate

Air conditioning

In the post 1945 period air conditioning of museums was considered to be the solution to the problem of extreme environmental conditions

In 1979 the North East Quadrant (NEQ) of the Tate gallery was conditioned

But much of the original building was, and still is, unconditioned



The older parts of the building

They suffered from several problems:

- Air pollution, mainly sulphur dioxide
- Particulates from coal and oil burning as well as other dusts
- The buildings are leaky to air
- They occasionally let in rainwater
- They rely on old pipe heating systems that respond slowly to changing conditions
- There are many skylights that need to be controlled

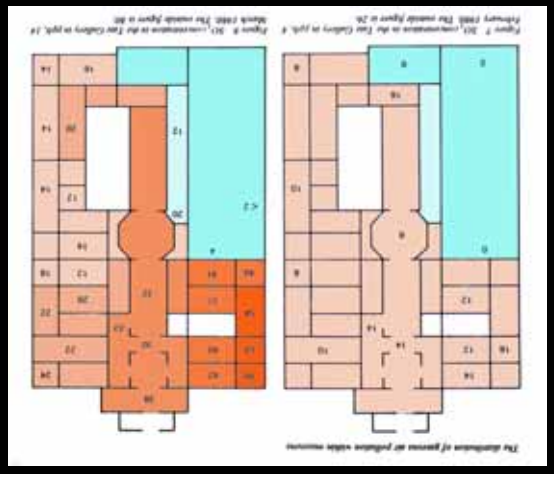
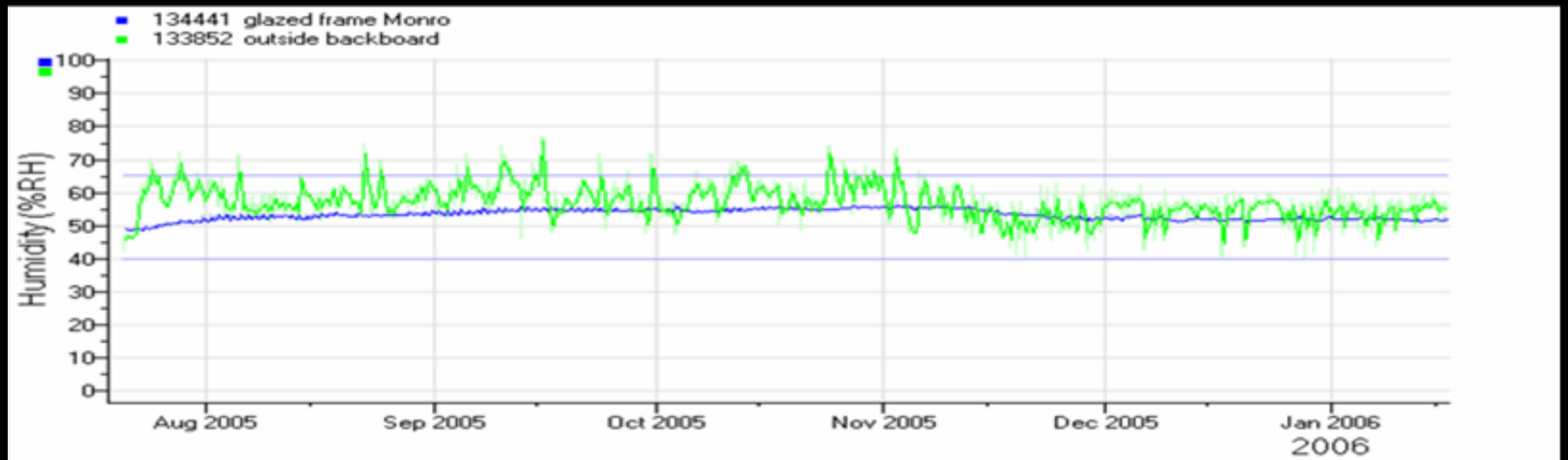


Table 3 Tate Gallery: SO_2 in ppb

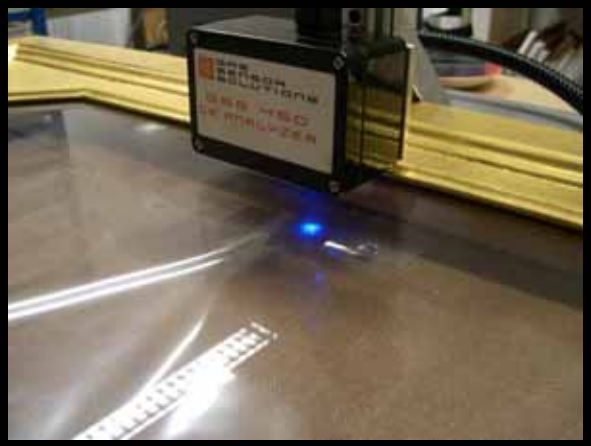
Gallery 14	*Gallery 35*	*Entrance to Duveen*	*Gallery 50*	*Date*	*Outside SO_2 range*
10	16	14	0	4.2.80	26
14	54	30	2–4	14.3.80	80
24	36	26	4	13.2.81	66
2	—	4	0	22.4.81	12 (background)
6	20	8	0	1.12.81	17–35
8	12	9	0	3.12.81	17–30
5	13	9	0	12.10.82	22/24
6	9	5	0	14.2.83	20 (variable)
10	16	13	0	18.2.83	22–50

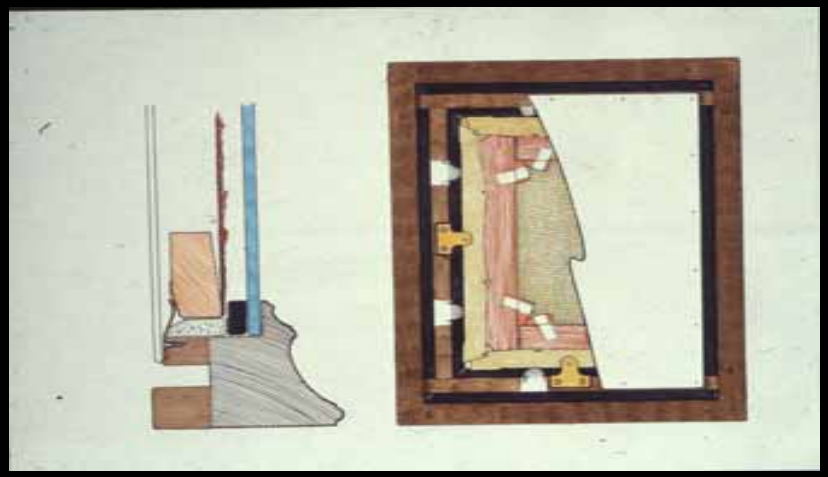
The microenvironment frame solution

- The adoption of a frame microclimate for paintings attempted to solve all these problems.
- It excluded these sources of deterioration
- It could be introduced gradually on an individual basis
- It was inexpensive
- It was hardly noticed on display
- It also addressed the increasing problem of frequent handling and re-hanging of the collection in different parts of the building or for loan
- It was a rare Multifunctional solution



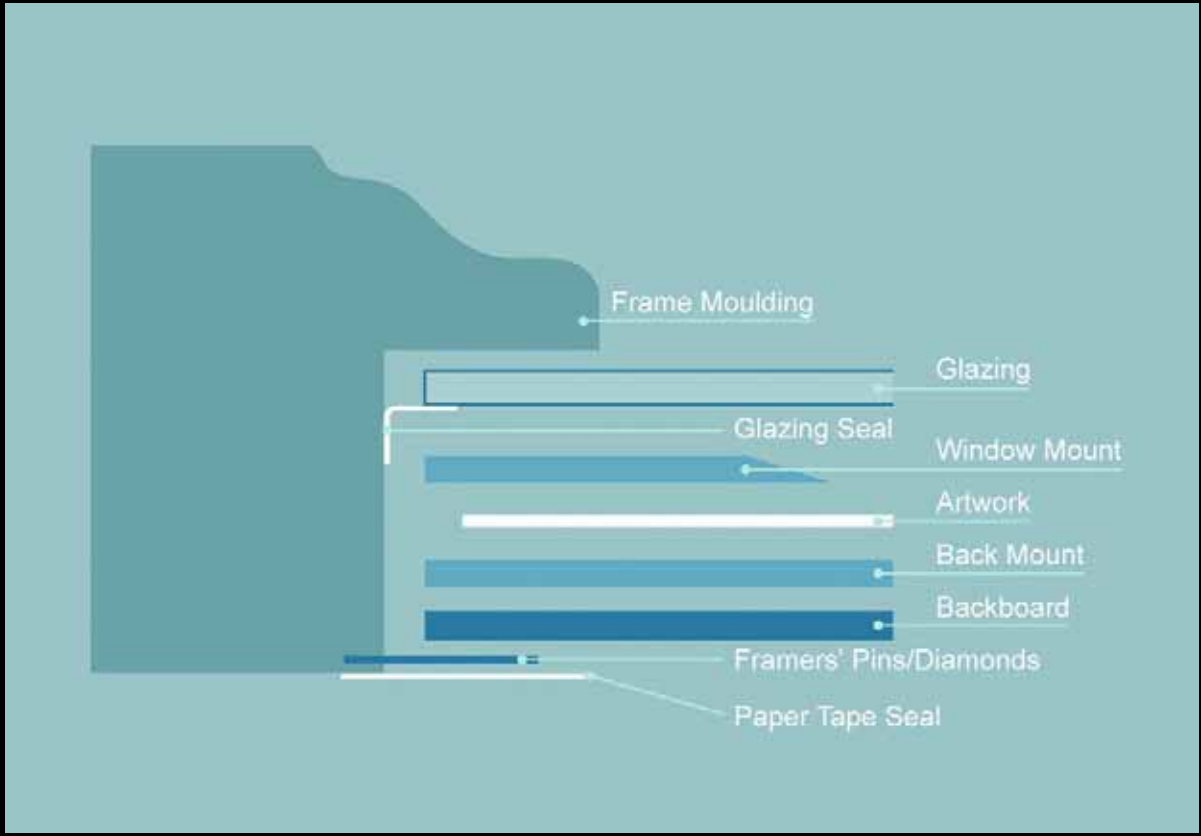
The self-buffering microenvironment frame solution





- The sealed glass and backboard provide about one air change per day
- It behaved better than expected because the material inside the microenvironment proved to be self-buffering
- The air volume is small and the surrounding material, including the painting, contains much more moisture (2-3 orders of magnitude greater)

Works on paper



Sulphur dioxide levels reducing after the Clean Air Act

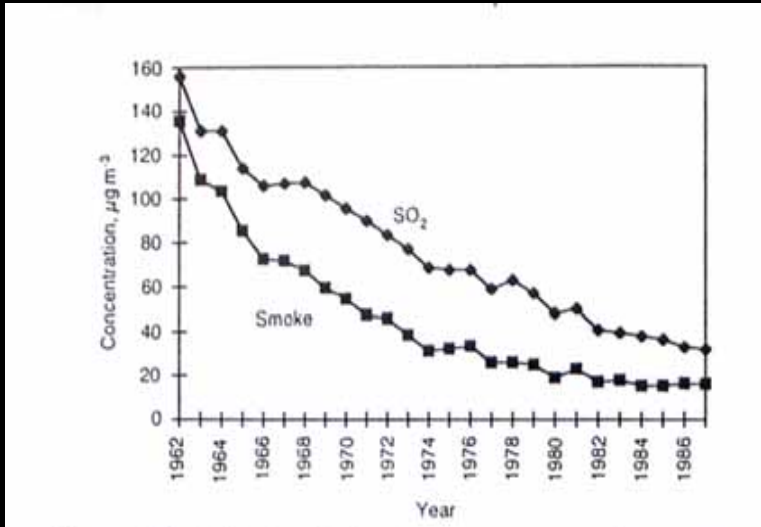


Figure 4.1 The decline in UK SO_2 and smoke concentrations between 1962 a
1987.

During the period from 1956 to 2000 the particulate and sulphur levels gradually declined

Now nitrogen oxides, especially from car exhausts, are the main concern in cities

Degradation measurements

- In order to test the protection provided, in 1980, linen canvas samples that had been kept in the gallery conditions for 24 years, some in enclosed containers, were examined in detail.
- Strong evidence emerged of protection afforded by enclosure. The colour, dirt deposition, pH and strength of enclosed samples remained significantly better than exposed canvases.
- This related to the polluted conditions during the period.

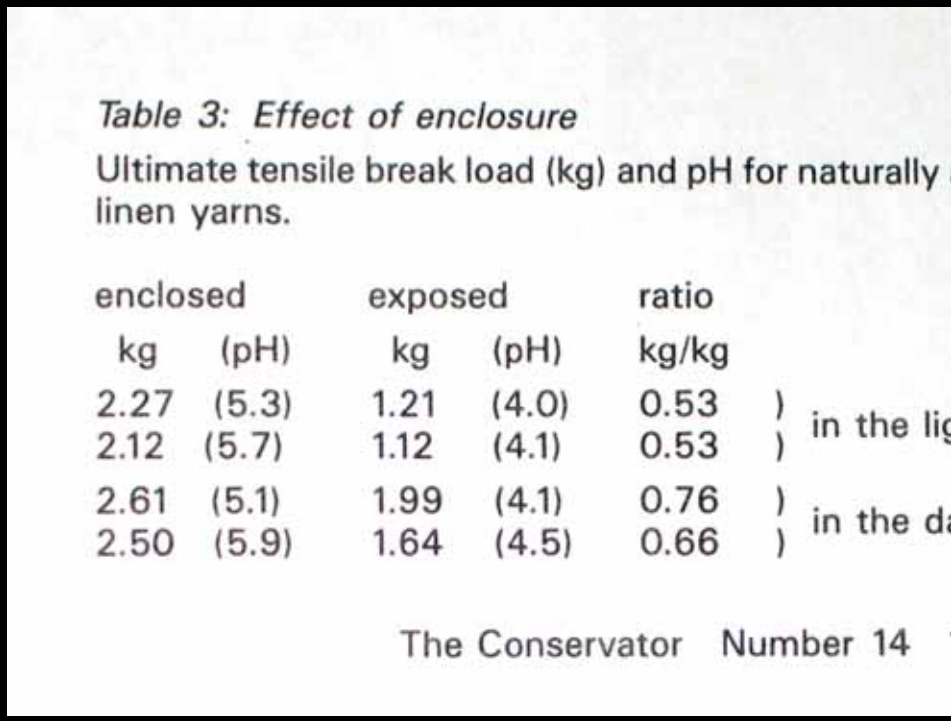


Table 3: Effect of enclosure

Ultimate tensile break load (kg) and pH for naturally
linen yarns.

enclosed		exposed		ratio	
kg	(pH)	kg	(pH)	kg/kg	
2.27	(5.3)	1.21	(4.0)	0.53	) in the lig
2.12	(5.7)	1.12	(4.1)	0.53	)
2.61	(5.1)	1.99	(4.1)	0.76	) in the da
2.50	(5.9)	1.64	(4.5)	0.66	)

The Conservator Number 14

RH and pollution control for the buildings

- Since we introduced our framing policy Tate has expanded to 4 display sites and a storage facility. Much of this is new building is air-conditioned and filtered.
- Some of the problems that were solved by our framing policy no longer exist.
- Does it remain a useful policy?

Tate Store where much of the collection is housed

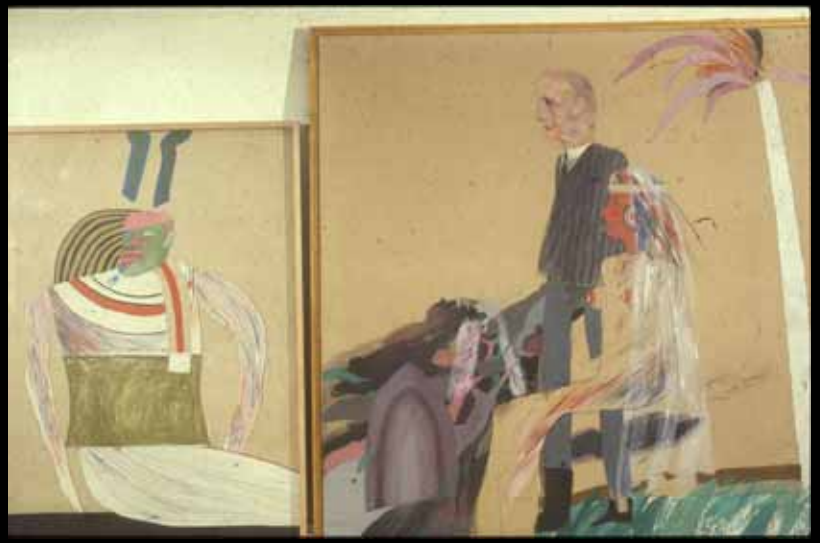
Breakage of glass
Low reflecting and laminated glass

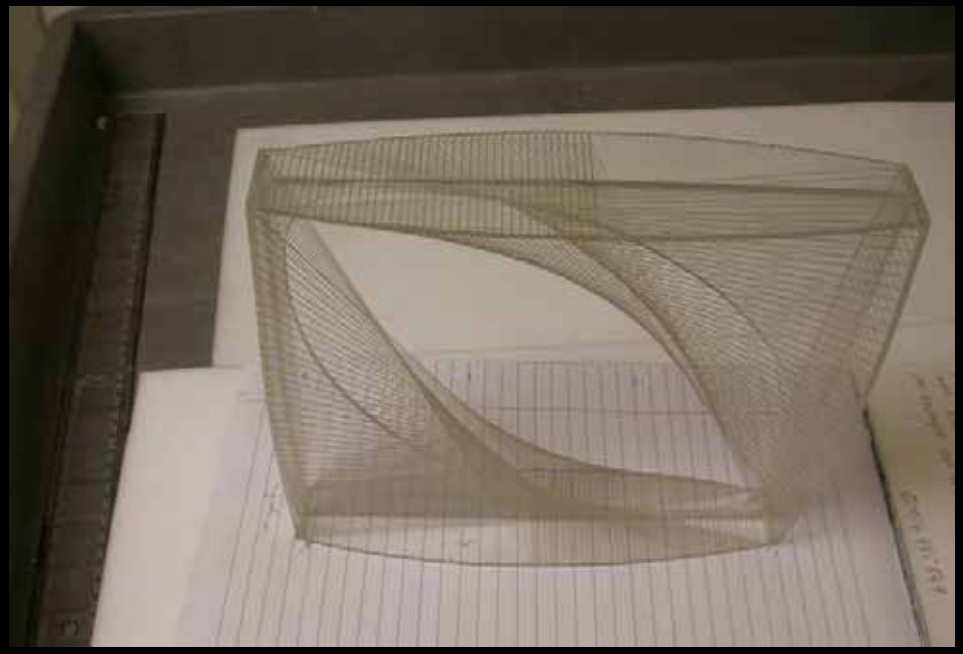
- Glass is a brittle material and raises concerns of breakage. Risk analysis of the problem has allowed simple and reliable procedures for the safe handling and transport of glazed paintings to be developed

- As laminated glass becomes more affordable we may extend its use to all glazed paintings.

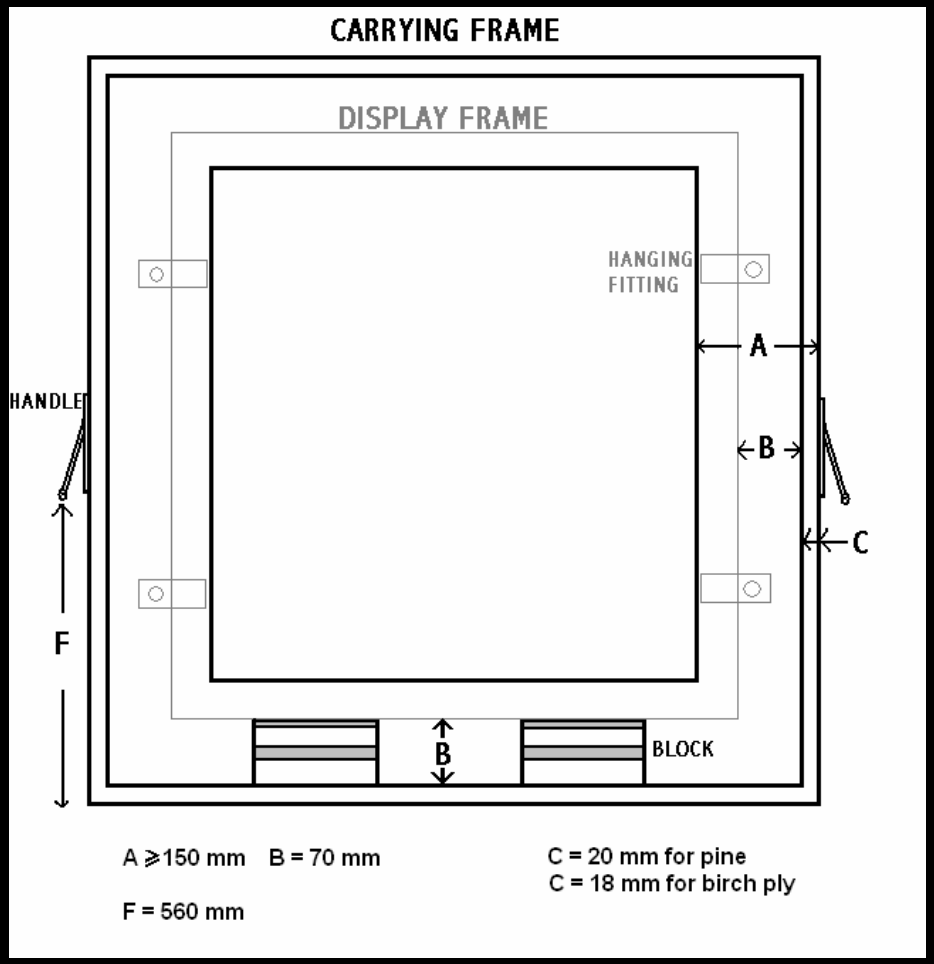
Problematic works

Unvarnished, unframed, unstable, unwashed, unprotected, un-restorable, unknown.





Some solutions



Where the surface is obviously vulnerable, such as exposed canvas, unvarnished paint or impasted surfaces, display vitrines can be used. A simple glass or acrylic box with a solid plywood backboard, preferably painted the same colour as the gallery wall, can look acceptable, especially when kept thin and wide so that it is visually well separated from the painting.

Off display paintings can be wrapped in polyethene in their transit frames

- **Sulphur dioxide** from earlier pollution sorbed onto the surface of museum objects such as canvas or paper is likely to contribute to degradation which in turn releases more pollutant.

- Two acids, acetic and formic, are produced by the degradation of various materials that may be enclosed.

- A pollutant continuously generated at low levels and trapped within an enclosure will eventually cause noticeable damage.

- **Acetic acid** is found naturally in certain woods, such as oak, or from the hydrolysis of man-made adhesives such as polyvinyl acetate. If the wood or adhesive is in close proximity to a work of art or is part of that work of art then acid build up is inevitable.

- Similarly **formic acid** is generated by the degradation of adhesives, wood products such as MDF, resins such as phenol formaldehyde and urea formaldehyde.

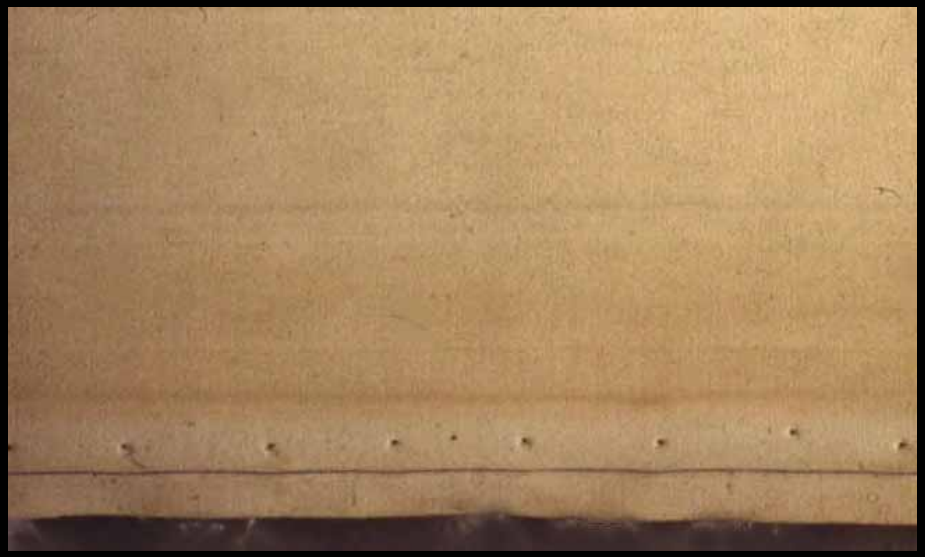
- The precursors to these acids are formaldehyde or acetaldehyde, respectively, which then oxidise to the formic or acetic acids. Although the aldehydes have been measured and are an indicator of a problem, they may not be immediately damaging.

The art object as a source of pollution

An example of increased deterioration of the canvas support of a modern painting by volatile degradation products from its own stretcher.

An unframed, unpainted canvas cannot be protected by glazing when on display so this painting is not in a microenvironment.

In this case any damage is both structural and visual and cannot be readily restored



Materials to absorb pollution

- The solution to chemical degradation is to introduce materials into the enclosure that isolate, absorb or neutralise acidity, oxidation products or any other pollutant.

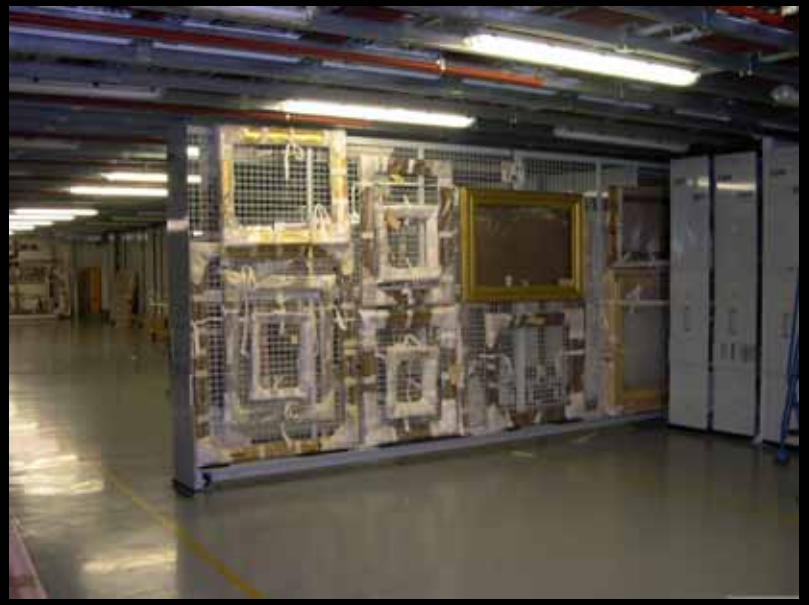
- This could either be applied directly to a work of art, say in the form of deacidification or to control the quality of the gas inside.

- The introduction of chemicals is not likely to be reversible therefore we are reluctant to apply them directly to an object and, since their effect is preventive, we need to apply them to an object that is still in good condition.

- With any successful chemical control, the controlling agent is consumed and some method of identifying when it needs replenishing is required

Air quality inside a frame

- Air quality inside an enclosure is not easy to measure
- The ProPaint project to examine off gassing and control of external pollutants
- The first dosimeters were put in place two weeks ago



Future work

- The benefits of a microenvironment are well proven except for the effects of internal pollution levels. These are more critical now that clean air and stable climates can be provided in many museums
- ProPaint will provide us with 3 years of monitoring. We hope to identify off-gassing, consider the use of alternative materials and quantify the use of pollution scavengers
- A Tate project on Anoxic Framing has 2 more years of funding. We also intend to look at pollution in our hermetically sealed frames with the same aim
- Energy prices and Green issues may make museums less enthusiastic about building new air conditioning systems in future.
- Many historic buildings, such as parts of the Tate, cannot be conditioned easily. Many private houses are not conditioned.
- The RH inside frames can be made much more stable than in an air conditioned museum and this points to a future role for glazed and backboarded frames

THE END

TATE

NATIONALMUSEET

Museum Microclimates