REF: TC/74/5

30th July 1974

N E W S L E T T E R No. 9

1. IMPORTANT GENERAL POINT - CHANGE OF ADDRESS

Now that I have retired from the Directorship of BGIRA, my address for correspondence, i.e. that of the Chairman of the Technical Sub-Committee of the British Committee of the CVMA, will be:- Professor Roy Newton, Department of Physics, University of York, Heslington, YORK, YO1 5DD. It is important that you should note this change of address. Most of my time, especially in the evening when telephone calls are cheaper, will be spent at home, telephone number 0742-661409.

2. ISOTHERMAL GLAZING SYSTEMS IN EUROPE

My visit to selected churches and cathedrals in Europe showed that there is much variety in the isothermal glazing systems in use. The extremes are encountered in Italy and in Austria. In Italy (item 2.1) the ventilation holes are relatively quite small and it would be interesting to measure how much air flow actually occurs through them, using a vibrating hot-wire anemometer.

The references given below are to the numbered items in the published version of the Newton Bibliography, CVMA Occasional Papers I, published 4th July by the British Academy.

2.1 The situation in Italy

There are three buildings which have been treated "isothermally", Prato Cathedral and, in Florence, the church of Santa Croce and the oratory of Or San Michele, but it is not possible to see the details in the last of the three, although there is a note about them on page 42 of the Report of the Florence (1970) CVMA Colloquium.

2.1.1 Prato Cathedral

The system at Prato Cathedral (Lat. 43°53'N, Long. 11°6'E) completely overcomes the problem of light shining around the perimeter of the medieval glass, so much so that there was great difficulty in taking photographs which would show the openings for ventilating the interspace between the old and the modern glass.

In effect, the system is one of sealed external protective glazing, using 18 panels of sheet glass, each 115 x 90 cm, on the outside, but ventilation of the interspace (9 cm wide at Prato) from the unheated cathedral is provided through louvred openings at the top and bottom of the lancets. The east window at Prato is 2.85 m wide and 9.45 m tall, the individual lancets being 0.86 m wide, and there is a hole cut in the middle of the sill of each of the two lateral lancets, 100 mm long 40 mm high, which is

covered by a bent metal strip. This allows access of air to this hole but prevents light shining through from the outside. At the top there are louvred openings above the tracery which are hardly distinguishable. These, together with the hole at the bottom, apparently permit sufficient circulation of air to avoid condensation.

The mid-winter temperature inside the unheated Prato Cathedral is said to be about 8°C; this is slightly higher than the average outside temperature (5°C, with 21 days having a minimum temperature below zero) and some circulation of the internal air will occur.

2.1.2 The Church of Santa Croce

In this church in Florence the South Nave windows have been covered with sealed external glazing, in 7 panels, the top panel on each double lancet covering the whole of the tracery. There are again small covered holes at the bottoms of the lancets, but here the holes at the top consist of three louvred apertures set symmetrically between the medieval glazings of the tracery.

2.1.3 The Oratory of Or San Michele

The east window has been glazed in a similar manner to that at Prato, but the north chancel windows have a sealed external glazing and it is stated that ventilation holes were not introduced because the sun never shines on these windows. Nevertheless it would seem to me that they might still be able to benefit from some ventilation to the outside, for the reasons given in the second paragraph on page 5 of News Letter No. 7.

2.2 The situation in Switzerland

Some windows at Berne Minster were treated "isothermally" in 1945 and these are undoubtedly windows which have been protected in this way for longer than any others (the window at Lindena has a sealed cavity and not a ventilated cavity - see item 3.4 of News Letter No. 7). The general arrangement for supporting the medieval glass internally is described in Professor Hahnloser's paper to the York (1972) CVMA Colloquium (Ref. No. 61).

There was a long delay, until 1965, before the next windows were treated isothermally, in Konrad Vetter's Workshop, and these windows at Jegenstorf seem to be the second-oldest anywhere. Windows in six other Swiss churches have now been treated, those at Aarwangen, Biel, Herzogenbosch, Hilterfingen, Lauperswil and Mülchenbuchsee, but I did not inspect them.

Konrad Vetter is now using an extremely simple arrangement for supporting the ancient panels internally in the north windows at Berne Minster. The arrangement will be described in Ian Addy's report of his visit.

2.3 The situation in Austria

The arrangements here are typified by the south chancel windows of St. Maria Am Gestade, in Vienna. The ancient panels are hung on T-bars supported on screwed bolts fastened in the masonry, and there is a clear space through which the warmed air of the building can circulate. The details of the construction have been published in Dr. Bacher's paper (Ref. No. 3).

2.4 Costs of using isothermal glazing

It is still extremely difficult to obtain satisfactory information about the extra costs of using "isothermal" glazing, compared with the use of external protective glazing on the same window.

The best information so far is for window No. SIII, at St. Maria Am Gestade. The total cost was 260,000 Austrian Schillings for 27 sq. m., or 9630 A.Sch/sq. m. (say £20 per sq. ft.). The exterior glazing was done by one firm, and their part of the total cost was 34,000 A.Sch. or 13% of the total. Cleaning and edge-joining by the restorers cost 20,000 A.Sch. or 8% of the total, but the bulk of the cost (206,000 A.Sch. or 79% of the total) included plating and partial re-leading as well as re-hanging the ancient glass. The window consists of 24 panels each 0.8 x 1.0 m, three heads and 13 tracery glazings.

3. METHODS OF CLEANING CRUSTED GLASS

It is well-known that a compromise has to be found when considering the use of cleaning solutions. If the cleaning action is fast, time and money are saved but any shadowing and back-matting will always be lost. If the cleaning action is slow it may need a long time and much care to clean a large window. Moreover, even soaking for a few hours in pure water may loosen the shadowing and the painting on both the front and the back.

One of the co-operating laboratories has tested the cleaning liquids described in section 2.4 of News Letter No. 7 which use either Pyrophosphates or EDTA as the active ingredients. In one case where the shadowing did not adhere well, 3 hours in the bath was found to be too much, and only the line-work remained, although even some of that was lost.

In another case treatment for 2 hours removed some line work and part of the edge of another line was lost. Thus these active cleaning solutions need careful consideration of the actual piece of glass being treated, and minimum soaking times should be used with frequent observation of the actual condition of the shadowing and the back-painting.

I shall be very glad to hear from any other laboratories about their use of any cleaning techniques, but especially those mentioned above, because the effects of cleaning agents appear to depend to such a great extent on the condition of the paint and/or shadowing, as well as the durability of the glass.

4. ANALYSES OF WEATHERING CRUSTS (WETTERSTEIN; PIERRE DU TEMPS)

Dr. Ferrazzini in Zürich (Kristallographisches Institut der Eidgenössische Technische Hochschule, Sonneggstrasse 5, Ch 8006, Zürich, Switzerland) has excellent facilities at his disposal for the identification of weathering crusts on medieval glass, and anyone who has unusual crusts in his possession, or wishes to know the composition of the crust on a particular window, should send a sample to him. Moreover, he has developed a very simple method of taking samples and sending them to Zürich. Use some "Magic" Scotch tape (3 M'S Type No. 1R) and press the adhesive side very firmly on the weathered surface of the glass,

using a thumb nail or a hard object to rub it down well. Then strip the "Magic" tape from the surface and fold it lengthwise (adhesive surfaces together) so that the pieces of weathered material - however minute - are trapped inside. Please post this tape to Dr. Ferrazzini at the address given on page 3.

5. SIMULATED MEDIEVAL GLASS

There are two rather different approaches to the use of simulated medieval glasses for experimental purposes. In Britain I have made these glasses with different durability characteristics in order to study the behaviour of the bulk glass (see page 3 of News Letter No. 5). In France J. M. Bettembourg has done something rather similar (see item 2.1 of News Letter No. 7).

In Switzerland, J. C. Ferrazzini proposes to use a different approach. He is collecting substantial quantities (ca. 200 g) of medieval glass from single windows and re-melting it in order to reproduce a fresh fire-finished surface of the medieval glass for experimental purposes. Thus he proposes to study the behaviour of a fire-finished (alkali deficient) surface of the medieval glass and I propose to study the bulk properties because the deep pits found in medieval British glass undoubtedly penetrate the alkali-deficient layer.

There are advantages and disadvantages of both approaches. Bettembourg and I are making a medieval-type glass with a simplified composition and Ferrazzini will be melting a (possibly inhomogeneous) actual medieval glass and will have the problem of avoiding refractory solution (from the crucible) and of judging what atmosphere (e.g. reducing or oxidising) was characteristic of the medieval furnace. It will be of the greatest interest to compare the results of both approaches.

6. CONDITIONS OF WAR-TIME STORAGE OF MEDIEVAL GLASS

There is a continuing need to collect data about the way that medieval glass was stored during the war, to protect it against bomb damage. It seems likely that the rapid post-war deterioration of some medieval glass may have been due to storage for some years in very damp conditions. Some information is now available about Königsfelden Church in Switzerland (Lat. 47°29'N, Lon. 8°13'E). The medieval lancet windows of the chancel of this church have external protective glazing which seems to be open at the top, although actual inspection at this point was not possible. There does not seem to be a drain-hole to the outside and the window certainly does not have an "Isothermal" glazing system, as had been reported.

The medieval glass seems to be in excellent condition (at least by British standards). It was removed during the war, as a protection against possible bomb-damage, and stored in the cellars of the adjacent building, previously a monastery but now a psychiatric clinic. These cellars are now quite dry, and have a cobble-stone floor. There is now heating in the adjacent corridor which was not present during the war. Thus the cellars may well have been damper when the medieval glass was stored therein, but apparently not so excessively damp that the glass might have been damaged.

The collection of data about war-time storage conditions will take a long time, but it is now evident that even Swiss glass was removed from buildings to protect it from war-time damage.

Some data are becoming available about the war-time storage of glass at Fairford Church in Gloucestershire, and it will be included in the next News Letter.

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