

A Study of Early Corrugated Iron Buildings in Rural Scotland

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INTRODUCTION

The colour and pattern of corrugated iron is a familiar aspect of the landscape of rural Scotland. The rusty sheets of the byre roof, the village hall, or church may be considered temporary, cheap and insubstantial but these buildings have fulfilled an important role over the years.

This paper aims to show that there is a rich history of prefabricated corrugated iron buildings in the Scottish countryside and that they have a greater cultural significance than is generally appreciated. The paper examines the development of production techniques and manufacturing companies active in Scotland, together with an assessment of the contribution of these buildings to the built heritage.

HISTORY OF CORRUGATED IRON BUILDING

Early Developments in Manufacturing

By the late 1820's the process of corrugating sheets of iron was known, and the first patent to take advantage of the additional strength of these plates was granted to Henry Robinson Palmer in June 1829.

Palmer, an engineer working at the London Docks, devised a system for a self-supporting roof which involved riveting corrugated sheets to a cast iron ridge and gutter plate. He wrote

My improvement in the construction of the roofs and other parts of sheds, warehouses and other buildings consists in the application of metallic plates or sheets, in a fluted, indented or corrugated form... I do not claim as my invention any particular mode of forming the plates or sheets, the means of producing such forms being well known.

(text of patent no. 5786, H.R.Palmer 1829)

In the same year the firm of Richard Walker, Carpenter Builder and Manufacturer of the Patent Corrugated Iron, was founded (G. Herbert, 1978). By 1832 Walker was advertising in Robson's London Directory, and the following year his Patent Corrugated Iron Factory, at Grange Road, Bermondsey, appears in the Post Office London Directory (H.W.Dickinson, 1943). However, the early corrugating process involved stamping one flute at a time with a heavy press, or casting in a mould. Only a few sheets could be made in a day's work and there were often inaccuracies in the pressing. The only protective coatings were oil or tar paints, which were found to be weak and ineffective.

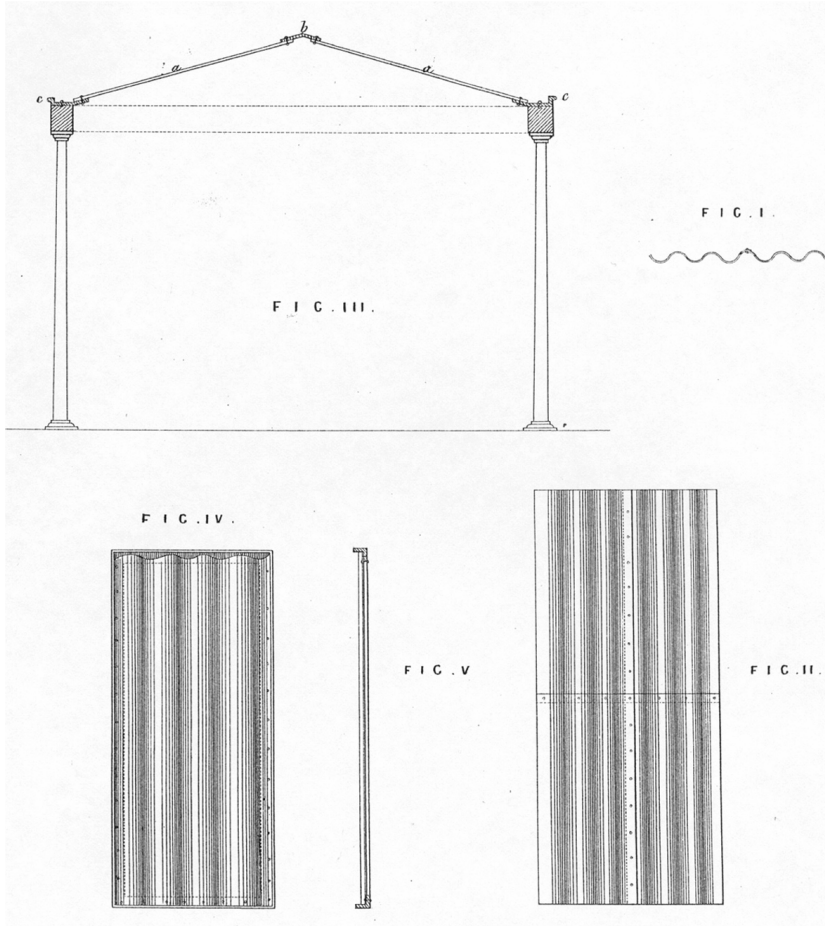


Figure 1. Illustration from Palmer's patent, 1829

An important step forward was the development of galvanizing. The first patent for this process was filed by Stanislaw Sorel in Paris, in May 1837. Sorel had been working for five years to perfect the technique of dipping an iron object in a bath of molten zinc, protected from volatilization by a layer of sal ammoniac. The same year the process was brought to the U.K. by Commander H.V. Craufurd RN and in 1838 The English Scotch and Irish Galvanized Metal Company was set up at Southwark, later transferring rights to the British Galvanization of Metals Company in Birmingham and Staffordshire (H.W. Dickinson, 1943). This new galvanizing process was first applied to corrugated roof sheeting by the manufacturer John Porter, also in Southwark, in 1843 (G. Herbert, 1978).

A number of improvements in the process of production followed. In 1844, John Spencer, an agent for the Phoenix Iron Works, West Bromwich, developed a technique for passing iron sheets

between grooved rollers to produce corrugations. In 1845, Edward Morewood and George Rogers patented a similar process and the following year they devised a corrugating machine for pressing the metal (H.W.Dickinson, 1943). At the Great Exhibition of 1851 a number of firms including Morewood and Rogers, showed galvanized iron products such as corrugated roof sheeting and rainwater goods. The Eagle Foundry of Edward Bellhouse displayed various prefabricated cottages and warehouses, which so impressed Prince Albert that he ordered one as a ballroom for the newly acquired Balmoral Castle.

Prefabricated Corrugated Iron Buildings

The potential for corrugated iron to be manufactured into kit form buildings was recognized early. An account of Richard Walker's works in 1833 noted that "portable houses might be very readily made for exportation" (J.C.Louden, 1833), while in 1843, Laycock's factory in Liverpool built an iron palace for King Eyambo of the Calabar River in Nigeria. This consisted of iron panels fixed to a wooden framework, and was erected and open for public exhibition before being exported. Spencer's Phoenix Iron Works produced a large iron market house for Honduras in 1846, and from 1846 to 1849 John Porter's factory sent a series of warehouses and other buildings to the West Indies (G.Herbert, 1978). Bellhouse sent cottages and warehouses to California in the 1849 goldrush, and later to Australia in the goldrush of 1851, while in the 1850's Hemmings of Bristol produced some of the first iron clad churches.

By the mid 1860's Francis Morton & Co. of Liverpool had established a special department under the direction of an architect for the design and manufacture of churches, chapels and school houses. Their Patent Railway, and Park Fencing, Galvanizing and Corrugated Iron Works produced St. Mark's in Birkenhead, consecrated in April 1867 and designed to accommodate 500 people, at a cost of £2000. Their catalogue of 1873 boasted

This company has lately turned its special attention to the improvement and development of Iron Church and Chapel Building, being anxious to show that this material, in practical and tasteful hands, may be utilized in producing structures at one economical, as comfortable as stone buildings, pleasing in their architectural appearance, and meeting a great desideratum for additional church accommodation throughout the country.

Corrugated iron came into its own in the last few decades of the nineteenth century with increasing availability and cheapness. The peak of production was probably between 1890 and 1900, when 250,000 tons were being exported annually (H.W.Dickinson, 1943). During the early twentieth century demand diminished at home and abroad though it was briefly stimulated by the military requirements of the First World War. The invention of the Nissen hut by Lt. Col. P.N.Nissen (a mining engineer from Canada), in 1915 demonstrated its suitability to provide a quickly erected and demountable, flexible, general purpose building.

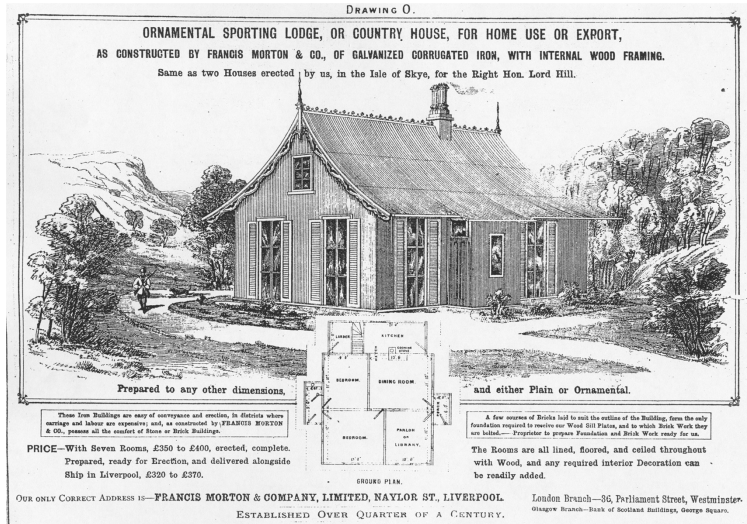


Figure 2. Francis Morton & Co. catalogue 8B 1873

The Scottish Contribution to the Manufacture of Corrugated Iron Buildings

One of the pioneers of this type of construction was the Glasgow firm of Robertson and Lister. By the early 1850's they had developed a reputation for exporting to Australia and before sending a large warehouse to Melbourne in 1853, they held a ball inside the structure. The novelty was such that a journalist reported "large crowds and lines of civic force guarding the living avenues of approach to the corrugated iron structure which was the scene of the most gay and gorgeous festivities" (G.Herbert, 1978). At one time fifteen large structures stood in their grounds as they produced churches and warehouses for dispatch. However it seems that by the mid 1850's they had been taken over by the Edinburgh firm of C.D.Young and Co. (Australian Heritage Database).

Charles D. Young was an Edinburgh ironmonger who started in business making iron fencing. He founded a company which developed a reputation for fine cast iron buildings, but also produced a range of corrugated iron structures. The firm developed quickly, and became an important early pioneer of prefabricated buildings. Their catalogue of 1856 illustrated stores, houses, markets, arcades etc. "largely in demand for various quarters of the World, from convenience, strength and utility". They probably produced and exported the elaborately cast and decorated Iron Church on MacQuarie Street, Sydney, and Corio Villa sent to Geelong, Victoria in 1855. At their peak they employed over 1000 workmen and had branches in Glasgow, Liverpool and London. However the firm ended in bankruptcy in 1858.

Also in Glasgow, the firm of Frederick Braby and Co. became a major producer towards the end of the nineteenth century. The company was established in London in 1854 and expanded to works in Deptford in 1866, Liverpool in 1871 and Glasgow which became the largest of their works, in 1875.

As well as corrugated iron, the firm manufactured a wide range of industrial and engineering products (Glasgow Chamber of Commerce Journal, March 1956). Braby's Eclipse Iron and Galvanizing Works at Petershill Road, Springburn, covered six acres by 1888, and at its peak employed 1700 men. A Glasgow Business Directory noted;

Iron buildings go from those works at Barnhill to every quarter of the globe – used for habitation, public meeting, warehousing, manufacturing and Divine worship. In colonies particularly where labour is scarce and costly one of the first necessities of the settler is a place of habitation, and to this requirement the iron buildings produced at and supplied by such establishments as Messrs Braby lend themselves in the most convenient and effective manner. That the advantages of the system of iron buildings thus developed are well recognized is shown by the great progress made in this branch of trade in recent years.

(Glasgow of Today, 1888)

The company survived into the twentieth century and the works were finally demolished in 1968.

The firm of A.& J.Main and Co. seems to have been established in the early 1870's when the Clydesdale Iron Works were erected at Possilpark, Glasgow. Main was involved in the iron industry in the city through the 1860's and may have been a manager with C.D.Young. The company's catalogue from 1894 advertises iron roofs, shedding, various buildings including galvanized iron shooting lodges, and covered cattle yards. They expanded in the early twentieth century and produced many industrial and warehouse buildings, motor and bus garages, still widely seen. The works closed in 1968 and were demolished in 1969.



Figure 3. Byre at Dornie, Lochalsh by A.&J. Main and Co.

Another important Glasgow based manufacturer was Speirs and Co. They first appeared in the Glasgow Post Office Directory in 1893 as “iron and steel churches , houses and weatherboard building contractor”, of 125 West Regent Street, and they remained active until at least the 1920’s. They manufactured a number of building types including churches, schools, hospital wards and houses. Between 1908 and 1914 Speirs produced 75 churches for the newly formed United Free Church (R.MacLeod, 2000). At least 8 of these buildings remain in the Highlands, in such places as Minard, Argyll; Craigton Sutherland; Foyers and Errogie Inverness-shire. Some of these buildings still bear their original manufacturers name plate. They may have been associated with the firm of F.D.Cowieson & Co. whose name appears with Speirs on plans for the cottage “Torrangeb” at Ford, Argyll, built for the captain of the steamer “Lochawe” in 1911 (Mrs.S.Carmichael, private correspondence) Cowieson’s were established in 1907 and were based at St. Rolox, Springburn, Glasgow.



Figure 4. Speirs and Co. nameplate, Minard Church, Argyll

CONSTRUCTING IN CORRUGATED IRON

Characteristics of Corrugated Iron Sheets

Initially sheets were made from wrought iron with varying amounts of carbon and other impurities. Bessemer invented his process of making steel in 1856 but a technique for producing light gauge steel sheets for corrugating was not developed until the 1890’s. Even then wrought iron was often preferred to mild steel as it had greater resistance to corrosion due to the fact that zinc alloys more readily with iron than steel.

There was considerable variation in sheet size and pitch (distance between corrugations) amongst the early manufacturers, but by the end of the nineteenth century a standard three inch pitch with a

depth of three quarters of an inch and an overall width of two feet three inches was becoming common. Other sizes such as a five inch pitch (as at Balmoral ballroom), and so called “Canadian” pattern, having flat sections between ridges nine or twelve inches apart (such as the roof of Heather Lodge, Kinbrace, Sutherland) are occasionally seen today. Sheet length varied in one foot increments from four feet up to twelve feet. Sheet thickness was measured on the scale of the Birmingham Wire Gauge. BWG 16 (1.65mm) up to BWG 22 (0.71mm) was used for building in the UK, whilst quantities of the thinner 24 and 26 gauge were exported to the colonies.



Figure 5. Lochfyneside Church of Scotland, Minard, Argyll



Figure 6. Five inch pitch on horizontal sheeting, Balmoral ballroom



Figure 7. Heather Lodge, Kinbrace, Sutherland

The characteristics of the sheets is built up by their patina of colour, reflective quality, layout of fixing bolts and washers and the effects of age. Rusting patterns may occur, particularly on early sheets which may have been dipped unevenly in sheet pots, allowing more zinc to be deposited on one side than the other (A. Warr 2000). They were often coated in oil based paints, commonly red, green, drab grey or cream.

Prefabricated Systems

Systems for complete prefabricated corrugated iron buildings were particularly appropriate for remote areas such as rural Scotland, where they could be delivered by sea or by rail.

Construction generally comprised corrugated sheets fixed to a timber framework, with varying degrees of decorative timber embellishment. As an example, the catalogue of William Cooper Ltd. 761 Old Kent Road, London (undated, but probably early twentieth century) illustrates numerous churches, chapels, mission rooms, houses and hospitals, and includes the following specification: -

Where a building is required to stand permanently, a four course brick foundation is advisable. It will be found more expedient to entrust this work to a local man, we, upon receipt of order, supplying a plan (free of charge) for his guidance.

- Framework comprising timber joists, rafters, framing and purlins sized to suit.
- Floorboards of inch or three quarter inch seasoned deal
- Linings of half inch or five eights inch tongued and grooved match board. Exclusion of draughts is effected by the liberal use of felt in the walls and gables.

Cladding in sheets of standard Birmingham gauge, truly and evenly corrugated and coated with pure Silesian spelter, true and even in temper and free from flaws and cracks. Galvanized capping provided for the ridge, and the whole completed with ornamental finishes to gables and pinnacles studied from the most approved Gothic designs.

The buildings were made in sections, numbered and lettered, and accompanied by a diagram so that erection required no particular technical skill. Packing for shipment received careful attention "so that the parts may be protected from rough usage consequent upon a long voyage and transshipment and carriage overland".

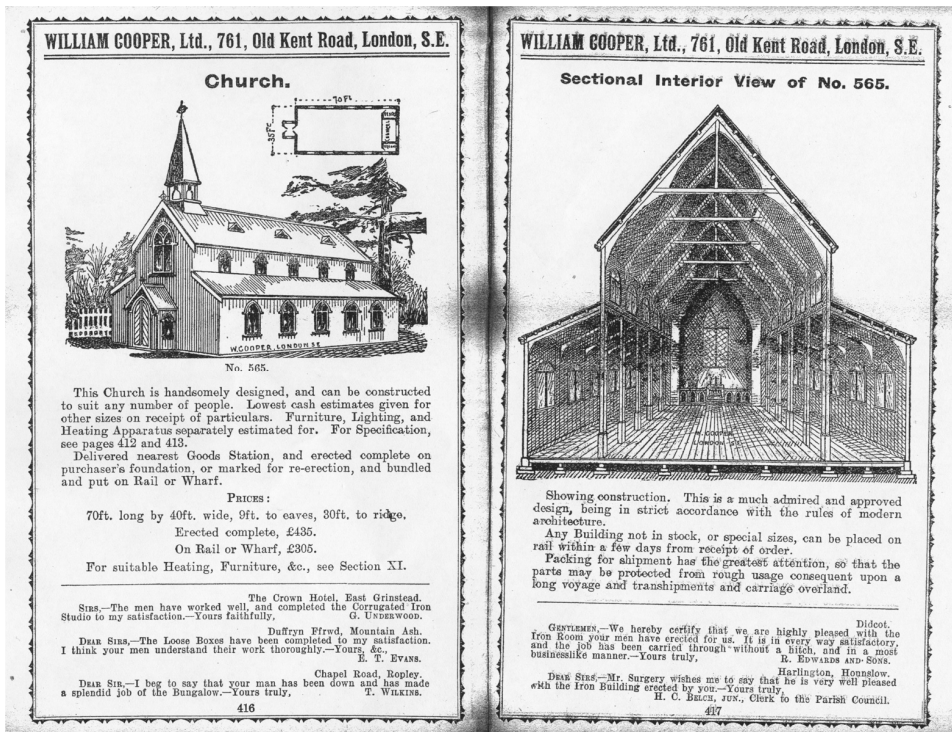


Figure 8. Catalogue of William Cooper Ltd

CULTURAL SIGNIFICANCE OF CORRUGATED IRON BUILDINGS

In some parts of the World corrugated iron has characterized a particular local architectural style. In Australia and South Africa it was widely used from the 1850's and likewise in Iceland it has contributed to a distinctive regional architecture. In Scotland it has been assimilated into the language of vernacular building and has contributed to the qualities of the built environment in terms of aesthetic design, social development and industrial history.

Aesthetic innovation

The colour and texture of corrugated iron forms an interesting and complimentary counterpoint to the colour and form of the natural landscape. Naismith argues that the rich rusty red on aging is not inappropriate, and argues that conservationists would wish to see it retained as a foreign but naturalised element of building (Naismith, 1985).

Often the sheets were painted, and the value of polychromy to the rural landscape is important, particularly as buildings were erected in locations where strong colour may not have previously appeared in the built environment. The cottage “Dunstalking” at Kinbrace in Sutherland is painted two shades of vivid blue with a red roof, Leannach church by Speirs (now at the Highland Folk Museum), is finished in strong red and cream, while Tomatin Church of Scotland is a bright emerald green.

Design innovations became possible as corrugated iron allowed greater freedom for large spans and curved roofs. Rigid self supporting roofs are a feature of the earliest patents, and Richard Walker’s advertisements in 1832 show bow roofed warehouse structures, while Edward Bellhouse of Manchester experimented with curved roofed cottages and lodges, one of which was proposed to accompany the ballroom at Balmoral for Prince Albert. Curved agricultural buildings began to appear in the late nineteenth century. Covered yards, “dutch barns” and hay sheds were produced by manufacturers such as Boulton and Paul of Norwich and A.& J.Main & Co. of Glasgow and feature in their “Country Gentleman’s Catalogue” of 1894. In addition, Nissen huts became widespread after the First World War, and their barrel shaped roofs remain a feature of farm and croft today.

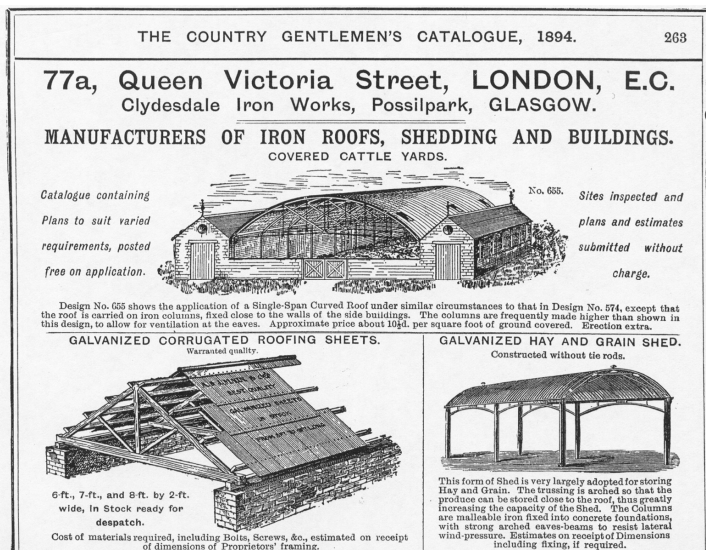


Figure 9. Curved roofed agricultural buildings, A. & J. Main & Co. catalogue 1894

Many manufacturers embellished their buildings with applied decoration. Ornamental timber features such as patterned bargeboards and finials were common. Speirs churches such as Strath Halladale in Sutherland had timber facings and moulded window surrounds picked out in colour. Elaborate wrought iron ridge capping such as the brattishing at Syre or Aberfeldy churches was also popular, together with iron bellcotes, spires and decorative ventilators which often contributed to “Gothicizing” the appearance of the building, even when it was not for ecclesiastical use (C.Surfleet, 1996).



Figure 10. Church of Our Lady of Mercy, Aberfeldy

Social Significance

Corrugated iron buildings started to appear at a time of great social change in rural Scotland. They tend to be utilitarian structures and symbolise the unwritten history of the ordinary people. The condition of housing in general was poor, and in particular in the Highlands was often desperate. In the 1880's, John MacPherson of Glendale on Skye wrote “We have very miserable dwelling houses. They are thatched with straw and as our crofts do not produce the required amount of straw necessary for fodder for cattle and thatch for our houses, and as we are prohibited from cutting rushes or pulling heather by the proprietor, the condition of our houses in rainy weather is most deplorable” (J.Hunter 1986). Changes to the law improved the security of tenure throughout the crofting counties and by the beginning of the twentieth century corrugated iron was in use in the construction of new croft houses. This continued through to the 1920's when the Board of Agriculture used corrugated iron to provide houses and weaving sheds for resettled families on the Minginish Estate on Skye.



Figure 11. Disused croft house, Colbost, Glendale, Isle of Skye

The large landowners also built in corrugated iron. Prefabricated buildings were suitable for halls for private functions, for cottages and shooting lodges. The seventh Marquis of Breadalbane even constructed a private church in corrugated iron for his weekend shooting parties which was built at Killin in 1876, and is known today as “The Grouse Chapel” (Gifford, 1992).



Figure 12. St.Fillan's Church, Killin

Isaac Dixon's Windsor Iron Works in Liverpool, advertising in 1879, claimed

Our buildings are well adapted for erection in shooting quarters in the Highlands etc, in situations where carriage is difficult and costly, and where it is impossible to erect buildings of brick or stone etc. These houses can be occupied the moment they are finished and are not liable to damp when shut up.

The manufacturers of corrugated iron structures also had a ready market for religious buildings. Diverse churches proliferated throughout the country in the nineteenth century and the suppliers of prefabricated buildings served most denominations. The church of Our Lady Of Mercy, in Aberfeldy, was built in 1885 by the Catholic Third Marquis of Bute (a year before he built the corrugated iron Catholic cathedral at Oban). At Syre in Sutherland, the church was built in 1891 as a Free Church Mission. In 1900 the congregation voted to join the newly formed United Free Church, and finally joined the Church of Scotland in 1929. The church hall at Dulnain Bridge, Inverness-shire was built in 1912 as a mission station by the Church of Scotland, while the Episcopal Church at Brora, Sutherland, is a corrugated iron building probably by Speirs of Glasgow, who also supplied a considerable number of prefabricated buildings to the United Free Church when it was formed.



Figure 13. Syre Church, Sutherland

Remaining corrugated iron buildings also served the rural community in other ways. Village halls such as Corgarff, Aberdeenshire and the Fisherman's Hall, Embo, Sutherland, date from the mid 1890's when corrugated iron was at its peak of production. Buildings were also produced for

schools which started to appear in the rural districts such as at Plockton in Lochalsh, where the dining hall possibly dates from 1889 (Gifford, 1992). Isolation hospitals were a reminder of the prevalence of TB in the countryside and corrugated iron wards were not uncommon. The Sutherland County Isolation Hospital at Cambusavie (1906), Dalmally, Argyll (1898) and Lochmaben, Dumfries and Galloway (now demolished) were all probably manufactured by Speirs of Glasgow.



Figure 14. Former hospital building, Dalmally, Argyll

Industrial and Economic Development

By the last few decades of the nineteenth century corrugated iron had become the first important industrially produced metal cladding material (M.Bowley, 1960). It's history is part of the story of the industrialisation of the building industry at this time. In addition, the association of an individual building to its manufacturer can be of particular interest and importance in assessing its value. A number of companies were active in Scotland, and evidence remains from at least eight manufacturers; The Eagle Foundry of Edward Bellhouse, Manchester; The Eclipse Ironworks of Frederick Braby, Glasgow; The Windsor Ironworks of Isaac Dixon, Liverpool; Speirs of Glasgow, The Clydesdale Ironworks of A.& J.Main, Glasgow; F.D.Cowieson of Glasgow; and two London firms, J.C.Humphrey and F.Smith.

The ballroom at Balmoral is of particular importance. It is a very early example, constructed only 20 years after corrugated iron was first developed, and it has associations with the early export trade and with the Great Exhibition. Prince Albert was impressed with the iron structures displayed at the Crystal Palace by Edward Bellhouse of The Eagle Foundry, Manchester. Bellhouse had exported buildings to California during the gold rush of 1849, and it was his Warehouse Pattern No.1 which

was chosen for the temporary ballroom (D.Millar, 1985). Correspondence in the Royal Archive at Windsor reveals the speed with which the building was prepared, dispatched and assembled on site.

On 4 July 1851 Edward Bellhouse wrote to Colonel Phipps, Keeper of the Privy Purse, stating the building was to be

An iron edifice 60 feet long by 24 feet wide, a shell composed of corrugated iron sheets no. 18 gauge, laid upon a framework of iron, including a wooden foundation frame; openings prepared for doors and windows (which last named are not included in the amount), height to eaves 10 feet, to peak of roof, 17 feet. The whole painted, packed, marked and delivered say in Aberdeen for the sum of £194-10-0.

(Royal Archive RA PP/BAL/70-74)

By the 19 August he again wrote to Colonel Phipps to enquire if he wished anyone to inspect the building which was to be completed in their yard that week, and that instructions should be given for preparing the site. The factor at Balmoral, Dr. Robertson, expressed doubts about the project, asking

If it would not be desirable to postpone the erection of the iron ballroom until after Her Majesty leaves Balmoral as no part of the material has yet arrived and the putting up of the iron must cause a deuce of noise and bother. I also find by letter I received from Mr. Bellhouse that a considerable after time will be required to get the whole finished.

(Royal Archive RA PP/BAL/70-74)



Figure 15. Former ballroom, Balmoral Castle

Nonetheless the building was completed and ready for the gillies ball on 1 October only three months after it was ordered, and received a considerable amount of favourable publicity at the time (D.R.Bellhouse, 1992). It was used as a ballroom and occasional studio until 1856, when it was re-sited near the new stables and game larder, where it is currently used as the estate carpenters workshop.

The only other known survivor of Bellhouse's work is a prefabricated cottage, sent to the Melbourne suburb of Fitzroy, and now in the care of The National Trust of Australia.

The distribution of corrugated iron buildings in Scotland mirrors improvements in communications. Through the mid nineteenth century the railway network expanded and by 1859 it had reached Inverness. It completed the push north into Caithness in 1874, enabling buildings like Heather Lodge, at Kinbrace, Sutherland to be delivered to site by train. Shipping was also important, with buildings like the church at Skerry, Sutherland brought by boat around 1905 from the factory of F.Smith & Co. in Stratford, east London (they also supplied the church at Port Sonachan, Argyll), while Minard church was sent in 1910, by Clyde puffer from the works of Speirs in Glasgow (R.MacLeod, 2000).

The developing trade in these buildings was also important internationally as prefabricated structures left the UK for all parts of the World. These particularly included exports to Australia and South Africa where the German Lutheran Church at Kimberley, (1875) and the English Church at Barberton(1887) were probably from the factory of Frederick Braby. Also active in this market was F.Smith & Co. who advertised in Burton's Cape Colony For Settlers (1903), and Longland's Transvaal & Rhodesian Directory (1903) (G.Herbert, 1978).

CONSERVATION STATUS

In the UK the number of corrugated iron buildings has dwindled rapidly. They are often regarded as cheap and temporary with good examples continuing to be lost with little regard for their cultural significance. Dadson states there seems to be a lack of appreciation and discernment of what is worthy of conservation, and what is not (P.Dadson, 1989). In Scotland there are approximately 43,000 listed buildings. Of these there are known to be just twelve which are corrugated iron structures in the rural areas. Only one is Grade A listed, that is The Italian Chapel, on Lamb Holm, Orkney, which is a World War Two Nissen hut, transformed by Italian prisoners of war into a highly decorated chapel.

Some efforts at conservation have been made and there are three corrugated iron buildings in the collection of the Highland Folk Museum at Newtonmore. Historic Scotland in their Memorandum of Guidance (1998), state that the historic interest of corrugated iron is often underestimated, and that good examples of buildings constructed using this material should be retained wherever

practicable. They have also recently produced a Technical Advice Note on conservation methods for corrugated iron. However a sample survey conducted in 2003 in the Highlands and Islands, undertaken as the basis of a research dissertation submitted for the MSc in Building Conservation (Technology and Management) at Heriot-Watt University (Thomson and Banfill, *Journal of Architectural Conservation*, March 2005), shows that considerable loss is still occurring. A total of 45 churches, halls, schools and commercial buildings were noted, of which only 26 (58%) were still in use. Some 27 houses, cottages and estate buildings were visited, of which only 10 (37%) were still in use. Of 72 buildings in total, there were around 32 (44%) in poor condition, empty, deteriorating or ruinous. Anecdotal evidence suggests this is reflected across the country. Lochmaben Hospital in Dumfries and Galloway (a B Listed building) was demolished in 2000, and the Grade B listed church of Our Lady Of Mercy, Aberfeldy, and Helensburgh Drill Hall, have both been subject to applications for demolition in recent years. There are also a number of important examples which are not listed and which are vulnerable to insensitive alteration. Examples include; original windows and doors having been replaced with upvc at Heather Lodge, Kinbrace; new window openings slapped through the principle side elevation of the ballroom at Balmoral then made good with a different sheet profile; and a number of the remaining Speirs churches reclad with box profile polyester coated sheeting.

Conservation practice presents a number of difficulties as sheets cannot easily be repaired once corrosion has taken hold, and accurate matching of profile and thickness to original materials may not be possible. These buildings typically comprise a single skin of corrugated iron on a timber framework, finished internally with timber boarding. This does not satisfy modern standards of thermal performance, and so buildings may be deemed as no longer suitable for their purpose and difficult or expensive to alter and improve. Buildings may also be lost as mortgage lenders and surveyors tend to prejudge the quality and durability of corrugated iron and assume it to be an insubstantial building material.

CONCLUSION

There are throughout rural Scotland many examples of corrugated iron buildings, some still in use for their original purpose, some long since abandoned. A few have been preserved, or have listed status, but there are many important examples which are not protected in any way. These buildings make a particular contribution to the built heritage in terms of aesthetic qualities of form, texture and colour; their expression of design innovation; their representation of social changes such as housing reform and church secession; and the evidence they embody of industrial and economic history.

The buildings which remain, particularly those from the late nineteenth century, are now reaching the point where the fabric of their structure is at the end of it's useful life. It is therefore likely that over the next few years their numbers will continue to decline. These buildings however have a

place in the evolution of construction history, as well as contributing to the architectural character of the area. The material has become a valuable part of the vernacular builders palette and a familiar feature of the Scottish landscape.

This study shows that the remaining examples of early corrugated iron buildings in rural Scotland have a value in their own right and as part of a body of work. They make a significant contribution to the built heritage and are worthy of greater appreciation and conservation.

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