

Building Paper arrives in New Zealand

Nigel Isaacs, Wellington School of Architecture, Victoria University of Wellington

ABSTRACT: Building paper, invented in Beloit, Wisconsin in 1869, arrived in New Zealand in the late 1880s. In 1891 it was used under the corrugated iron roof and walls in the four-bed Tasman Glacier Hut where it would have provided relief from condensation on the inside of the corrugated iron as well as reducing the ability of the wind to blow through the hut. Building paper quickly became common place, with advertising from English and American manufacturers appearing daily newspapers as well as trade journals. The paper traces the first decades of building paper use in New Zealand as it evolved from a novelty to a common building product – hidden under the cladding but improving on the comfort of the occupants. It ends with a brief foray into the twentieth century, with examples of its use and eventual inclusion in building controls starting with NZSS 95 Part IX: Light Timber Construction:1944.

Introduction

Although it is convenient to think of historical research as being complete, it is always worth reconsidering findings when new knowledge or new material becomes available. In 2012 in one of my regular *BUILD* "History of building Technology" articles, I wrote:

Building paper was advertised in New Zealand from 1898 when George Ross of Wellington promoted the use of "P & B building paper" which was "waterproof and will not rot. Keeps the walls dry, and prevents draughts and excludes cold."¹

In more recent years I have been exploring in detail the invention and evolution of this now omnipresent New Zealand construction item, and thought it was time to re-investigate this statement. While some new material has become available, improved knowledge of building paper terminology evolved the list of

¹ Isaacs "Resourceful Timber" p 89.

useful search terms. This paper starts with a brief introduction to building paper, explores the introduction of building paper to New Zealand, and places New Zealand's early use of this product into a broader international context.

The Invention of Building Paper

During the early- to mid-1860s, the Rock River Paper Company of Beloit, Wisconsin, USA manufactured a straw board 27 inches wide x 38 inches long (0.69 m x 0.97 m). Their products were used for a range of purposes, including newsprint, paper bags and bookbinder's board. ²

About 1866 a client in the dairy town of Elgin, Illinois ordered 10 tons (9 tonnes) of board 27 inches by 13 feet (0.69 m x 4 m) to be used for

² Merrill *Narrative of Experiences* p 31.

cheese boxes. The Company's plant could make and dry this length of board, but it was not possible transport it, so they suggested it could be delivered in rolls.³

The company's founder, Sereno Merrill, thought the new product might have a use "as a lining for buildings, directly under the studding or on the outside of sheathing boards under the clap boards." A roll was sent to the company's Chicago office which found architects responded positively to the product but desired it to be waterproof. They called this new product "building paper" and in its first use was mounted horizontally under the clapboards. Sereno's father, Pardon H. Merrill, then suggested a width of 34 inches (0.9 m) to

³ Merrill *Narrative of Experiences* pp 31-32; Rock River Paper Co., *Rock River Paper Co.'s Patent Building Paper, Roofing Felt and Quartz Cement* pp 3-4.

overlap the studs when used vertically.⁴

The first use of the term "building-paper" was found in an 1869 newspaper report for the use of the Rock River Paper Company's product.⁵ Competitor, FN Davis' 1871 US patent 117,155⁶ appears to be the first formal use of the term. In 1871 the company trademarked "building paper" in America, although from the available material it is unclear whether this also included the words "Rock River Paper Company."⁷

Their original promotional material for the "Sheathing and Roofing Board" advertised:

No wind, however strong or piercing, can penetrate it, and being one of the best known NON-CONDUCTORS, it resists the action of both *heat and cold*, and a house is thus made

Warmer in Winter and Cooler in Summer.

It will not shrink or swell; is not affected by heat, cold, frost or dampness, and in ease of fire will not burn as easily as pine. The fibre is so compact, the finish so hard and the whole so solid and substantial that it is *absolutely impervious to air*.⁸

⁴ Merrill *Narrative of Experiences* p 32.

⁵ "Building Paper" p 1.

⁶ Davis "Improvement in Papers for Buildings"

⁷ Rock River Paper Co. "Trademark Registration"

⁸ Rock River Paper Co. *Rock River Paper Co.: Manufacturers of Plain and Saturated Sheathing and Roofing*

The board described in 1868 was considerably heavier and less flexible than modern building paper. The Rock River Paper Company's products average surface density was 814 grams per square metre (gsm) compared to the modern product of 200 to 400 gsm.⁹ The original product was intended as a method of insulation, although neither the thin layer of paper nor the one side closure of an already draughty wall cavity would have a high thermal resistance. However, with respect to wind management it would have provided a real benefit, as interior linings of edge-buttet sarking gave many gaps for wind to enter, pushing against the hessian scrim and wallpaper, and then blowing into (infiltration) the room. It also provided the benefit of temporary weather protection before the exterior cladding was put in place. Initially tar was used as a waterproofing agent, but due to its high fire danger was soon replaced by less-flammable treatments.

In more recent years building paper, or its replacement building wrap (now officially termed "wall underlay"), have provided water

Board, Roofing Felt and Quartz Cement. p 3.

⁹ Isaacs "Building Paper 1868 to 1884: A Growing Child" pp 6-7.

and moisture management¹⁰ as they are resistant to the entry of water, provide absorption when water penetrates, and breathes allowing moisture to escape over time.

Sheathing Paper Arrives in New Zealand

The earliest report found thus far for the use of sheathing paper in New Zealand is in a newspaper report on "Thames Goldfield Hospital." The subscription-funded hospital was opened on 2 November 1868.¹¹ It appears the "cracks and openings" in the walls were such that in April 1875 the architect, EW Hollis who was also the clerk of the Thames County Council, recommended "papering the whole interior of the building with strong sheathing paper." The Hospital's House Committee took this up only in part, requiring that "walls should be only sized and varnished, all cracks and openings to be first covered with laths."¹² However at the next meeting in May 1876, even though "the doctor strongly condemned that method," it was agreed that "the experiment be tried with one

¹⁰ MBIE *Verification Methods E2/VM1 and Acceptable Solutions E2/AS1, E2/AS2 and E2/AS3* pp 20, 23, 24.

¹¹ "Thames Goldfield Hospital" (2 November 1868) p 5.

¹² "Thames Goldfield Hospital" (8 April 1875) p 2.

ward"¹³ and at the following meeting in June 1875 it was reported it had been successfully implemented in the ophthalmic ward.¹⁴

While it appears that in the Goldfield Hospital paper was used for the purposes of reducing draughts, it was used internally, not as a cladding or a lining beneath the weatherboards. What is interesting is that an architect in Thames should have heard about the use of paper sheathing. Although newspaper reports on the use of sheathing, or building, paper were published in New Zealand newspapers the earliest so far found is a June 1877 report of shanties built in Saginaw Bay, Michigan of "thin wood lined with heavy building paper."¹⁵ It is possible the information came from an overseas journal or magazine, but none have yet been identified.

The first New Zealand advertisement found for sheathing paper comes from an advertisement in the *New Zealand Times* of 3 September 1888 from EW Mills and Co. Ltd. for "2 crates 'Sacketts' Sheathing Paper" which had arrived "Ex Clan Macleod, from New

¹³ "Thames Goldfield Hospital" (6 May 1875) p 3.

¹⁴ "Thames Goldfield Hospital" (3 June 1875) p 3.

¹⁵ "Odds and Ends" p 3.

York."¹⁶ EW Mills and Co, ironmongers, iron merchants and ships chandlers of Jervois Quay, Hunter and Victoria Streets, Wellington were founded in 1854,¹⁷ merging with Briscoe and Co. in 1932.¹⁸ EW Mills and Co. were again advertising Sackett's sheathing paper in 1894.¹⁹

Augustine Sackett is best known for his 1894 invention of drywall, or plaster board, based on a sandwich of alternating plaster and paper.²⁰ A decade earlier Sackett had invented a similar multiple-layer product - a sheathing paper. He had patented firstly a multiple ply "sheathing paper or felt" based on

cementing together three or more sheets of paper, felt, or canvas with roofing- pitch, asphaltic cement, bituminous or other suitable cement, the outer sheets or layers being wider than the inner sheet or layer, so as to project beyond the edges of the inner layer or sheet²¹

¹⁶ "[advertisement Patent EW Mills and Co Ltd]" (3 September 1888) p 8.

¹⁷ Cyclopedia Company Limited, *The Cyclopedia of New Zealand: Wellington Provincial District I*, p 691.

¹⁸ "Hardware Merger" *Evening Post* (26 May 1932) p 13.

¹⁹ "[advertisement Patent EW Mills and Co Ltd]" (13 February 1894) p 3.

²⁰ Sackett "Inside-Wall Covering [US Patent 520,123]"; Leslie ""Dry and Ready in Half the Time"" 682-687.

²¹ Sackett "Roofing or Sheathing Paper" p 2.

and then the machinery necessary to manufacture this 3-ply product."²² "Sacketts Sheathing Paper" was being advertised in America in 1885²³ and available in New Zealand just three years later. In America, the product was taken over and sold by the Barrett Manufacturing Co from 1906 to about 1911.²⁴

In 1891 the Tasman Glacier Hut was reportedly constructed of "corrugated iron lined with Willesden roofing paper,"²⁵ which in this case would appear to involve both the roof and walls. The Willesden Waterproof Paper and Canvas Company of London, UK had developed an 1862 patent for the use of cupro-ammonium solutions for the waterproofing of paper and canvas, opening a manufacturing plant in 1873. By 1878 they were able to make material 4ft 6 inches wide (1.38m) in continuous lengths.²⁶ Willesden

²² Sackett "Roofing Felt and Mechanism for Making the Same"

²³ New York Coal Tar Chemical Company "Roofing Building Paper [Advertisement]" p 413.

²⁴ Architectural Record Co. *Sweet's Indexed Catalogue of Building Construction for the Year 1911* p 444.

²⁵ Minister of Lands "C-01a Surveys of New Zealand. Report for 1890-91" p 39.

²⁶ Wright "Cupro-Ammonium Solutions and their Use in Waterproofing Paper and Vegetable Tissues" p 643.

roofing paper was exhibited at the 1885 Canterbury Agricultural and Pastoral Show, where it was said to be "extensively used for roofing on stations in Canterbury."²⁷

Building paper, of an unidentified brand, in conjunction with "Firth's prepared pumice" was used in 1894 for the new Balance Butter Factory.²⁸ Auckland mayor and businessman JC Firth, with his son WT Firth, promoted the use of pumice as better suited as insulation than charcoal. WT Firth argued that charcoal, even when dried, absorbed water, oxygen or "noxious gases arising from animal or vegetable matter" while calcined (heated) pumice had none of these problems.²⁹ JC Firth trademarked a logo (application 2209, 12 November 1897) which brought together his claims for the use of "calcined sterilized pumice" for insulation and his initials (JCF).³⁰ The Firth Pumice Company also produced "Pumicine sand soap" which was available with (blue label) and without (red label) carbolic.³¹

²⁷ "Metropolitan Show" p 2.

²⁸ "Ballance Butter Factory" p 2.

²⁹ Firth "Art. LV." pp 464-465.

³⁰ "Trademarks" p 2143.

³¹ "[advertisement Firth Pumice Co.]" p 4.

The final advertisements for building paper in the 1890s have been found in Wellington, Wairarapa and the Dunedin-published, but nationally distributed Catholic weekly, *The New Zealand Tablet*.

The Wellington agent for P&B Ruberoid Building Paper was Mr George Ross, Customhouse-quay,³² which also sold in the Wairarapa.³³ In 1900 Mr Ross resigned his other job to devote his time to the business of Ross and Jack,³⁴ but this partnership was dissolved a year later with James W Jack retaining the P&B agency.³⁵ In 1900 *The Tablet* included advertisements for Ruberoid roof from E Thomas and Co Ltd of Bond St, with the illustration showing the product being used both on the roof and walls.³⁶

Building Paper Enters the Twentieth Century

It took some time before building paper became widely used in New Zealand. For example, the 1902 third edition of *Brett's Colonists' Guide and Cyclopaedia of Useful*

³² "[advertisement P&B]" (22 June 1898) p 6.

³³ "[advertisement P&B]" (1 November 1898) p 3.

³⁴ "Local and General" p 4.

³⁵ "[advertisement P&B]" (24 April 1901) p 6.

³⁶ "[advertisement Ruberoid]" p 15.

Knowledge provides a detailed house construction specification with no building paper was listed.³⁷ In 1907 Wellington, specifications for a Kelburn house included building paper (house cost £724)³⁸ but it was not included in the same builder's two lower cost houses in Lyall Bay (£231³⁹ and £300⁴⁰). In 1911, a moderate cost (£439) Aro Valley, Wellington house used building paper.⁴¹

By the 1930s, use of building paper was common, but it was not until 1941 that the Duroid Company commenced manufacture of Malthoid brand products in Onehunga, Auckland.⁴² Just three years later, building paper was required in NZSS 95 Part IX Light Timber Construction:1944 to be "under all external timber wall coverings in buildings intended for human habitation."^{43 44} In 1964

³⁷ Leys *Brett's Colonists' Guide and Cyclopaedia of Useful Knowledge* p 1143.

³⁸ Nielsen "Specification the Work Required to Be Done" p 11.

³⁹ Nielsen "Specification the Addition to Mrs Kilfoy's Property, Maranui"

⁴⁰ Nielsen "Specification Mr Cowie's House, Maranui"

⁴¹ Isaacs "Making the New Zealand House 1792 - 1982" p 168.

⁴² "Two New Factories" p 3.

⁴³ NZSI NZSS 95 *New Zealand Standard Model Building Bylaw. Part IX* para. 945(a).

the use of building paper behind cladding, except brick veneer, became a requirement under NZSS 1900 New Zealand Standard Model Building Bylaw: Chapter 6.1:1964 Construction Requirements for Timber Buildings Not Requiring Specific Design.⁴⁵

Conclusion

In the 21 years since I first wrote on the arrival of building paper in New Zealand, new material has become available through the internet, and I have undertaken more research on the topic. This includes the work reported in this paper on the invention of the "first" building paper in Beloit, WI in the 1860s.

The Rock River Paper Company closed in 1884⁴⁶ and apart from one of the founder's limited-edition autobiography,⁴⁷ very little remains beyond library holdings of three of the company's annual publications, several patents, and numerous newspaper reports and advertisements. History had largely

forgotten the company and its role in the creation of building paper.

This research into the origins of building paper has most importantly provided a context – if building paper did not exist until the late-1860s, it could not have arrived in New Zealand any earlier.

The quoted newspaper advertisements and articles have shown that sheathing paper was at least known in New Zealand in the late-1870s. By the 1890s, the New Zealand market was supplied with English Willesden roofing paper (first newspaper report in 1885), American Sacketts' sheathing paper (1888) and American P&B Ruberoid Building Paper (1890). By 1894 building paper was being used in a butter factory for its unique moisture and wind management properties.

What is not answered by the research reported in this paper is how much impact building paper had on the construction of New Zealand houses from the late-1880s. The existence of an advertisement is not necessarily evidence of use, although it is unlikely businesses would waste valuable funds to promote a product which was not being purchased.

The examples provided of its use in the first decade of the twentieth century suggest building paper was starting to be used in residential buildings, although it took until the 1940s for local demand to be sufficient to support local manufacture. Future research could make use of local government building permit archives to examine house specifications to explore building paper's early use and then its wider use. These could help answer questions about the evolution of the New Zealand timber-framed house construction. Was building paper initially only used in more expensive houses, or did the location play a significant role – money versus wind? Did certain suppliers have a greater (or lesser) role, and did this match with the newspaper and magazine advertising?

⁴⁴ Isaacs "NZSS 1900 Model Building By-Law" p 101.

⁴⁵ NZSI NZSS 1900 *New Zealand Standard Model Building Bylaw: Chapter 6.1:1964* cl 945.

⁴⁶ Isaacs "Building Paper 1868 to 1884: A Growing Child" p 8.

⁴⁷ Merrill *Narrative of Experiences in the Life of Sereno Taylor Merrill: Written for His Children*.

REFERENCES

- "[advertisement Firth Pumice Co.]" *Otago Daily Times* (15 December 1906):4.
- "[advertisement P&B]" *Evening Post* (22 June 1898):6.
- "[advertisement P&B]" *New Zealand Times* (24 April 1901):6.
- "[advertisement P&B]" *Wairarapa Daily Times* (1 November 1898):3.
- "[advertisement Patent EW Mills and Co Ltd]" *New Zealand Times* (3 September 1888):8.
- "[advertisement Patent EW Mills and Co Ltd]" *New Zealand Times* (13 February 1894):3.
- "[advertisement Ruberoid]" *New Zealand Tablet* (13 September 1900):15.
- Architectural Record Co *Sweet's Indexed Catalogue of Building Construction for the Year 1911* New York, NY: Architectural Record Co, 1911
<https://www.google.co.nz/books?id=untNAAAAYAAJ>
- "Ballance Butter Factory" *Woodville Examiner* (21 September 1894):2.
- "Building Paper" *Red Bluff Independent* (3 June 1869):1, California Digital Newspaper Collection <https://cdnc.ucr.edu>
- Cyclopedia Company Limited *The Cyclopaedia of New Zealand: Wellington Provincial District* Christchurch: The Cyclopaedia Company Limited, 1897.
- Davis, Francis N. "Improvement in Papers for Buildings [US Patent 117,155]" Beloit, Wisconsin: 1871 www.uspto.gov
- Firth, W. T. "Art. LV.—On the Relative Commercial Values of Pumice and Charcoal for Purposes of Insulation. [Read before the Auckland Institute, 6th September, 1897]" *Transactions and Proceedings of the New Zealand Institute [Electronic Resource]* (1897) 30: 463-465.
http://rsnz.natlib.govt.nz/volume/rsnz_30/rsnz_30_00_007090.html
- "Hardware Merger" *Evening Post* (26 May 1932):13.
- Isaacs, Nigel "NZSS 1900 Model Building By-Law: A Planned Evolution" *Architectural History Aotearoa* (2022) 19:100–110.
<https://doi.org/10.26686/aha.v19i.8052>
- Isaacs, Nigel P. "Building Paper 1868 to 1884: A Growing Child" *Proceedings of the Tenth Annual Construction History Society Conference 2023* ed James W. P. Campbell, Nicholas Bill, Michael Driver, Michael Heaton, Natcha Ruamsanitwong, Fiona Smyth, and others (Cambridge: Construction History Society, 2023) 11pp.
- Isaacs, Nigel P. "Making the New Zealand House 1792-1982" Wellington: PhD thesis, Victoria University of Wellington, 2015
<http://hdl.handle.net/10063/4804>
- Isaacs, Nigel P. "Resourceful Timber (Building History)" *BUILD* (October 2012):88–89 www.buildmagazine.co.nz
- Leslie, Thomas "'Dry and Ready in Half the Time': Gypsum Wallboard's Uneasy History" *History of Construction Cultures* ed João Mascarenhas-Mateus, Ana Paula Pires, Manuel Marques Caiado, and Ivo Veiga. Lisbon, Portugal: CRC/Balkema, 2021 II: 682–687
<https://doi.org/10.1201/9781003173434>
- Leys, Thomson W. *Brett's Colonists' Guide and Cyclopaedia of Useful Knowledge: Being a Compendium of Information by Practical Colonists* Auckland, N.Z.: Brett Printing and Publishing, 1902.
- "Local and General" *Evening Post* (6 August 1900):4.
- Merrill, Sereno T. *Narrative of Experiences in the Life of Sereno Taylor Merrill: Written for His Children* [unknown]: S.T. Merrill, 1900
<https://catalog.hathitrust.org/Record/010979418>
- "Metropolitan Show" *The Press* (12 November 1885):2.
- Minister of Lands "C-01a Surveys of New Zealand. Report for 1890-91" *Appendix to the Journals of the House of Representatives* Wellington, N.Z.:

- Government Printer, 1891.
<https://paperspast.natlib.govt.nz/parliamentary/AJHR1891-II.2.1.4.2>
 Ministry of Business, Innovation and Employment (MBIE) *Verification Methods E2/VM1 and Acceptable Solutions E2/AS1, E2/AS2 and E2/AS3. For New Zealand Building Code Clause E2 External Moisture Amendment* 10. Wellington N.Z.: Ministry of Business, Innovation and Employment, 2020 <https://www.building.govt.nz>
- New York Coal Tar Chemical Company "Roofing Building Paper [Advertisement]" *Scientific American* (27 June 1885)
<https://www.jstor.org/stable/10.2307/26087623>
- New Zealand Standards Institute (NZSI) *NZSS 95 New Zealand Standard Model Building Bylaw. Part IX: Light Timber Construction* Wellington N.Z.: New Zealand Standards Institute, 1944.
- New Zealand Standards Institute (NZSI) *NZSS 1900 New Zealand Standard Model Building Bylaw: Chapter 6.1:1964 Construction Requirements for Timber Buildings Not Requiring Specific Design* Wellington N.Z.: New Zealand Standards Institute, 1964.
- Nielsen, Niels "Specification Mr Cowie's House, Maranui" (Wellington City Council Archives, 1907), Wellington City Council Archives, 00043:17:1090
- Nielsen, Niels "Specification the Addition to Mrs Kilfoy's Property, Maranui" (Wellington City Council Archives, 1907), Wellington City Council Archives, 00043:16:1021
- Nielsen, Niels "Specification the Work Required to Be Done and of the Material to Be Used in the Erection of a Residence in [Mariri Road] Kelburne [Sic] for C.W. Nielsen, Esq" (Wellington City Council Archives, 1907), Wellington City Council Archives, 00043:21:1248
- "Odds and Ends" *Otago Witness* (2 June 1877):3.
- Rock River Paper Co. *Rock River Paper Co.: Manufacturers of Plain and Saturated Sheathing and Roofing Board, Roofing Felt and Quartz Cement.* [Circular] Chicago, IL: Rock River Paper Co., 1868.
- Rock River Paper Co. *Rock River Paper Co.'s Patent Building Paper, Roofing Felt and Quartz Cement {Circular}* Chicago, IL: North-Western Printing House, 1870.
- Rock River Paper Co. "Trademark Registration by Rock River Paper Company for Building Paper" 1870, Library of Congress
<https://www.loc.gov/pictures/item/2020744615/>
- Sackett, Augustine, "Inside-Wall Covering [US Patent 520,123]" New York, NY: 1894 www.uspto.gov
- Sackett, Augustine "Roofing Felt and Mechanism for Making the Same [US Patent 291,628]" New York: NY, 1884 www.uspto.gov
- Sackett, Augustine "Roofing or Sheathing Paper [US Patent 278278]" (New York, NY, 1883):2.
<https://patents.google.com/patent/US278278A>
- "Thames Goldfield Hospital" *Daily Southern Cross* (2 November 1868):5.
- "Thames Goldfield Hospital" *The Thames Star* (8 April 1875):2.
- "Thames Goldfield Hospital" *The Thames Star* (6 May 1875):3.
- "Thames Goldfield Hospital" *The Thames Advertiser* (3 June 1875):3.
- "Trademarks" *New Zealand Gazette* (25 November 1897):2143.
- "Two New Factories" *New Zealand Herald* (28 March 1941):3.
- Wright, C. R. Alder "Cupro-Ammonium Solutions and their Use in Waterproofing Paper and Vegetable Tissues" *The Journal of the Society of Arts*, 32.1643 (1884), 641–48 <https://www.jstor.org/stable/41334880>