DEAN & CHAPTER OF LINCOLN

Detailed Programme Guide for the
Structured Traineeship in the Restoration and Conservation of
Historic and Architectural Stained Glass

Cathedra! Works Department
28 Eastgate
Lincoln
2001

Contents

1. Introduction

With the traditional apprenticeships no longer functional in this country training and professional education is nowadays taking place removed from a real place of work, being transferred to colleges and universities. This is particularly so for most craft based professions. Although academically such places offer valuable knowledge on a theoretical bases, they are not equipped to offer the practical training a fully functional and traditional workshop can offer.

Unlike other areas of conservation, there are very few courses in Europe, which are formally teaching the conservation and restoration of historic and architectural stained glass. As a result the Lincoln Cathedral Glazing Department offers a trainee ship aiming to combine both the practical and the academic education in the conservation of stained glass. The traineeship is specifically designed to be offered to an individual already having a sound base knowledge of the principal processes and techniques involved within the stained glass craft. Skills such as glass cutting, leading, glazing, glass painting and experience in site work are essential. This programme is designed to help the trainee to refer to as guide and explains the individual components making up the structured traineeship

2. Brief & Structure

The traineeship is offered for a duration of two years full time. During the two year training period the main emphasis is put upon the further development of the applicant's existing craft skills. The trainee will be working alongside the various established team members of the Glazing Department and will be made familiar under their guidance with practical conservation skills. These abilities will be consolidated so as to be applied in the restoration and conservation of the Cathedral's historic glazing and the close houses.

The Lincoln Cathedral Works Department is solely set up for the preservation of the cathedral's fabric and is a non-profit making organization and training must be facilitated within the existing structure. The majority of the practical processes take place within the workshop environment. However a large proportion of the work also consists of outside site work on the building, involving working in situ.

The practical preservation work is to be supported by further academic training taking two modules offered within the conservation course of De Montfort University. These modules are to be negotiated to compliment the academic understanding of the trainee's existing conservation knowledge. However, it is recommended to focus upon **'Applied Conservation Science and Conservation Theory'**

The trainee is furthermore being encouraged to enter a National Vocational Qualification (NVQ) at a suitable level collecting evidence of practical work and involvement in projects, so as to build up a portfolio.

Also it is expected for the trainee to keep a weekly workshop/laboratory notebook recording processes, techniques, achievements and skill developments within the training period. The notebook is to be countersigned each month by a senior member of staff.

3. Personel Structure

Roy Bentham: Chapter Clerk
William Roberts: Clerk of the Works
H. Thomas Kupper: Glazing Team Leader
Stephen Lewis: Deputy Team Leader
Michael Bullen: Full Time Senior Glazier
Ellen Kharade: Part Time Senior Glazier
Trainee Glazier

4. Review & Support

Stained glass conservation is a very slow, labour intensive process and a project may take many weeks or months to complete. Within this context the trainee will be made aware of problems and instructed how to deal with them as they arise. The progress of the trainee's development will be observed and reviewed by the Team and/or Deputy Team Leader at periodical intervals. This will be an opportunity to have progress feedback and is a mechanism of monitoring potential weaknesses and to provide more support if need be.

5. Learning outcome

After the training period the individual should be a competent person in his/her field holding a sound practical and academic knowledge in the conservation of historic and architectural stained glass.

Successful completion of the traineeship demonstrate that the student:

- Can recognize specific deterioration phenomena and problems of stained glass windows and be able to explain the decay mechanics
- Can carry out full recording and documentation to produce condition reports
- Can produce a treatment proposal and fully justifying all actions
- Can implement passive conservation techniques and produce ethical and aesthetic recommendations.
- Can demonstrate advanced practical craft skills and has an understanding of materials and techniques
- Has developed painting skills to an appropriate degree to be able to produce a copy.
- Can demonstrate knowledge of material technology and history
- Can demonstrate expertise in applied conservation science
- Can demonstrate expertise in conservation theory.

At the end of the traineeship the Dean and Chapter present a Certificate of Achievement to the trainee. Credits accumulated from the University and the completion of the NVQ will also be presented and will take the training period to conclusion.
H. T. Kupper Lincoln Cathedral Glazing Department 2001

6. Structured Training Programme
Part I. Craft Work
The team members of the glazing department, who have together a wealth of experience, will provide the tuition and support for the craftwork. The following processes will be covered during the two year period of the training and consolidated whilst working along side the individual team members.

6.I.1 Setting out
• Techniques in template taking and familiarization with measurements.
• Drawing out a master drawing.
• Producing bench drawings.
• Producing rubbings and recognizing their significance and purpose.
• Health & Safety

6.1.2 Leadwork
• Introduction to materials and tools.
• Recognizing different types of leads and their uses, present and historic.
• Removing pieces of leadwork and replacing repair pieces.
• Dismantling leadwork - de-leading -
• Building up an awareness of the range of glazing techniques and soldering.
• Recognizing of potential and actual problems, i.e. buckling, lead fatigue, etc.
• Banding techniques and its propose.
• Health & Safety.

6.1.3 Waterproofing/Cementing
• Mixing and applying traditional lead light cement.
• Cementing by hand and using applicators.
• Recognition of cementing problems, i.e. hardness, disintegration, bleeding, etc.
• Health & Safety.

6.I.4 Glass
• Introduction to the material and tools.
• Identification of different types of glass.
• Glass cutting techniques.
• Setting out for glazing and quarry glazing.
• Health & Safety

6.1.5 Ferramenta
• Recognition of Materials, historic and present.
• Function and types of different support systems
• Metalwork for protective glazing
• Compatibility of metals

Part II. Glass Painting
Glass painting and its associated techniques are considered to be complex processes demanding a thorough understanding artistically as well as on a practical level.

The associated techniques *[painting, acid-etching and kilnwork]* are particularly important in the restoration and repair work of Nazarene, Victorian and Art & Craft stained glass windows.

Although all effort is made to introduce the trainee to such important techniques they are however not necessarily used frequently enough in the workshop by the existing team members. So as for the trainee to have the opportunity to learn more, than by just basic observation, a condensed period of internal teaching by a third party is proposed. This applied study taught by an invited expert would be of great benefit in the skill development of the trainee.

Acid etching is an extremely hazardous process and demands vigilant caution when using the chemical. Stringent Health & Safety procedures are to be followed and the trainee is to be supervised at all times by a senior member of the glazing team.

6.II. 1 Glass Painting

- Introduction to materials and equipment.
- Colour matching of glass.
- Traceline, matting and staining using a variety of mediums and multi paint layers and matt overlays creating a surface texture
- The intermixing of various paints for pigment and colour matching.
- Develop the ability to analyse a style of glass painting in order to re-create an awareness of the appropriate brushes required to archive a desired finish.
- Health & Safety.

6.II.2 Kilnwork

- Introduction to kiln operations.
- Kiln care - cleaning handling and kiln preparations.
- Appropriate kiln firings and settings.
- Firing & Slumping
- Health & Safety.

6.III. 3 Acid Etching

- Safe operation of equipment, handling hazardous materials and associated safety procedures.
- Masking agents, etc.
- Behaviour of glass etc. and etching techniques.
- Health & Safety.

<u>Part III.</u> Site Work

The team members of the glazing department, who have together a wealth of experience, will provide the tuition and support for sitework. The following processes will be covered during the two year period of the training and consolidated whilst working along side the individual team members.

6.III. 1 Minor In situ Repairs

- Introduction to tools and techniques.
- Secure working of ladders and towers.
- Securing and protection of artefacts and sites.
- Technique of stop-ins.
- Lacunae technique.
- Health & Safety.

6.III.2 Major Removals

- Introduction to tools and techniques.
- Designs of scaffolding, securing and protection of site and artefacts.
- Templates and measuring.
- Recognizing different methods of historical window fixings and fittings.
- Recognition and understanding associated material, i.e. timber, stone, metal, etc.

- Handling, packing and transportation of glass from and to site.
- Health & Safety.

6.III.3 Installation
- Introduction to tools and techniques.
- Inserting panels, dealing with traceries.
- Pointing - techniques and mixes.
- Protective glazing and isothermal glazing systems.
- Panel supports and fixing of ferramenta.
- Health & Safety.

6.III. 4 Domestic Repairs
- Introduction to tools and techniques.
- Secure working of steps, ladders and towers.
- Securing and protection of the working area, i.e. furniture artefacts and sites.
- Putty repairs and hack-cuts
- Recognizing types of plain glass and glazing.

Part IV. Conservation

Whereas the craft and the painting skills are very traditional processes the subject of conservation is the prime criteria of the traineeship. Most processes are carried out within the workshop environment on an applied basis. However, the practical preservation work is to be supported by further academic training linking up with De Montfort University in Lincoln, taking two modules offered within the course of the Restoration and Conservation of Historic Objects. These modules are to be negotiated to compliment the academic understanding of the applicant's existing conservation knowledge. However, it is recommended to focus on '**Applied Conservation Science and Conservation Theory'.** The University part of the learning will consist of attending the module lectures, producing essays and log books etc, and at the end of each semester, sitting a two hour exam.

6.IV. 1 Documentation/Recording
- Purpose of documentation.
- Producing rubbings for recording, introducing legends and symbols and setting up appropriate recording methods and techniques in the workshop and on site.
- Visual recording, i.e. taking photographic evidence, handling of equipment, etc.
- Written documentation, i.e. report writing, pre & post-conservation diagrams, computer documentation.

6.IV.2 Cleaning
- Recognize surface accretions and patinations.
- Able to identify appropriate cleaning techniques, including knowledge of the application and suitability in the workshop and on site.
- Identify problems of unstable paint.
- Use of detergents and solvents.
- Health & Safety.

6.IV.3 Edgebonding & Consolidation
- Practical edgebonding and consolidation using chemical solvents and adhesives.
- Practical edgebonding using mechanical methods
- Distinguishing between mechanical and chemical edgebonding and when to use the appropriate technique.
- Producing resin in-fills and colour matches.
- Recognizing the pros and cons of plating for stabilization.
- Producing surface treated plates, plate forming and sealing.
- Mould making.

- Health & Safety.

6.IV.4 Cold Colour Painting
- Introduction to tools and materials
- The use and application of cold colour paints
- Health & Safety.

Part V. Theoretical Learning

As already mentioned the practical learning is to be supported by further academic training. However, the trainee is also being encouraged to enter a National Vocational Qualification (NVQ) at a suitable level collecting evidence of practical work and involvement in projects, so as to build up a portfolio. Keeping a weekly workshop Laboratory notebook would be in part counting towards such evidence and is a valuable method of recording achievements within the training period. The notebook is to be countersigned each month by a senior member of staff.

It is also envisaged that during the time the university is closed, i.e. holidays, half terms, etc., the trainee will be given time to study **'Theoretical Learning',** which will form part of a specific academic development of glass and its conservation. If however the trainee has already gained an understanding within a given subject due to prior learning, this would also be seen counting towards collected evidence.

The following headings are to be covered:

6.V.1 Material Technology
- Materials, Techniques, and methods in the manufacture of Gglass, i.e. vessel glass, plain glass, coloured glass, modern glass, antique glass, etc.
- Types of glass.
- Glass manufacturing processes.
- Types of leads, their alloys and behaviour
- • Manufacturing processes of lead, past and present
- The appreciation of plain glazing and its styles.

6.V.2 Deterioration
- Ability to recognize and explain material deterioration such as:
  Glass - weathering crusts, devitrification, organic growth, crizelling, weeping, browning, etc.
  Lead - lead fatigue, organic acid pollution, resistance and yield points, etc.

6.V.3 Material History
- Developments in architectural and vessel glass.
- Developing painted styles and forms of architectural glass.
- The history of lead and its manufacturing technology.

Part VI. Further Training

6.VI.1 Placements
- It is important that a trainee has the opportunity to build up as wider skill base and understanding as possible to consolidate his/her confidence and the ability to develop a responsibility for his/her own decisions and actions. This can be substantially encouraged if the trainee is to be exposed to different attitudes, practices and conservation environments. Each workshop has its own culture and the trainee would benefit from some time as a placement in a different working environment. The placement would be for a period of 1-2 Weeks in any one year. The glazing department has close working relationships with a number of conservation workshops in England and Germany which would be in a position to accommodate a placement.

6.VI.2 In-house Training

- Due to the complexity of the Cathedrals fabric and to realize how the building functions the opportunity exists for the trainee to spend some time with the other trades working on the building. In principal some in-house training with the stone conservators is suggested gaining an inside into their preservation activities. Particularly beneficial would be learning the various stone cleaning techniques and how to work with lime mortars.

6.VI.3 Courses and Seminars

- During the time of the traineeship various seminars and short term conservation courses are offered covering various topics and location visits. Such further external educational courses are specifically designed for a student's wider understanding of materials and their technological importance in conservation.

  The trainee will attend either/or
  The Study and Conservation of Stone,
  The Study and Conservation of Metals,
  The Study and Conservation of Timber.
  The above courses are taking place at the University of York and a scheduled timetable for the lectures is to be confirmed.
  Further details and of each course can be obtained in the appendix.

  The trainee would also be expected to attend suitable seminars and conferences usually organized and facilitated by the Institute for Conservation (ICON), or the British Society of Master Glass Painters (BSMGP). Time would be made available for this as and when the need arises.

1. Conclusion

Essentially the restoration of stained glass -windows has always been considered in the past to be a rather hands on practical craft.

However, stained glass conservation requires that conservators have a high degree of skill in the manufacture of their material as well as having a sound understanding of conservation theory and practice.

The above programme aims to provide the trainee with the opportunity by bringing the two complex processes together developing a wider focused awareness in the conservation and restoration of historical and architectural stained glass. This situation places the trainee in a unique position not only consolidating his/her craft abilities but also to be able to make ethical and aesthetic judgements based sound academic conservation training.

H T Kupper Lincoln Cathedral Glazing Department May 2001

A. <u>Appendix</u>

A.I Health & Safety

The nature of working in the profession of stained glass restoration and conservation means that one inevitably comes in contact with hazardous substances and processes posing a risk to health and safety. Not only to one self but also to fellow conservators and crafts people working along side each other. Materials such as Glass, Lead and particularly the toxic painting enamel are to be handled and used with care. Consideration has also to be given to the organic solvents and the range of other chemicals used in the conservation processes, releasing hazardous vapours and fumes. The process of aciding, although rarely used in the conservation of historic windows, is **extremely** dangerous and can have fatal implications for the operative if not handled in accordance with the provided Safe Systems at Work.

Working on site poses a risk of a different kind, especially working off highs. 'Height does Kill' and correct working procedures must be followed at all times: Eating, drinking and smoking is prohibited anywhere within the Dean & Chapters working environment

During the course of the training the potential trainee will be introduced with all current Health and Safety legislation's and has to familiarize him/herself with the 'Safe Systems at Work' which are put in place, Risk Assessments, COOSH Sheets, etc. The team members will provide support in the first instance with the cathedral's Health & Safety consultant being at hand to answer and discuss further queries.

A.II Short Course Brief

Information directly taken from the 2000-2001 programme of 'The Institutes of Advanced Study-University of York'

'The Conservation of Stone'

Objectives: including geology, petrology, chemistry, basic types of stone used in building culture (e.g. limestone, sandstone, granites, basalt, marbles); historical and contemporary use of stone for structural and decorative purposes; causes of failure and how to analyse them, current state of knowledge with regard to decay mechanisms; consolidation and maintenance, the practice and skill of the stonemason, conservator; the necessity for an inter-disciplinary approach; flora and stone buildings; case histories; visits.

'The Study and Conservation of Metals'

Objectives: to understand the historical use of metals in building construction and architectural decoration; to provide a basis for understanding decay mechanisms, and how to combat them, visits.

'The Study and Conservation of Metals'

Objectives: to understand the historical use of metals in building construction and architectural decoration; to provide a basis for understanding decay mechanisms, and how to combat them, visits.

'The Study and Conservation of Timber

Objectives: to understand the strong regional traditions in the structural and decorative use of timber in building culture; to provide a basis for understanding decay mechanisms, and how to combat them, visits.

A.III Further Training Expenditure Forecast

Bellow is a breakdown for the approximate costs of various additional training sessions and courses which are proposed for the duration of the traineeship. It is understood that such valuable further training is to be encouraged and builds' a substantial part of the learning outcome as it is outlined in section 5. However, the feasibility of achieving such further training does of course depend upon the Dean and Chapters affordability within any one fiscal year. All suggested further training might therefore not be entirely possible and only a selection of courses can be negotiated during the 2 year traineeship.

Applied Conservation Science £ 700.00 approx.
Applied Conservation Theory £ 700.00 approx.
National Vocational Qualification (NVQ) £ 500.00 approx.
The Study and Conservation of Stone £350.00
The Study and Conservation of Metals £ 350.00
The Study and Conservation of Timber £350.00
Taught Painting Sessions (External) £ 450.00
Placements (One week only) £800.00
One Day Seminars and Conferences £ 165.00
Total £4365.00

A.IV Reading List

Stained Glass

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- BROWN S. (1992), Stained Glass, an Illustrated History. Studio Editions, London.
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- COE B. (1981), Stained Glass in England: 1150-1550. Howard & Wyndham Company, London.
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- WHALL C.W. (1905), Stained Glass Work. John Hogg, London.
- WOODFORDE C. (19541. English Stained and Painted Glass. The Claredon Press, Oxford.

Conservation

- CRONYN J. M. (2001) The Elements of Archaeological Conservation. Routledge Publishers, London.
- HORIE C. V. (1998), Materials for Conservation. Architectural Press, Oxford.
- J. Kerr (1991), The Repair and Maintenance of Glass in Churches. Church House Publication, London.
- NEWTON R. & DAVISON S. (1989), Conservation of Glass. Butterworth Co. Publishers Ltd., London.
- Tennent N.H. (1999), The Conservation of Glass and Ceramics. James & James, London.
- THOMSON G (1999), The Museum Environment. Second Edition, Butterworth & Heinemann, Reed Educational and Professional Publishing, Oxford.
- The Conservation Unit 1992, Science for Conservators Volume I 'Materials' Butler and Tanner, London
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- POLOCK A. (1975), Glass, its Makers and its Public. Weidenfeld & Nicolson, London.
- THORPE W. A. (1949), English Glass, Second Edition, Adam & Charles Black, Edinburgh.