

THE GLASGOW SCHOOL OF ART

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• CHARLES RENNIE MACKINTOSH •
• REPORT ON THE PRODUCTION OF THE •
• BROADSHEETS •

DISSERTATION
presented to the
MACKINTOSH SCHOOL OF ARCHITECTURE
for the
DIPLOMA IN ARCHITECTURE
by
GRAEME D ROBERTSON
August 1987

• ACKNOWLEDGEMENTS •

The original impetus to produce a broadsheet of Mackintosh's work came from Professor Andy Macmillan, who directed our ⁱ attention to Hiroaki Kimura's Ph.D thesis, and who continued to offer us advice, encouragement and positive criticism.

Without Hiroaki's thesis, our task would have been much more difficult. His architectural drawings catalogue, gave us a comprehensive list of Mackintosh's work, with detailed information on the existence and whereabouts of original drawings.

We thank : Neil MacVicar, architectural librarian, G.S.A. library, for his patience and assistance ; Pamela Robertson, Curator of the Hunterian Art Gallery, Mackintosh collection, for enabling us to consult the collection of original drawings ; Jocelyn Grigg, Curator of the G.S.A. Mackintosh collection, for allowing us to photograph original drawings.

The following people have also assisted us : Mr. Hector McLean, at the B.B.C. , who granted us permission to survey the elevation of Queen Margaret's Medical College ; Mr. Frank Walker of the University of Strathclyde, department of Architecture, for allowing us to use measured studies by students in his department ; Mr. M Nail of the Boys Jarvis Partnership, for providing us with their survey drawings of Hill House ;

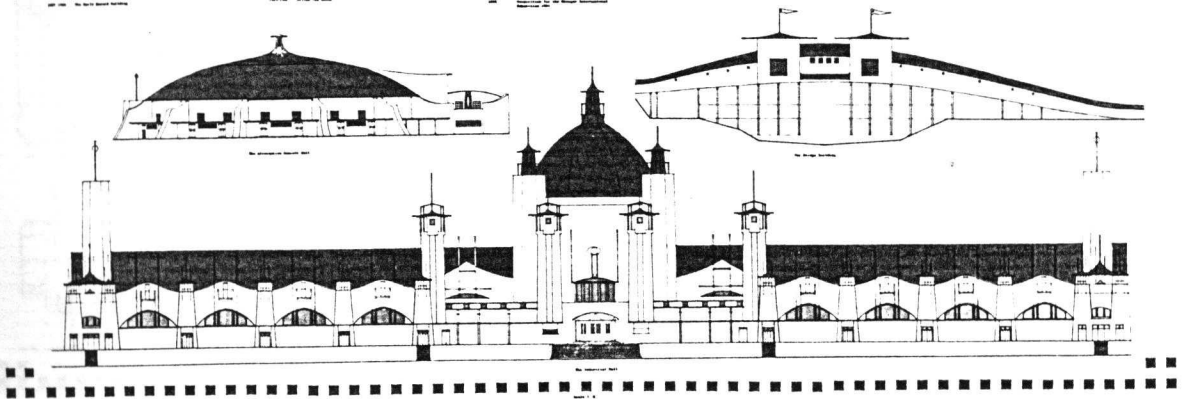
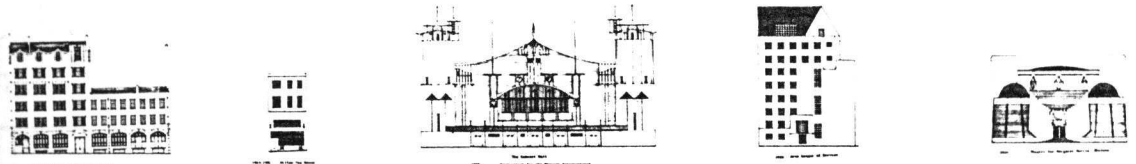
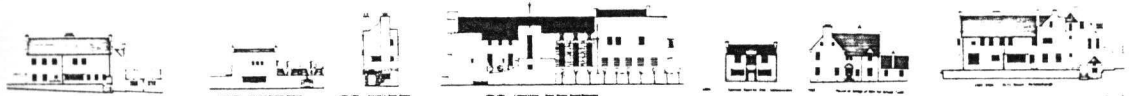
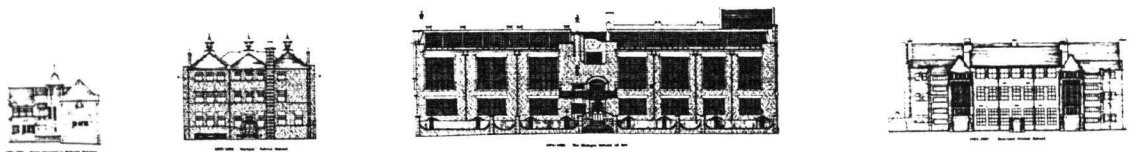
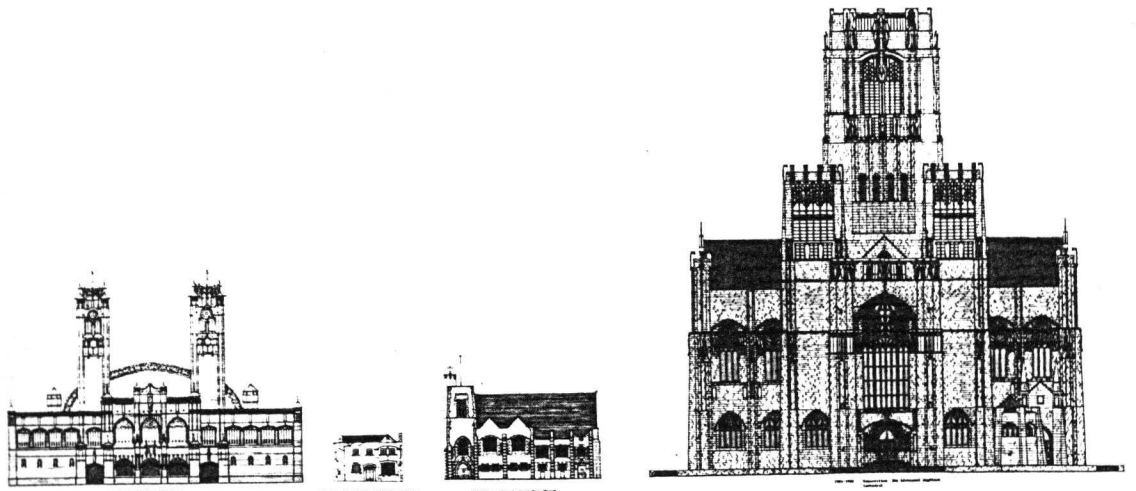
Mr. Jim Johnston of Assist Architects, for giving us copies of their survey of the Martyrs Public School. Finally, Mr. Tony Vogt for his assistance with the preparation of this report.

1 our - refers to Andy Bow, Roy McLean, Graeme Robertson who produced the folio of drawings and the Mackintosh broadsheets.



CHARLES RENNIE MACKINTOSH

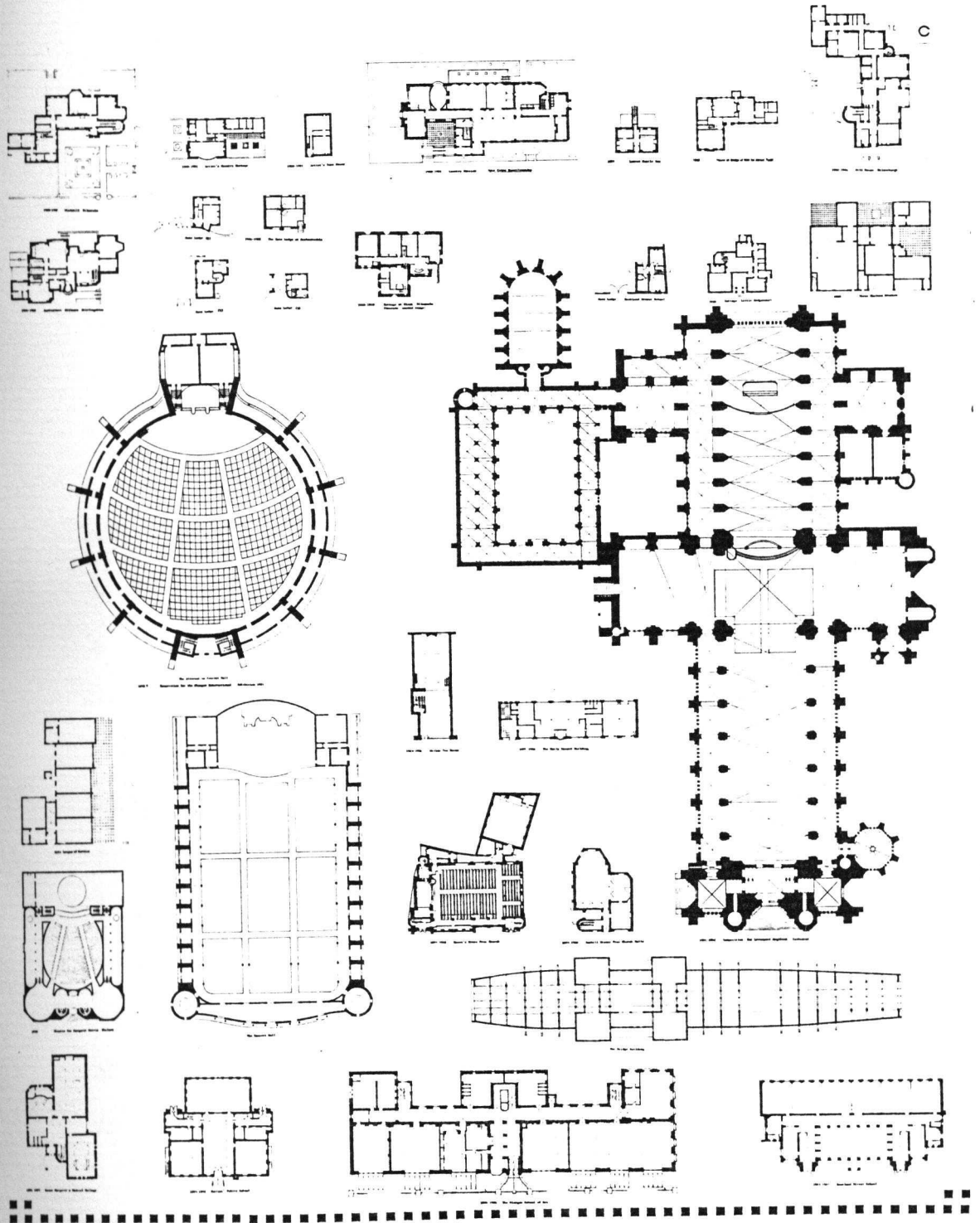
1868 1928



• BROADSHEET OF ELEVATIONS •



CHARLES RENNIE MACKINTOSH



• BROADSHEET OF PLANS •

• INTRODUCTION •

• INTRODUCTION •

Most of us are familiar with well known works by Mackintosh, and with particular drawings such as the perspective of Martyrs Public School or Queen Margaret's Medical College.

Scrutiny of Hiroaki Kimura's architectural drawings catalogue, enlightened us to the fact that there are several barely known projects, and others which were difficult to place, appreciate and compare with the more celebrated examples.

The idea of the production of the Mackintosh broadsheets, was stimulated by the existence of many other architectural posters which conform to a similar format ; i.e. illustrating several buildings drawn to the same scale.

This form of representation facilitates both an overview of a collected body of works and the opportunity to make comparisons between individual members of the group. Such a broadsheet on the work of Mackintosh, would serve several purposes ; it would enrich the body of knowledge already assembled about Mackintosh by collecting together all his known projects ; represent them at the same scale ; and drawn to the same format. This overview offers a simple graphic analysis of the scale and range of his works. A commercially sponsored broadsheet, would

also help to promote and extend an appreciation of Mackintosh architecture.

When selecting buildings and projects, we decided to include all substantial realised and unrealised work attributable to Mackintosh, although interior remodelling, minor extensions and unfinished sketches were excluded. Once the scope of our investigation was agreed, we chose 1 : 200 as the most appropriate scale for our drawings.

In a majority of projects, plan elevation and sections were available from a variety of sources. The study, we concluded, would be of enhanced value if we drew plan, section and elevation of as many buildings as possible.

As a general guide, applied in the majority of cases, we drew the main entrance elevation. In every case, the entrance level plan was drawn, and a key section if possible for each was also drawn.

The plan, section and elevation drawings are bound together in an A3 folder.

When the 1 : 200 drawings were completed, we assembled, by photocopying, two A1 sized prototype broadsheets; one of elevations, one of plans. At this stage, we also committed ourselves to using 1 : 400 for the broadsheet, as 1 : 500 was felt to be too small.

In this first attempt, the buildings were arranged in chronological sequence from top left to bottom right. After some debate, we agreed that there was no special value in this arrangement, and opted to make the following typological groupings ;

public buildings, schools and colleges, dwellings and commercial buildings.

The second pair of A1 broadsheets were prepared using a photographic technique to give a crisper, more faithful result.

• CHAPTER ONE •

PREPARATION OF THE DRAWINGS AND USING THE BACK-
PROJECTION TRACING TABLE.

Having examined the likely sources of drawings from which we could prepare our own drawings at 1 : 200, we found that :

five buildings were the subject of detailed measured studies

four buildings had been surveyed for the purposes of renovation works

thirteen buildings were in the G.S.A. library slide collection, in a form suitable for tracing. These were either of surviving Dean of Guild drawings, or of design drawings.

seven buildings were illustrated in sufficient detail in published and unpublished works, that we could prepare drawings from this source.

This left two small buildings unrepresented ; Ruchill St. Free Church hall and the elvation of Queen Margaret's Medical College, both of which

we surveyed. We found that back-projection and tracing, gave us accurate base drawings conveniently quickly and cheaply. Although photocopying was quicker, in 50% of cases, there was no reproduction of the original available for copying. The photocopying process is inherently inaccurate, as it tends to alter the proportions by around 3 - 5% each time a copy is taken.

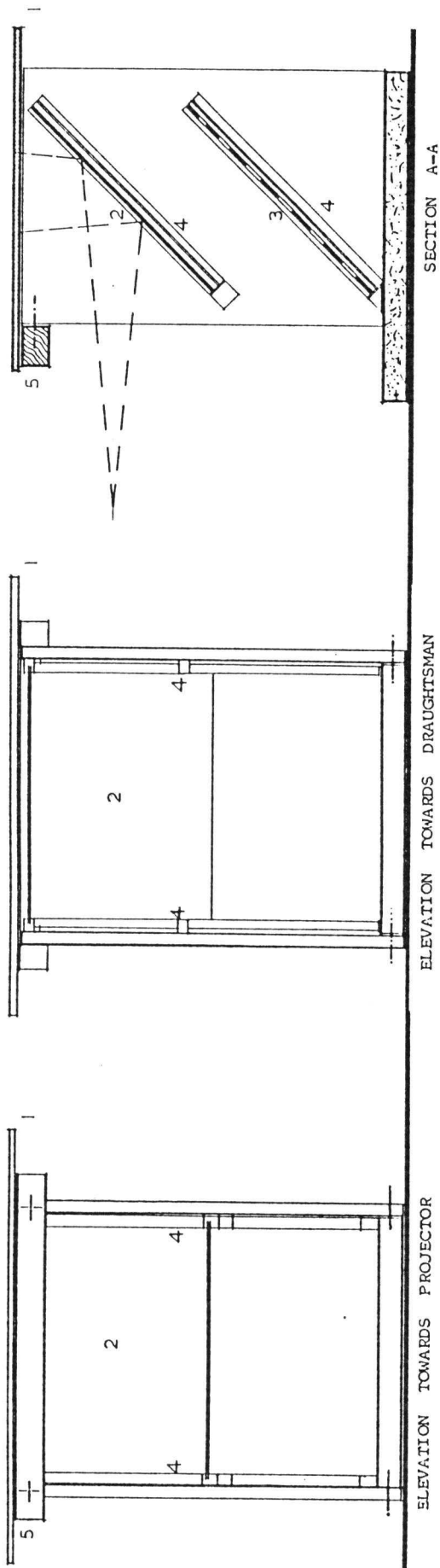
I designed and made a tracing table for use with a projector (see illustrations). The operating principles are quite straightforward and will be discussed in the following section.

The tracing table consists of two planar uprights, fixed to a base, supporting between them a 305mm square mirror tile at 45° . The table top is an 8mm sheet of plate glass which must have straight sides suitable for use with a T-square. The glass is not fixed but held with a G-clamp which allows adjustment to the horizontal angle of the top.

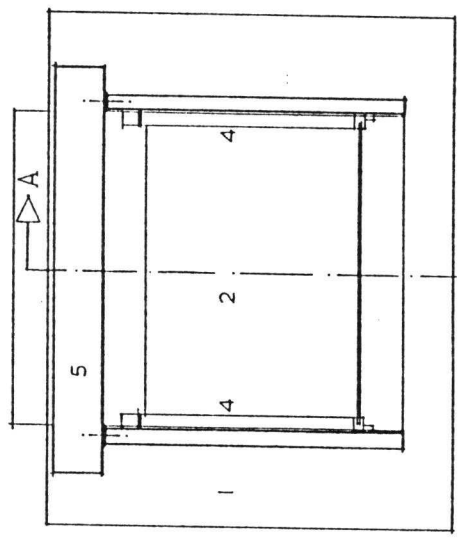
In principle, a slide of a drawing is projected horizontally onto the mirror which in turn reflects the image up onto the glass. A sheet of tracing paper temporarily stuck to the glass, renders the image visible. The projector and the tracing table must sit on a flat, level surface, usually a large table top. As an added precaution, to avoid

accidental movement, the tracing table could be G-clamped to a table top.

If an overall dimension of the image is known or as in the case of most of Mackintosh's drawings, a drawn scale is provided, the scale of the projected image can be gauged. To adjust the scale to the one required, simply means moving the projector (and re-focusing) backwards or forwards on the horizontal plane. When the projected image is found to be at the desired scale, all that remains to be done is to turn the glass plate, with the T-square firmly held against the edge, until the blade of the T-square is parallel to a major horizontal line in the drawing, then secure the G-clamp. The image is ready to be traced. It should be pointed out that for a slide to be suitable for this purpose, it must be taken as perpendicular to the plane of the drawing as possible, and a distorting lens such as a wide angle must not be used.



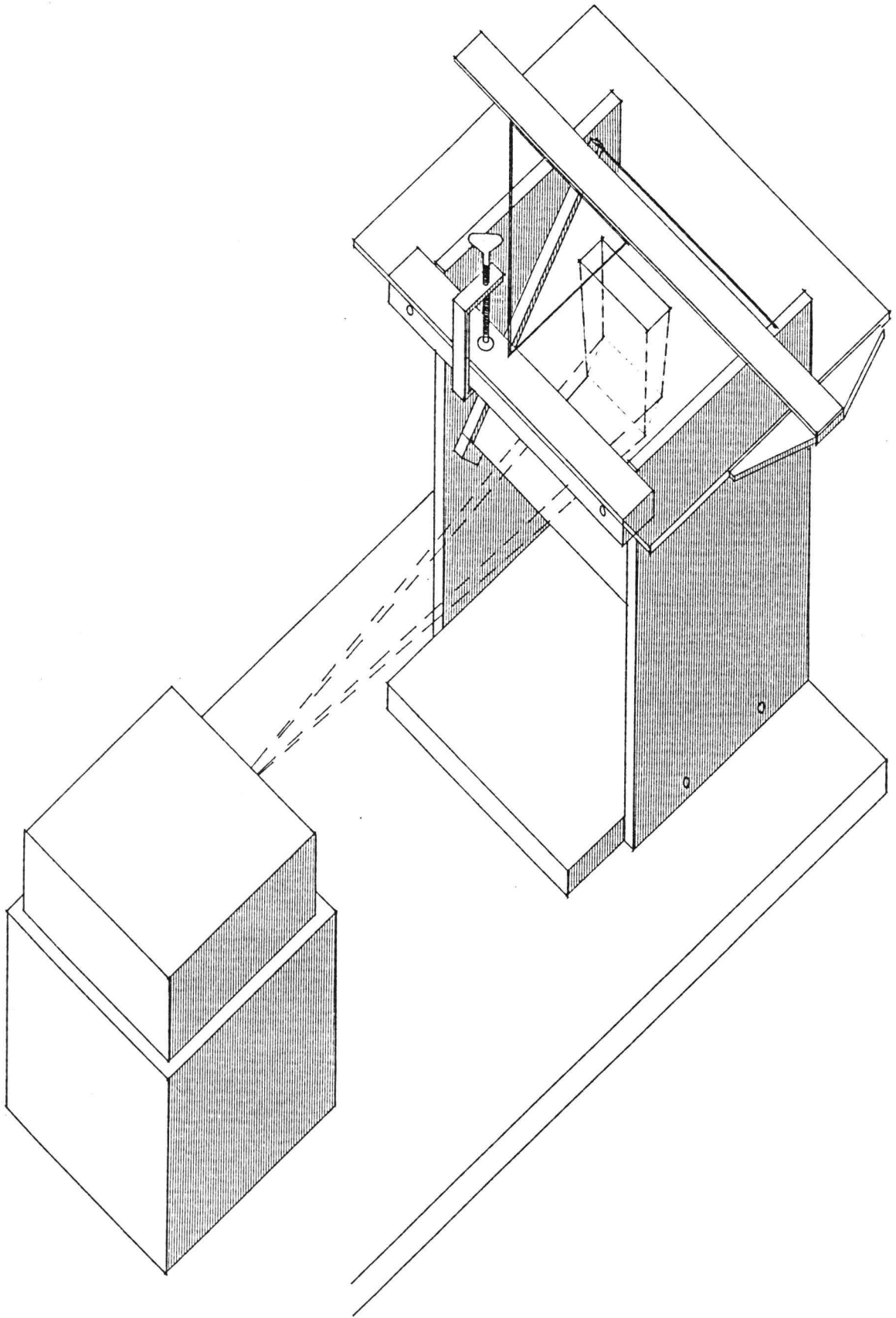
- 1 PLATE GLASS TOP
- 2 MIRROR
- 3 LOWER MIRROR POSITION
- 4 MIRROR SUPPORTS AT 45°, FIXED TO UPRIGHTS
- 5 BATTEN, TO G-CLAMP PLATE GLASS ONTO



SCALE OF MILLIMETRES



• BACK-PROJECTION TRACING TABLE •



• AXONOMETRIC OF BACK-PROJECTION TRACING TABLE •

• CHAPTER TWO •

CHRONOLOGICAL LIST OF PROJECTS INCLUDED
ON BROADSHEETS.

- | | | |
|---|--|------------|
| 1 | Design for a Railway Terminus. | 1892. |
| 2 | Queen Margaret's Medical College, Glasgow. | 1895. |
| 3 | Martyrs Public School, Glasgow. | 1895-1898. |
| 4 | Lennox Castle Inn, Lennoxtown. | 1895. |
| 5 | Glasgow School of Art. | 1896-1909. |
| 6 | Queen's Cross Church, Glasgow. | 1897-1899. |

DESIGNS FOR GLASGOW INTERNATIONAL EXHIBITION 1898.

- | | | |
|-----------|--|------------|
| 7 | The Industrial Hall. | |
| 8 | The Concert Hall. | |
| 9 | The Alternative Concert Hall. | |
| 10 | The Bridge Building. | |
| 11 | Ruchill St. Free Church Hall, Glasgow. | 1899-1900. |
| 12 | Windyhill, Kilmacolm. | 1900-1901. |
| 13 | Design for Artist's Town House. | 1901. |
| 14 | Design for Artist's Country Cottage. | 1901. |
| 15 | The Daily Record Building, Glasgow. | 1899-1906. |
| 16 | Design for 'Haus eines Kunstfreundes'. | 1901. |
| 17 | Gate Lodge, Auchenbothie, Kilmacolm. | 1901. |
| 18,19,20. | Designs for Gate Lodges, Auchenbothie,
Kilmacolm. | 1901. |

- | | | |
|----|--|------------|
| 21 | Design for Liverpool Anglican Cathedral. | 1902. |
| 22 | The Hill House, Helensburgh. | 1903-1904. |
| 23 | The Willow Tea Rooms, Glasgow. | 1903-1904. |
| 24 | Scotland St. School, Glasgow. | 1904. |
| 25 | Janitor's House for Scotland St. School. | 1904. |
| 26 | Auchenibert, Killearn. | 1906-1908. |
| 27 | Mossyde, Kilmacolm. | 1906-1915. |
| 28 | Cottage at Little Hedgecourt. | 1919. |
| 29 | Design for Three Chelsea Studios, London. | 1920. |
| 30 | Design for Arts League of Service, London. | 1920. |
| 31 | Design of Theatre for Margaret Morris, London. | 1920. |

NOTES AND OBSERVATIONS ON SOURCES AND PREPARATION
OF INDIVIDUAL DRAWINGS.

- 1 Design for a Railway Terminus. 1892.

We elected to draw the front elevation and the best copy of the original drawing was in Robert Macleod's book¹. There was no drawn scale on the chosen drawing, so reference was made to the original drawings² and the scale determined from the longitudinal section. Our drawing was then prepared using a photocopy enlargement.

- 2 Queen Margaret's Medical College, Glasgow. 1895.

The ground floor plan was drawn from a photocopy enlargement of the original drawing as illustrated in Hiroaki Kimura's Ph.D.³. No drawings of the elevation or section, as built exist. Since most of the entrance elevation is visible (despite being engulfed by the B.B.C. complex) we undertook an elevational survey, sufficient to make an accurate drawing. The minor parts of the elevation obscured by its' neighbours were established from Mackintosh's perspective and contemporary photographs⁴. We made no attempt to survey the section of the building, as the interior is substantially altered.

- 3 Martyrs Public School, Glasgow. 1895-1898.
No original drawings exist of the building other than Mackintosh's perspective. A measured study at 1 : 100 was made available to us by Assist Architects. Our drawing was prepared using photocopy reductions.
- 4 Lennox Castle Inn, Lennoxtown. 1895.
The plan and elevation were prepared by back-projecting slides of the original drawings. Slide 72 MACK LE 1a of the plan, and slide 72 MACK LE 2 of the elevation. G.S.A. library.
- 5 Glasgow School of Art. 1896-1909.
A measured study to a scale of 1 : 96 by Peter Porteus and Paul Spear of the Mackintosh School of Architecture was the basis of our drawings⁵. The study was reduced by photocopier and traced.
- 6 Queen's Cross Church, Glasgow. 1897-1899.
None of Mackintosh's original drawings exist, apart from a perspective. Our drawings are based solely upon a highly detailed measured study at 1 : 50 by Lesley MacFarlane and Ann Dodds of the department of architecture, the University of Strathclyde. Their drawings were reduced by photocopier and traced.

- 7 The Industrial Hall. 1898.
No reproduction exists in a published work of the hall, in a form which would allow us to use photocopying techniques. A preliminary drawing of the north elevation was prepared from a slide of the original drawing. Slide 72 MACK EX 8 G.S.A. library. Reference was then made to the original drawing, G.S.A. Mackintosh collection, to establish details and confirm dimensions. A further series of slides were taken to prepare the final drawing by back-projection. No plan or sectional information survives.
- 8 The Concert Hall. 1898.
The plan was prepared by back-projection of a slide of the original drawing. Slide 72 MACK EX 3, G.S.A. library. A new slide was taken of the original elevation drawing⁶ and our drawing prepared by back-projection to the correct scale.
- 9 The Alternative Concert Hall. 1898.
The building was too large to conveniently back-project and trace, so we used a photocopy enlargement of the illustration in Robert Macleod's book⁷. Dimensions and details were verified by reference to the original drawing⁸.

- 10 The Bridge Building. 1898.
The plan and elevation were prepared from slides of the original drawings. Slide 72 MACK EX4, G.S.A. library.
- 11 Ruchill St. Free Church Hall, Glasgow. 1899-1900.
None of Mackintosh's original drawings exist. Hiroaki Kimura's Ph.D. illustrates a measured drawing of the hall by Duncan A. Scott. On inspection, we decided that the elevation was not proportionally accurate, and decided to undertake a survey sufficient to represent the building at 1 : 200.
- 12 Windyhill, Kilmacolm. 1900-1901.
Slides of the original drawings for the Dean of Guild, were back-projected and traced. It was noted that the eaves height had been raised in the built work, which our drawing shows. The rainwater barrel on the west elevation was never executed. Slides 72 MACK WH 20, of the plan,
72 MACK WH 23, of the elevation
and 72 MACK WH 22, of the section, G.S.A. library.

- 13 Design for Artists Town House. 1901.

The plan and elevation were traced from slides of the original drawings.

Slides 72 MACK ATH 2, of the plan,

and 72 MACK ATH 3, of the elevation, G.S.A. library.

The original drawings⁹ were referred to, to establish a scale and dimensions, as no drawn scale is shown. The elevations are at 1 : 48 and the plans at 1 : 192. On elevation, the entrance doors are shown as double, whereas the plan shows a single door.

- 14 Design for Artists Country Cottage. 1901.

The plan and elevation were drawn from a slide of the original drawing. Slide 72 MACK AC 5, G.S.A. library. Again the original drawings¹⁰ were referred to, to establish a scale and dimensions. The elevations are at 1 : 48 and the plans at 1 : 192.

- 15 The Daily Record Building, Glasgow. 1899-1906.

Our drawings were based solely on a highly detailed measured study¹¹ by J. Crawford and S. Drummond, of the Mackintosh School of Architecture. Their drawings were reduced by photocopier and traced.

16 Design for 'Haus eines Kunstfreundes'. 1901.

Slides of the original drawings provided us with all the information required to produce, by back-projection, a plan and an elevation.

Slide 72 MACK HK 2a, of the plan,

and 72 MACK HK 4b, of the elevation, G.S.A. library.

Minor discrepancies between the plan and elevation were noticed, the columns of the entry court, the positions of the ornamental trees and the gable window. It is interesting to note that the original drawings had a metric drawn scale because they were submitted for a German competition.

17 Gate Lodge, Auchenbothie, Kilmacolm. 1901.

Our drawings of this, the executed design, were prepared from slides of the original drawings.

Slides 72 MACK AU 4, of the plan,

and 72 MACK AU 5, of the elevation, G.S.A. library.

18, 19, 20, Designs for Gate Lodges, Auchenbothie, Kilmacolm. 1901.

These, the unexecuted designs, were prepared from illustrations in Hiroaki Kimura's Ph.D.¹².

21 Design for Liverpool Anglican Cathedral. 1902.

Like the Alternative Concert Hall, the drawing was too large to be drawn by back-projection of the slide. The plan was enlarged from Robert Macleod's book¹³ by photocopier and traced. The elevation, however, did not show sufficient detail when enlarged from 'Mackintosh Architecture',¹⁴ but it did give us the basic outlines of the drawing. To obtain the details, four slides were taken of the original drawing¹⁵, and the information traced by back-projection.

22 The Hill House, Helensburgh. 1903-1904.

Our drawings were prepared from a photocopy reduction of a survey at 1 : 100 made by the Boys Jarvis partnership, who were undertaking restoration works.

23 The Willow Tearooms, Glasgow. 1903-1904.

None of Mackintosh's original drawings survived. Keppie Henderson Architects, carried out restoration work for Henderson the Jewellers in 1981. Their drawings, reduced by photocopier, enabled us to prepare our drawings.

- 24 Scotland St. School, Glasgow. 1904.
An excellent measured study¹⁶ by Alan Millar and James Opfer of the Mackintosh School of Architecture, provided us with all the information required. Our plan, section and elevation were traced from photocopy reductions from 1 : 100.
- 25 Janitor's House for Scotland St. School. 1904.
As above.
- 26 Auchinibert, Killearn. 1906 -1908.
Slides of the original drawings submitted to the Dean of Guild, were back-projected and traced. Slides 72 MACK AUC 7, of the plan,
72 MACK AUC 13, of the section
and 72 MACK AUC 11, of the elevation. G.S.A. library
The house was completed by another architect, so we decided to draw what Mackintosh had intended rather than as built.
- 27 Mossyde, Kilmacolm. 1906-1915.
Although slides of Mackintosh's original drawings are available, it was decided that a measured study of the building by John D Wingate Architects, would be a more accurate source. Plan, section and elevation were prepared from photocopy reduction.

- 28 Cottage at Little Hedgecourt, Sussex. 1919.
Although Mackintosh's original drawings for this house are in the University of Glasgow, Mackintosh Collection, these drawings have never been published, or the building written about. Our drawings were prepared from a photocopy enlargement of reproductions of the originals in Hiroaki Kimura's Ph.D.¹⁷.
- 29 Design for three Chelsea studios, London. 1920.
The elevation was traced from a slide of the original drawing. Slide 72 MACK CS 9, G.S.A.library.
The plan was prepared from slide 72 MACK CS 2, a slide of the Arts League of Service design which showed the Chelsea Studios plan.
- 30 Design for the Arts League of Service, London.1920.
Our drawings were prepared from a slide of the original drawings, slide 72 MACK CS 2, G.S.A.library.
- 31 Design of Theatre for Margaret Morris, London.1920.
We would have prepared our drawings from a slide in the G.S.A. library, but unfortunately, it had been taken slightly obliquely, and was therefore distorted. Consequently, we enlarged the plan and

elevation illustrated in 'Mackintosh Architecture'¹⁸
by photocopier. Sizes and details were verified
by reference to the original drawings in the
University of Glasgow, Mackintosh Collection.

NOTES TO CHAPTER 2.

- 1 Macleod, Robert Charles Rennie Mackintosh,
Architect and Artist. 1985
Ed. Glasgow : Collins. P 32.

- 2 Hunterian Art Gallery, University of Glasgow,
Mackintosh Collection.

- 3 Kimura, Hiroaki Charles Rennie Mackintosh,
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G.S.A. Architectural Ph.D.thesis
6563 (H/DIS 1982 KIM). P 103,
Illustration 14a.

- 4 Billcliffe, Roger Charles Rennie Mackintosh,
The Complete Furniture, Furniture
Drawings and Interior Design.
London : Lutterworth Press, 1979
P 32.

- 5 Porteus, Peter Glasgow School of Art : A Measured
Study. G.S.A. Architectural
dissertation (A/DIS 1983 POR).

- 6 Hunterian Art Gallery, University of Glasgow, Mackintosh Collection.
- 7 Macleod, Robert Charles Rennie Mackintosh
Architect and Artist. OP CIT.
- 8,9,10, Hunterian Art Gallery, University of Glasgow,
Mackintosh Collection.
- 11 Crawford, J Daily Record Building,
Drummond, S Glasgow : A Report. G.S.A.
Architectural dissertation
(A/DIS 1981 CRA)
- 12 Kimura, Hiroaki Charles Rennie Mackintosh
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Catalogue. P 169 illustrations
37a, 37b, 37c. OP CIT.
- 13 Macleod, Robert Charles Rennie Mackintosh,
Architect and Artist. P 109.
OP CIT.
- 14 Mackintosh Architecture Ed.
Jackie Cooper (London :
Academy Editions, 1978)P 102.

- 15 Hunterian Art Collection, University of Glasgow,
Mackintosh Collection.
- 16 Millar, Alan A Study of Scotland St. School
Opfer, James by Charles Rennie Mackintosh.
G.S.A. Architectural
dissertation (A/DIS 1980 MIL)
- 17 Kimura, Hiroaki Charles Rennie Mackintosh
Architectural Drawings
Catalogue. P 259 illustration
59b of the elevation and
section. OP CIT.
- 18 Mackintosh Architecture. P 107 illustrates plan and P 106
illustrates elevation.

• CONCLUSION •

• CONCLUSION •

As a result of this study, we all gained a much fuller appreciation of Mackintosh's output, as a whole. Our perception of the chronology and breadth of work from barely known to celebrated, was enhanced. Preparing the drawings of built and unbuilt, in the same way without differentiation, raised our consciousness of 'what might have been'.

Familiar built work such as the Art School and Scotland St. School, became our yardsticks for the scale of the unrealised projects, providing us with some unexpected revelations.

'Haus eines Kunstfreundes' turned out to be virtually the same plan size as Scotland St. School; the Industrial Halls are about three times the length of the art school.

The alternative concert hall, the cathedral and the bridge building are all much larger than we realised.

With the set of drawings we had prepared, we could easily make objective comparisons of scale, planning sectional and elevational treatment and sophistication within types and between types.

We are sure that the broadsheets, once available will enable others to contemplate these concerns with a comprehensive, graphic representation to refer to.

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