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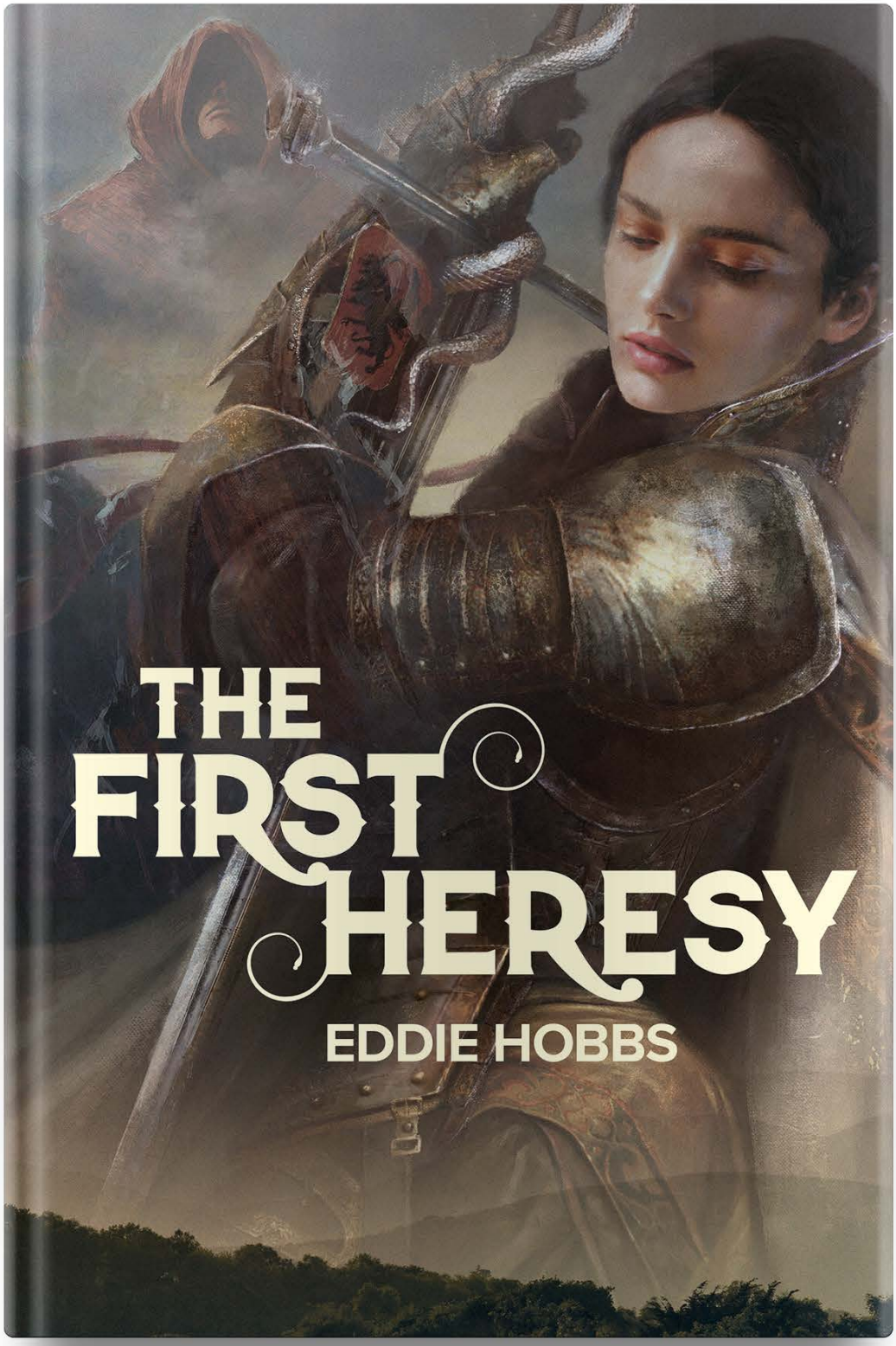

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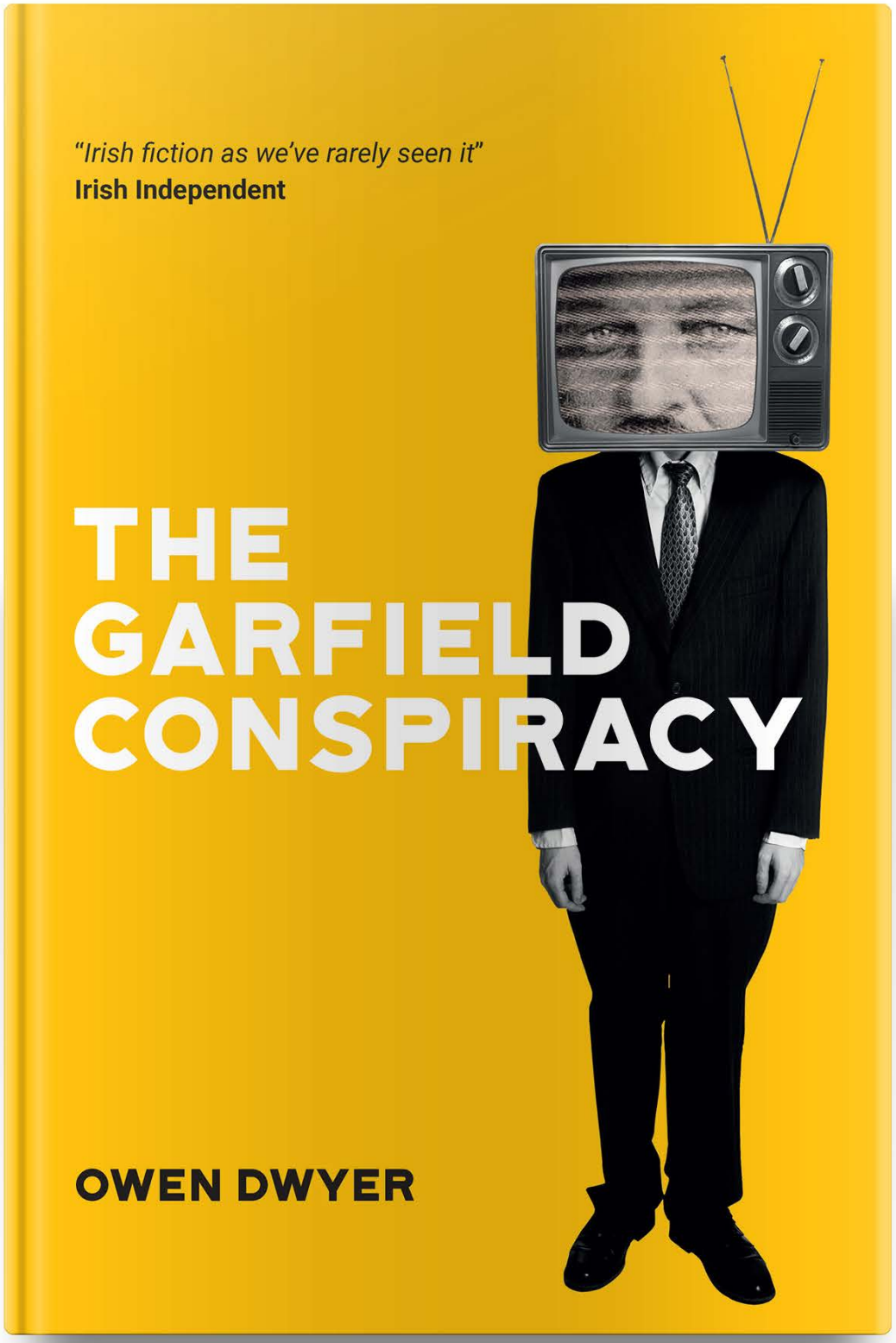
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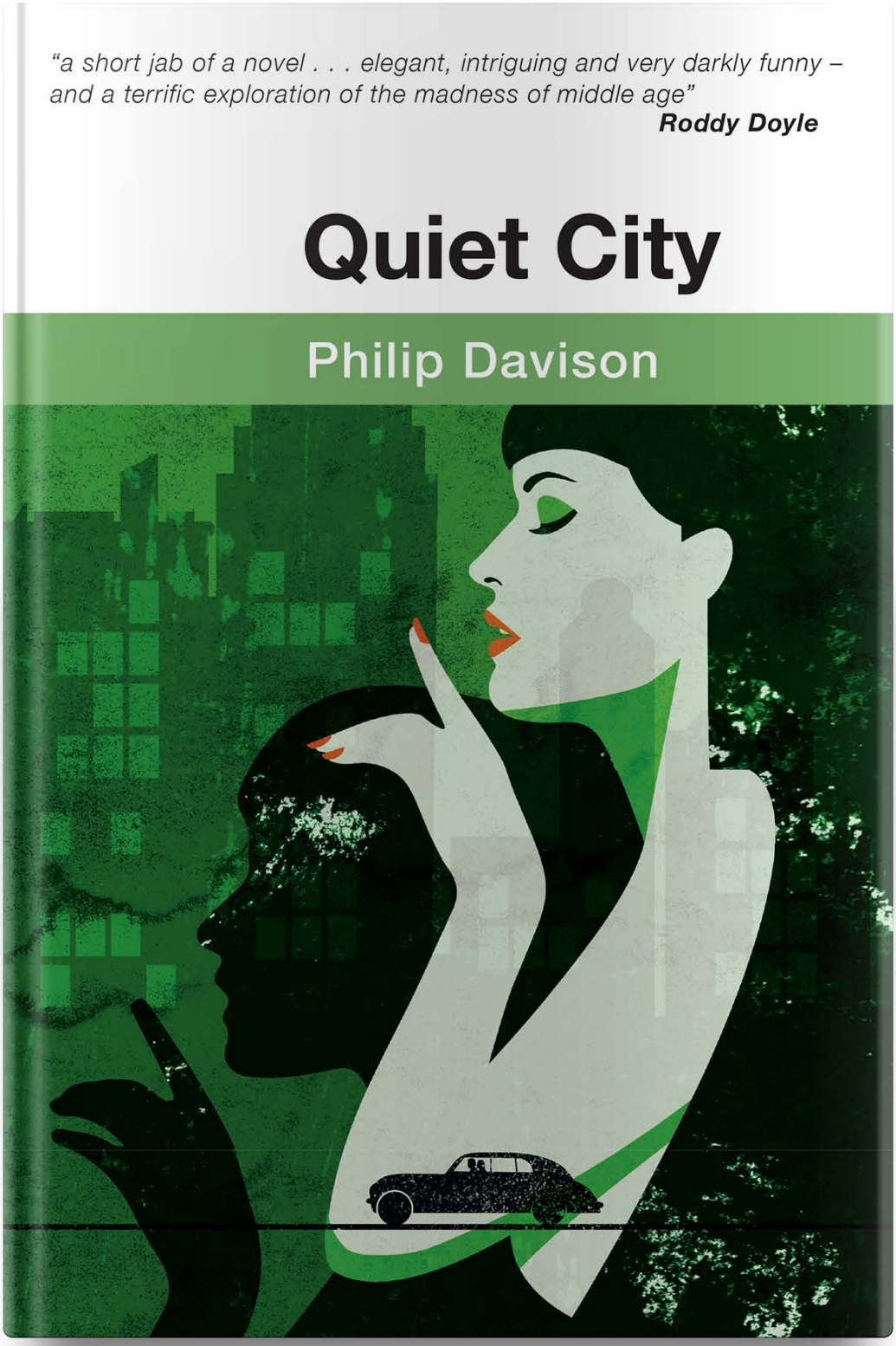
"a short jab of a novel . . . elegant, intriguing and very darkly funny – and a terrific exploration of the madness of middle age"
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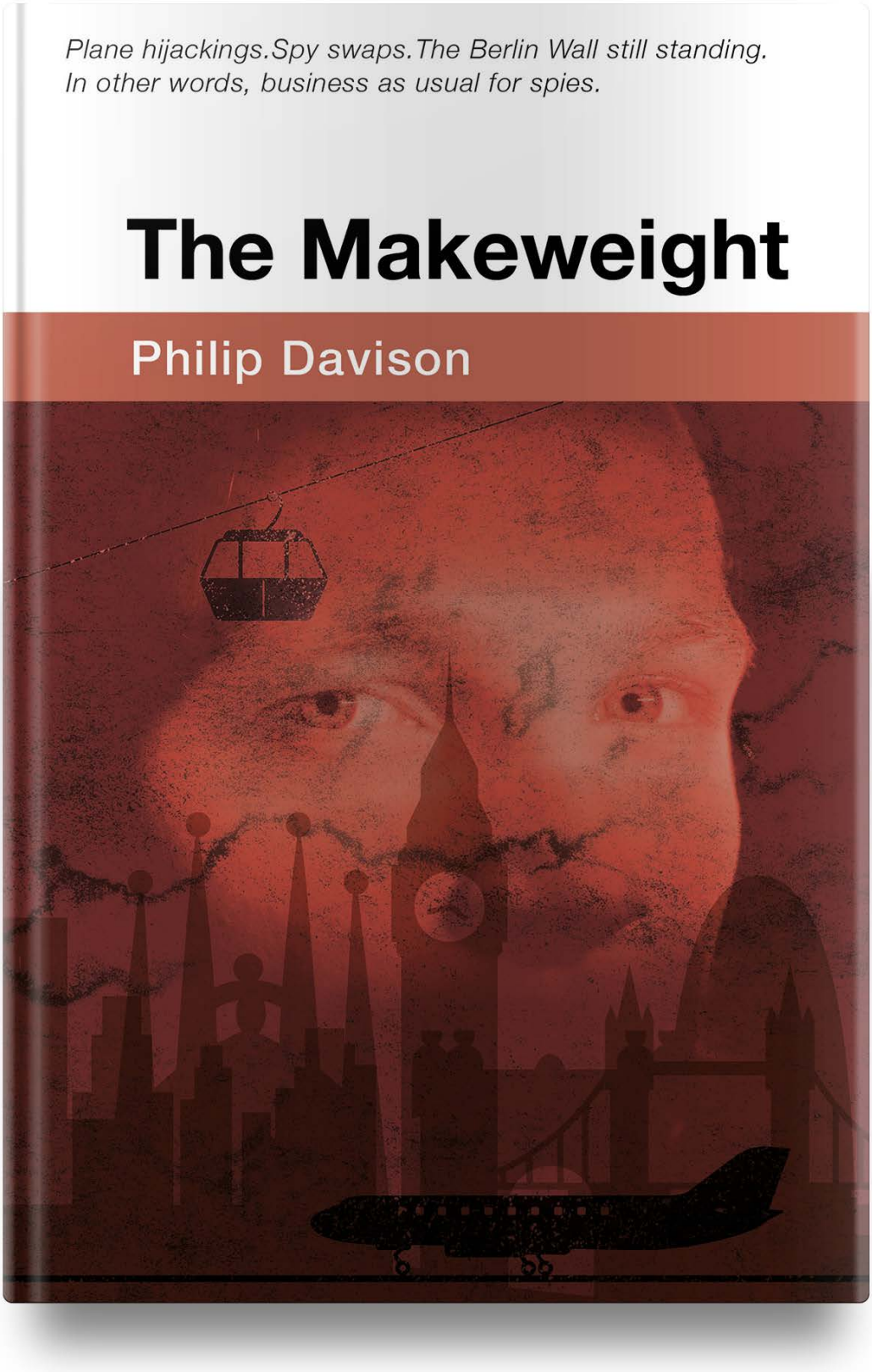
Plane hijackings.Spy swaps.The Berlin Wall still standing.
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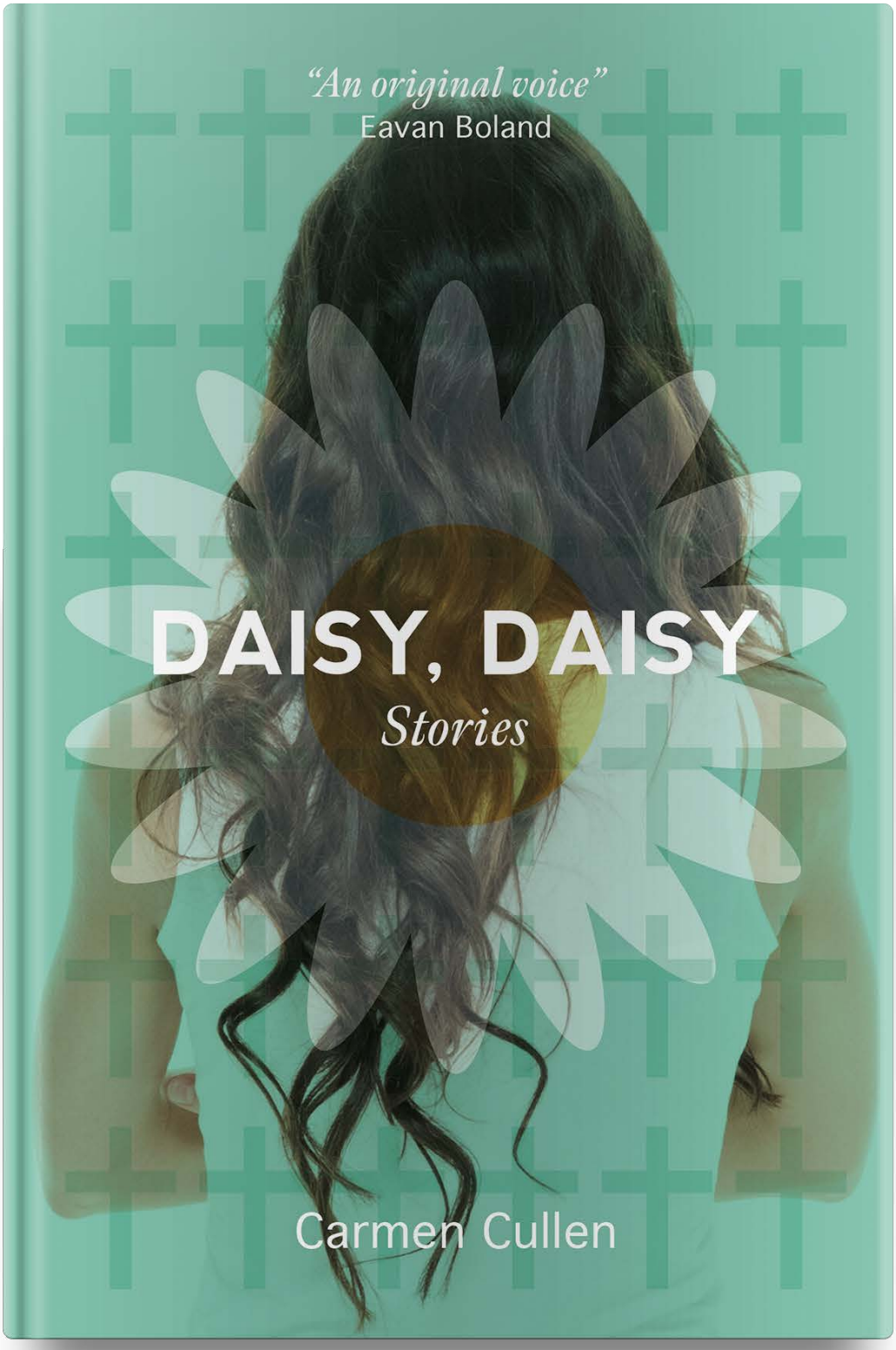
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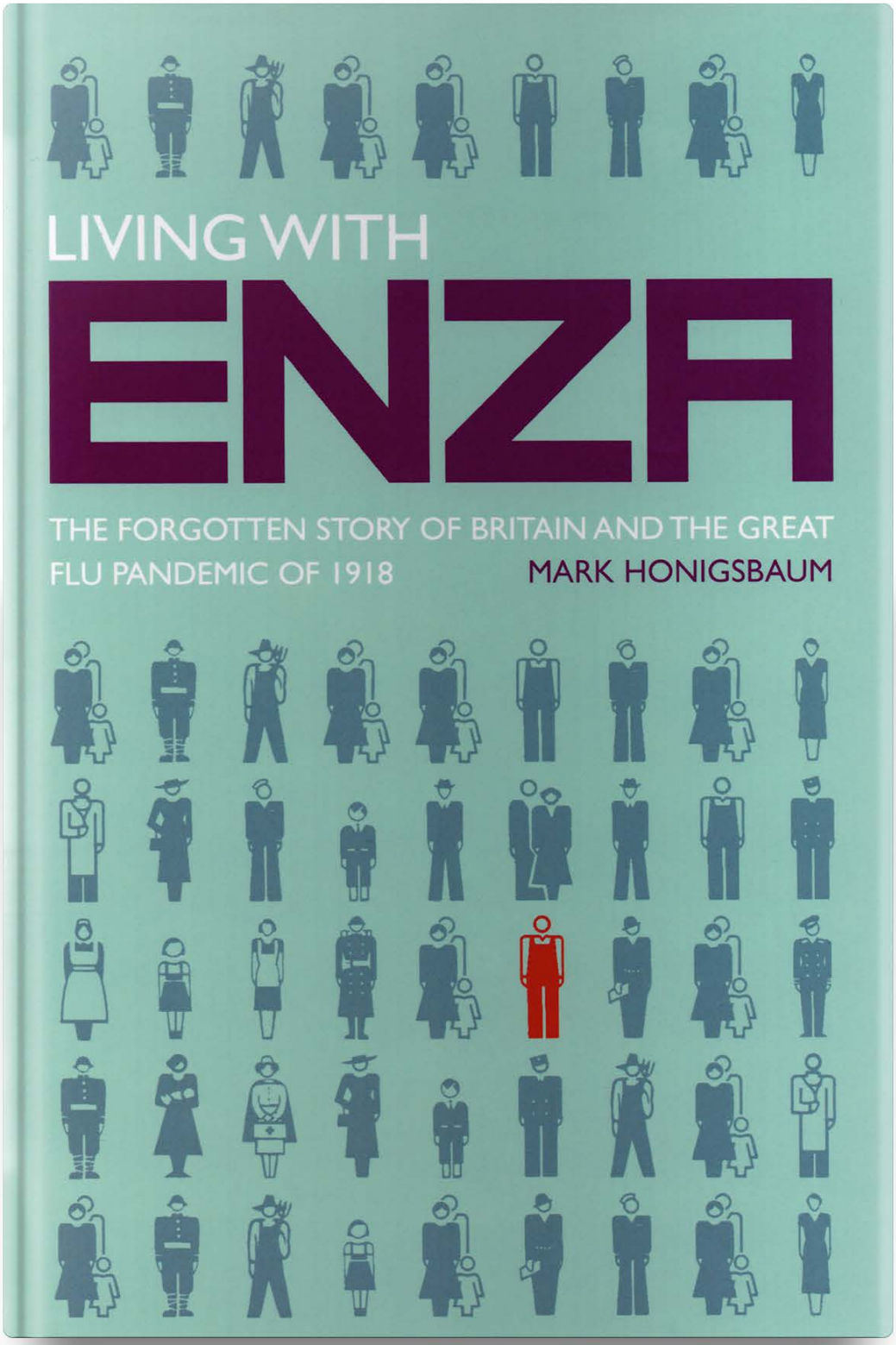
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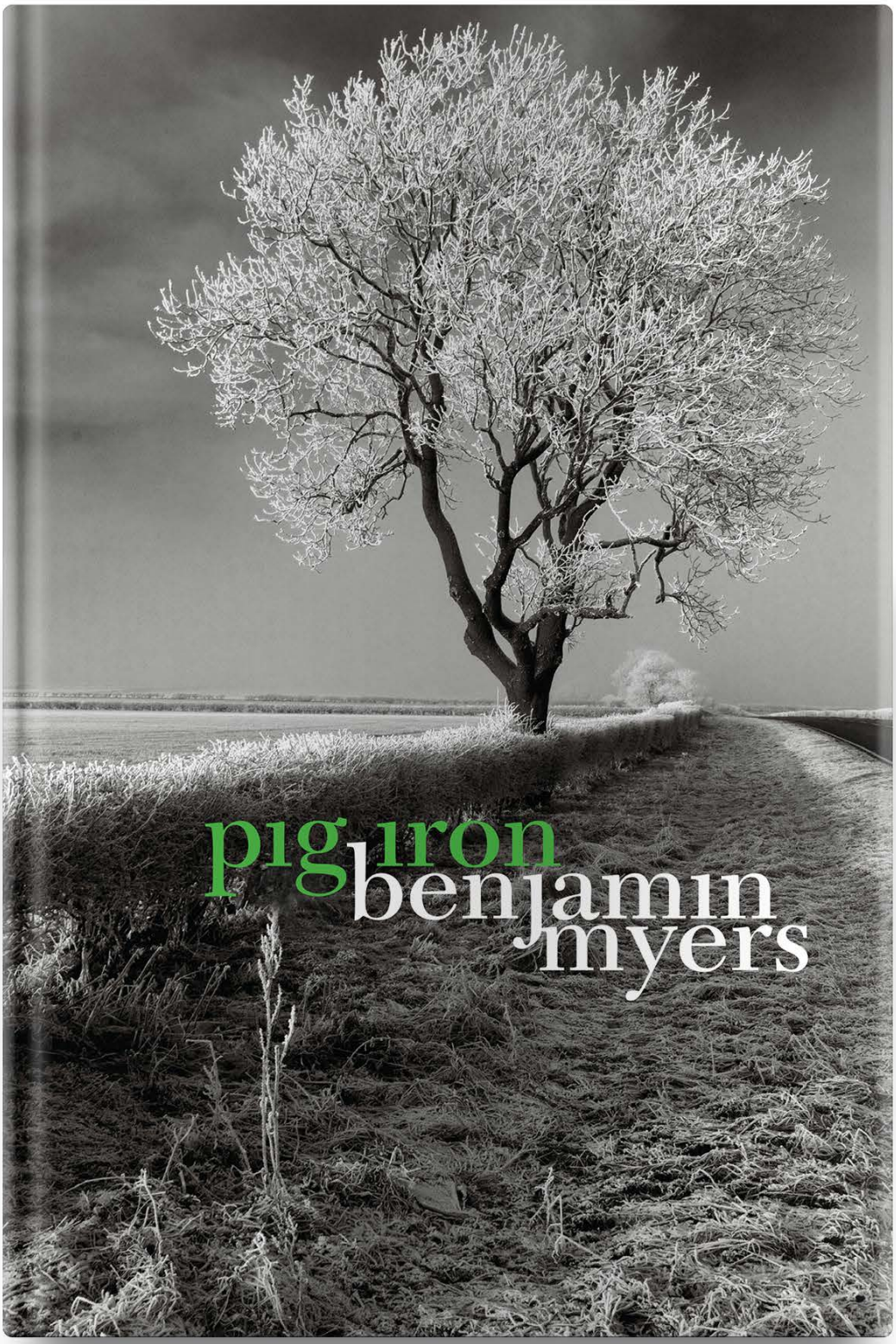

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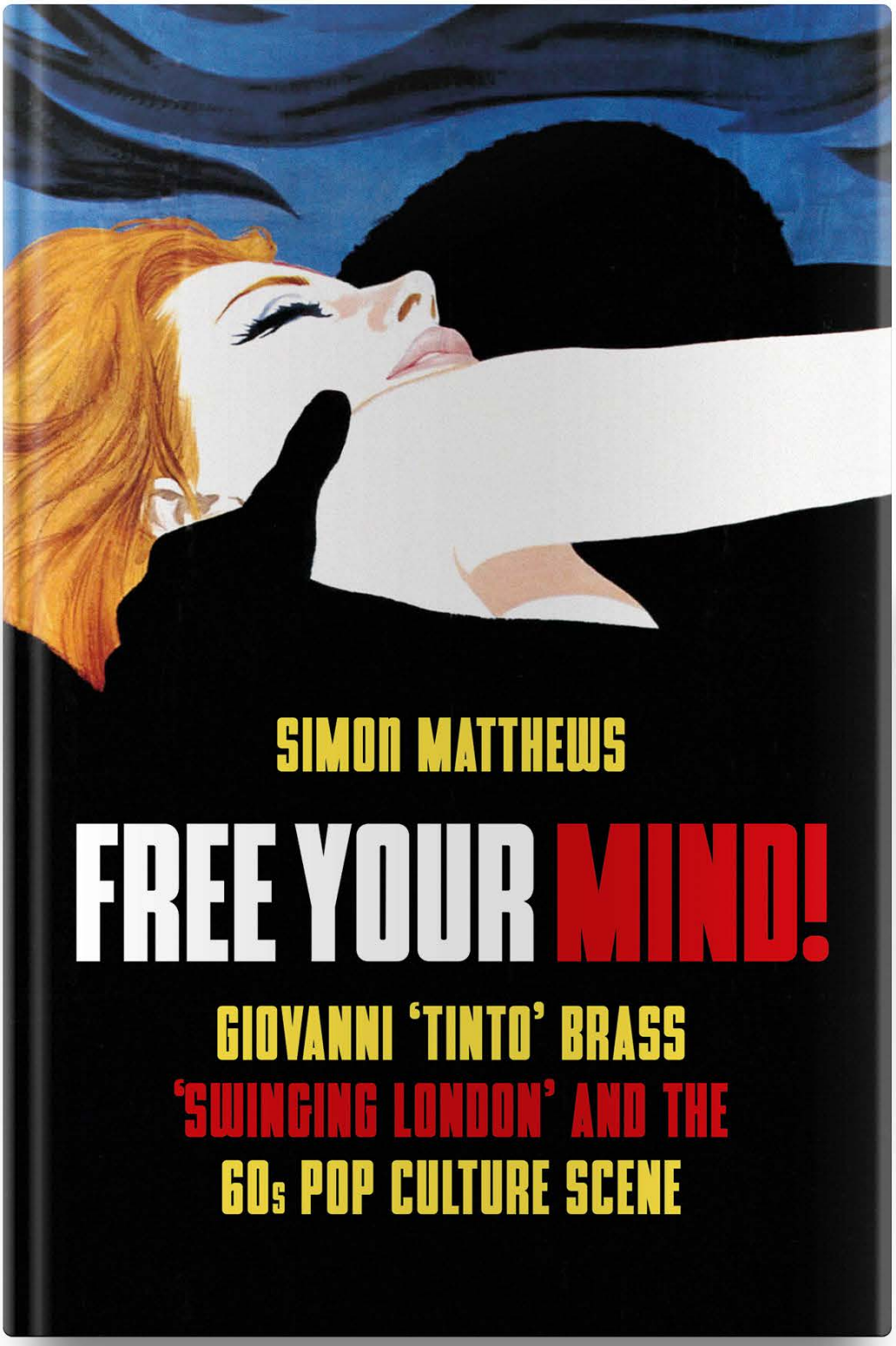
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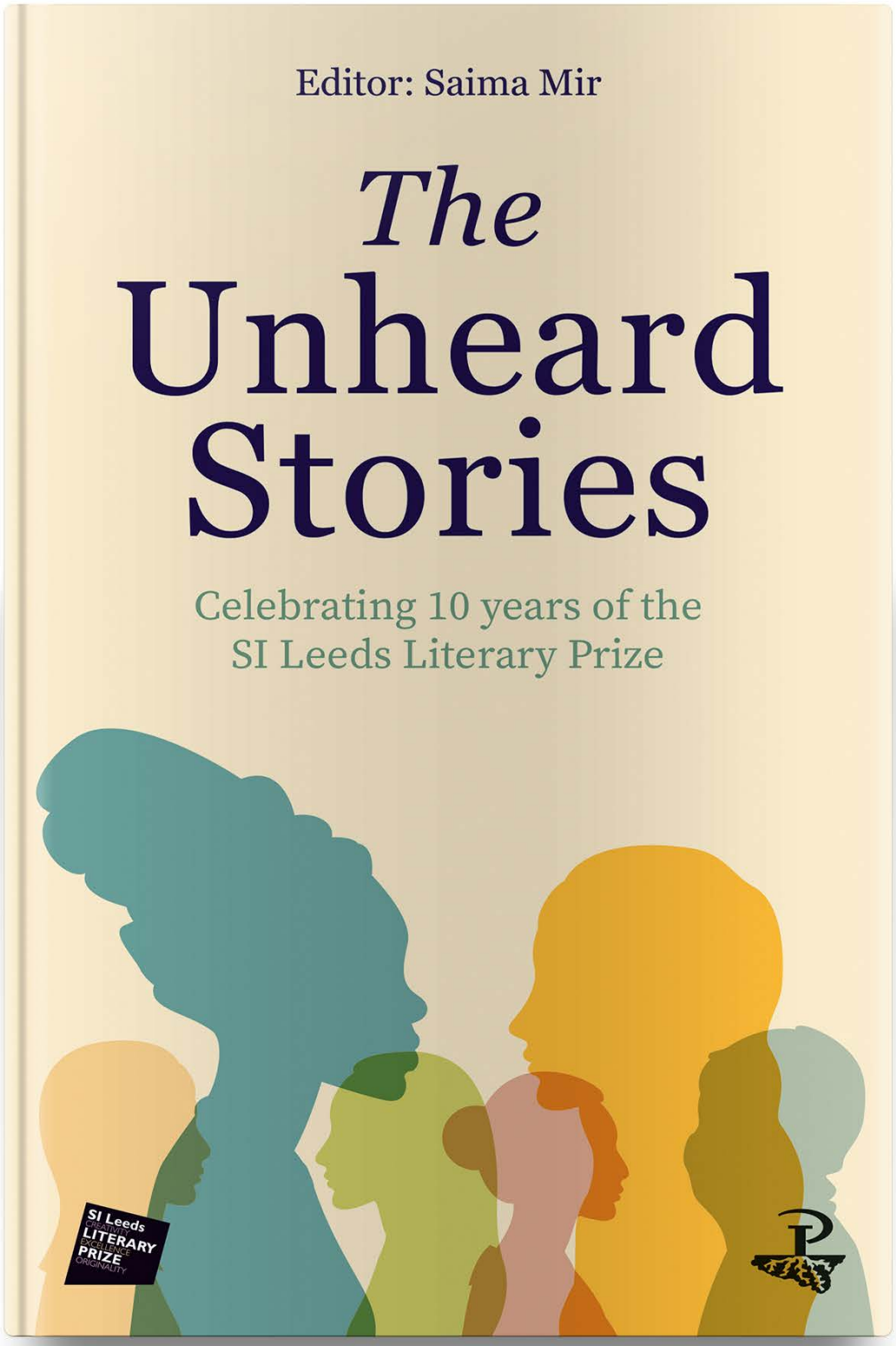
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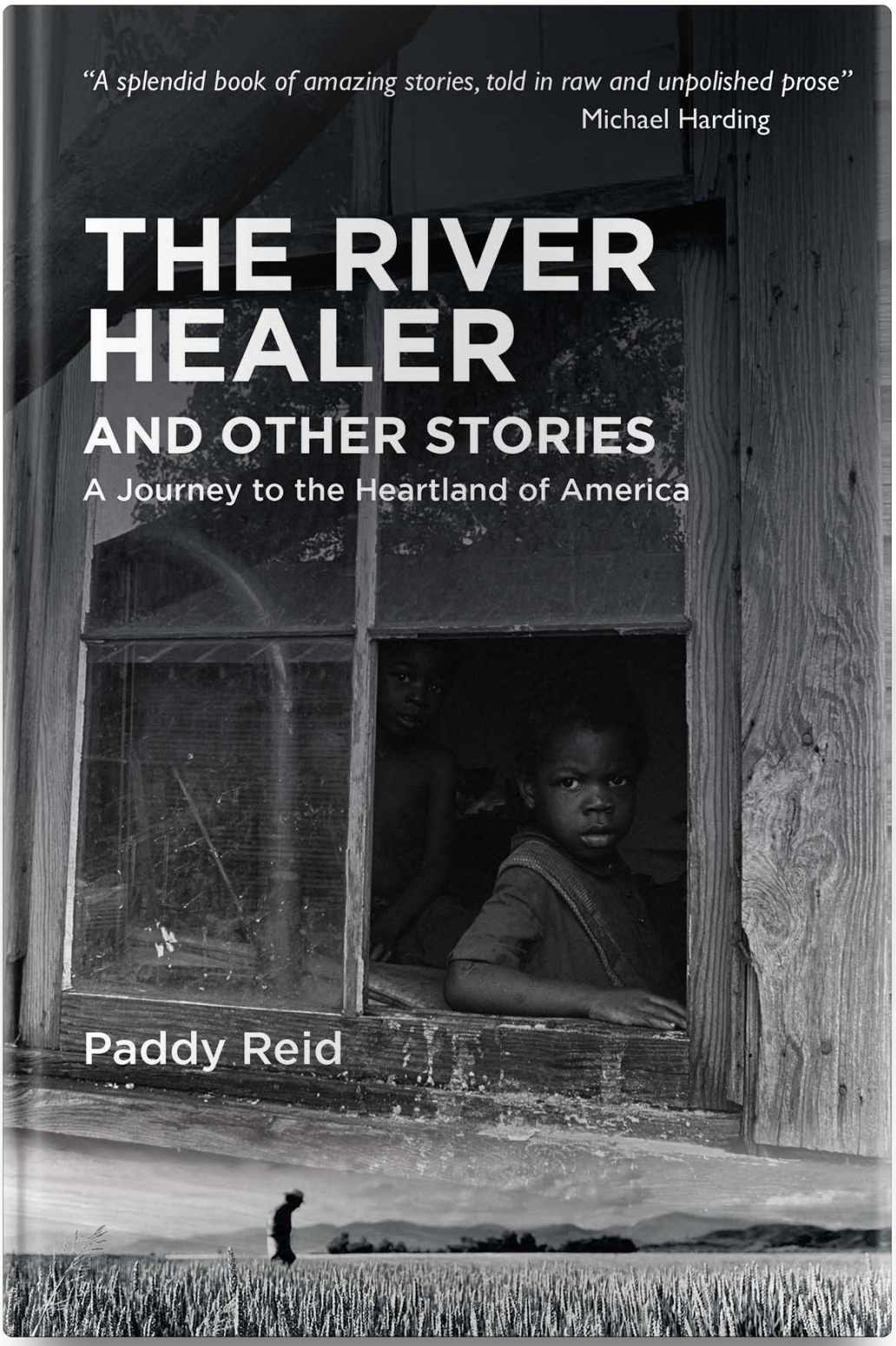
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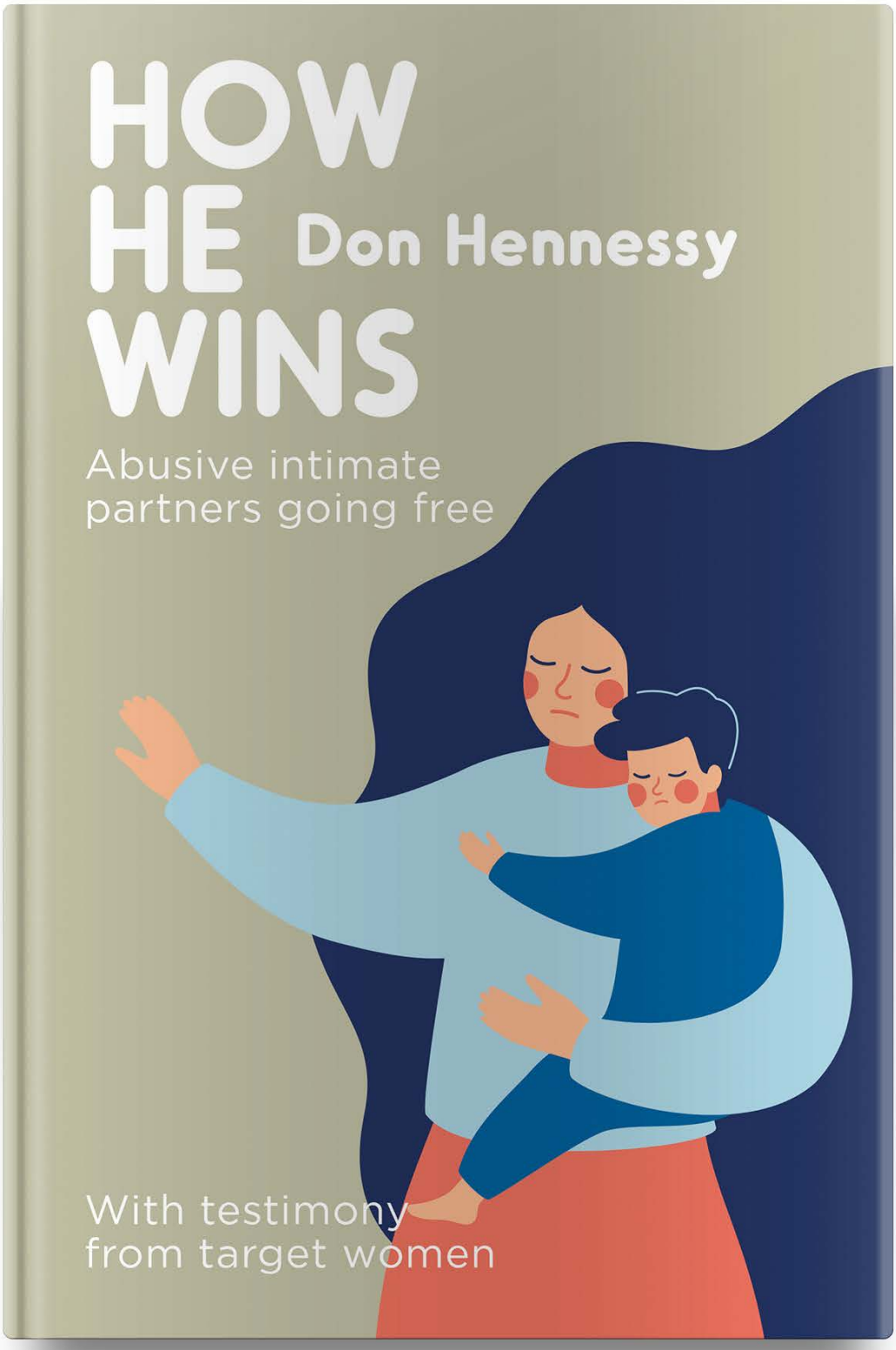
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Don Hennessy
Abusive intimate partners going free
With testimony from target women

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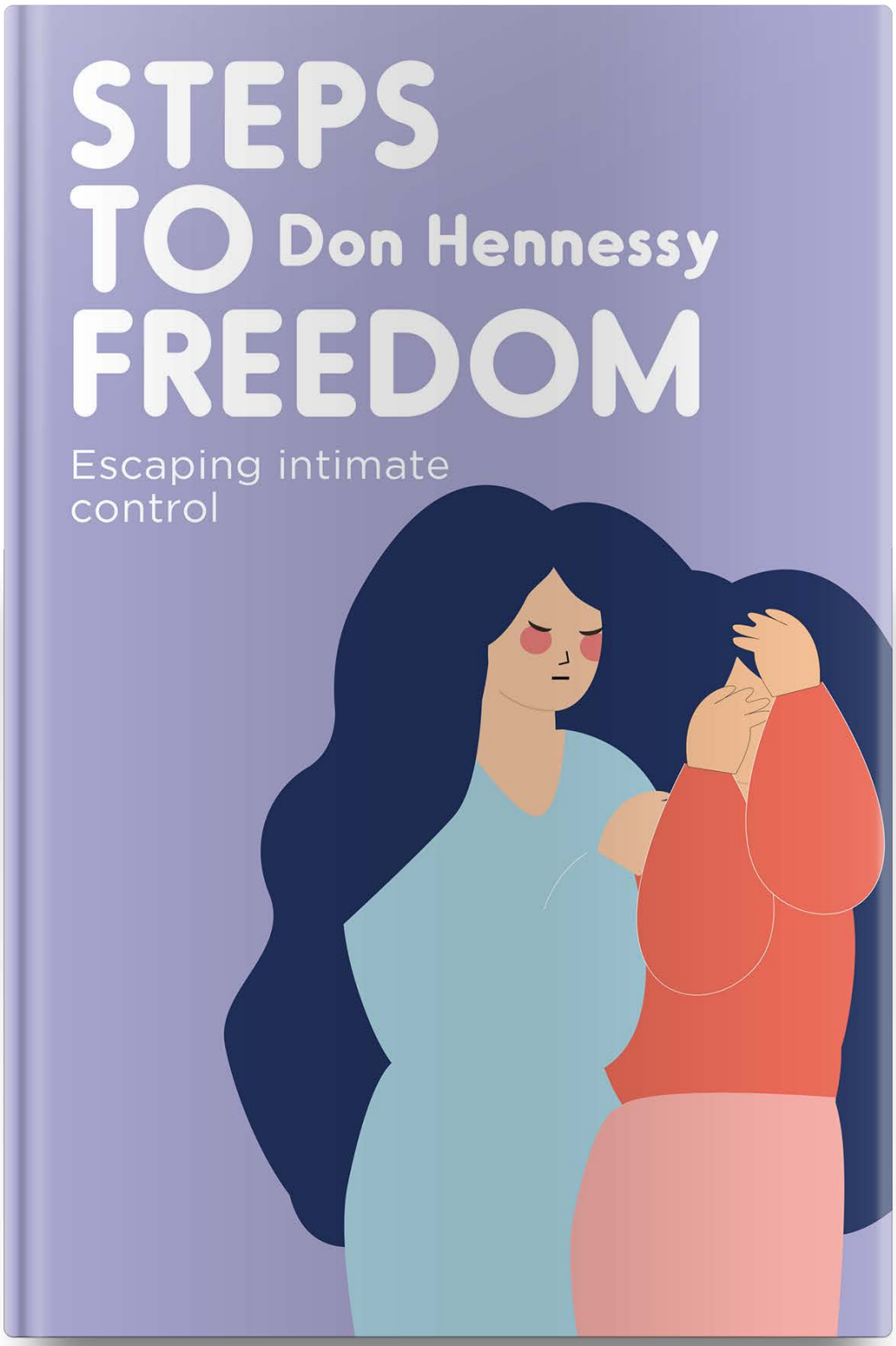
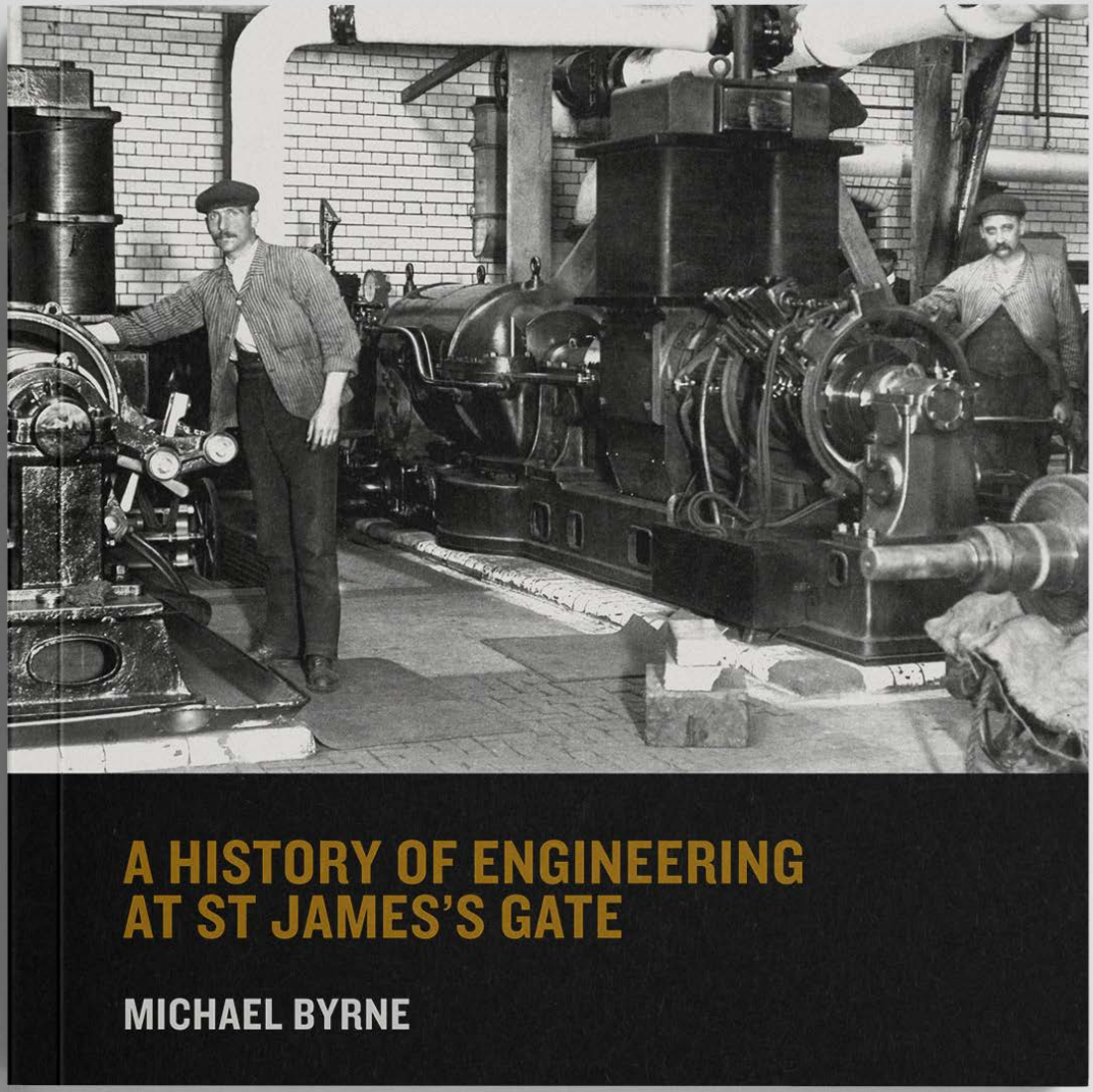


BOOK JACKETS & SPREADS



BOOK JACKETS & SPREADS

8. NO. 1 BREWHOUSE

Brewing Process

The pale malt and roast materials were screened, weighed and milled separately before being mixed together in the grist-case above the kieve. The grist was mixed with hot liquor in the Steele's external mashing-engine. The bruised and broken pale malt-shells filtered the wort during run-off from the kieve.

Mashing

Internal mashing of the grist in the kieve was carried out by a rotating carriage fitted with revolving rakes. The mixture was known as "the goods", and the temperature at the end of mashing, which was critical, as "the goods' heat".

As soon as the malt and liquor were mixed, the action of the diastase on the starch began, and proceeded rapidly. After being in the kieve for some time, the husky portion of the goods floated to the top, and the solution extracted from the malt and roast-material sank to the bottom. The wort, which is very sweet, was run off from the goods through the perforated false bottom in the kieve, and into an underback below. A second quantity of small wort or hot liquor was mixed with the goods, and finally sparged with more hot liquor for about ten hours until no more extract could be taken from the goods. This whole process took about seventeen hours to complete.

The spent grains, also known as wet grains, left behind in the kieve were shovelled into a spent-grains pit on the ground floor. From here, they were collected by carters and sold for cattle-feed. When not disposed of as wet grains, they were dried and bagged for future sale.

Boiling and Hopping

The third stage of the brewing process involved boiling the wort with hops in a copper, the objective being to impart to the wort the flavouring and preservative substances contained in the hop-cones. They were boiled at a rate of three pounds of hops per barrel of wort. The hops were boiled twice, first with strong wort and then with a weaker wort, called "small wort".

The boiled wort and hops were struck off into a hopback similar to a kieve. The wort was pumped to three large gauging backs. The wet hops were returned by elevator to copper for boiling a second time with weaker wort, after which the wort was again pumped to the gauging backs. The total boiling-time in copper was four hours. The boiled wort in the gauging backs from each copper was carefully measured. The spent hops were dropped through a hop-hole in the brewhouse floor onto the ground below. They were sold to market gardeners for manure.

The wort from the gauging backs was pumped to wort-coolers at the top of the old storehouse, passing through spray-nozzles to aerate it. Here the strength of the stout in its unfinished state was finally fixed, the level of alcohol depending on the original strength of the wort. As the stronger wort was collected in various wort-coolers, their strengths, i.e. gravities, and quantities were measured so that the correct volume of weaker wort could be added, to give the stout in tun the desired strength.

The original small kieve, estimated at twenty-five-barrel capacity, and underback were replaced in 1806 by a ninety-barrel-capacity kieve, complete with new underback. This was first mashed on 20 August 1806.

With the installation of the first steam-engine in 1809, Guinness was now in a position to avail of the economics inherent in the large-scale brewing of porter. A second kieve with a capacity of 150 barrels was installed in 1811. It is not known when the two grist-cases over the kieves were erected, but it was certainly before 1820. The grist-cases were filled in the evenings, which allowed time to mellow the rank smell imparted by the hot mill-stones.

In an attempt to survive the depression in Irish brewing caused by the Napoleonic Wars, Guinness opened an export market to Britain in 1816; this proved very successful. By the early 1830s, more than 50 percent of its output was being exported. The need to increase the mashing capacity had again become urgent. However, there was no space available. Then, quite unexpectedly, in early 1834, Luke Teeling offered to sell his extensive holdings on Thomas Street adjoining the Guinness brewery to the east. This doubled the brewery site from four to eight acres, and included the frontage of Nos. 2 to 6 Thomas Street. Guinness continued to expand on this site for the next forty years.

Leaks and Dashes

In 1840, an increase in extract was achieved. As the kieves were run off, additional hot liquor was added to "the goods" in kieve, to maximise the extract. Hot and cold liquor mixed in a small copper vessel known as "the dash-box" provided hot liquor of the required temperature. The inlet valves to each kieve from the dash-box, operated manually, supplied the hot liquor in "leaks and dashes". This was very inefficient and prone to error, and ultimately led to low extracts. In 1842, sparging was introduced. The sparger – a copper cup with arms attached – rotated freely on a central spindle inside the kieve. The sparge-arms, similar to a lawn-sprinkler, sparged the goods continuously and evenly. Increasing the temperature to about 99 degrees Centigrade considerably increased the amount of extract produced. From September 1842, "leaks and dashes" were no more, and sparging was the new norm.

The mid-nineteenth century saw Guinness exporting 60,000 barrels of stout – half the Dublin market – to Britain. At the same time, it was firmly focused on the domestic market, particularly the country market. Effective agencies were established throughout rural Ireland, and availed of the advantages offered by the building of the Irish canals and railways. The year 1855 saw Guinness sales really take off. The British trade was further expanded, but the most notable increase in trade was seen in the Irish market following the end of the Famine years.

The mashing capacity was further increased in 1856 when a large kieve, No. 4, with a capacity of 340 barrels, was installed alongside Crane Street (see Schedule No. 5 below). A fresh-grains tank, built under this kieve on ground-level, also served kieves 1, 2 and 3. From here, carters arriving on Crane Street removed the wet grains for sale to local dairies and farmers for feeding their cattle.

In the 1860s and 1870s, there was great innovation at St James's Gate. This included the introduction and widespread use of cast iron for brewing vessels, external mashing engines and the mechanical firing of the copper furnaces.

perfectly bright. The capacity of the Johnson presses was greater, and the pressed yeast was dispatched more quickly, than with the old Walker patent presses. This was critical, as the shelf-life of barm was only four days. The shelf-life was subsequently improved by washing the pressed barm with cold water at 2 degrees Centigrade on the filter press before re-pressing.

In 1909, Guinness sold its surplus yeast to two local companies, Dublin & Wicklow Manure Company and Barmak Limited. The three-year agreement with Barmak was a great deal more lucrative. It paid seven and sixpence per ton, which included collection and removal of the barm from the brewery. Dublin & Wicklow Manure Company only paid three shillings a tonne. Barmak's contract required Guinness to supply a maximum of 1,016 tonnes of barm for the first year, increasing to 1,524 tonnes and 2,032 tonnes for the second and third years respectively.

Guinness Yeast Extract (GYE)

In 1920, the output of pressed barm had reached 30,148 tonnes per annum, equivalent to 864 tonnes of extract. A Guinness chemist, Doctor Miller, successfully converted pressed yeast into yeast-extract in the laboratory. In 1920, this was scaled up to a two-tonne plant, which was in production by February 1921. Miller continued his experiments until June 1935, when a larger plant, with a capacity to convert yeast-extract from one ton of pressed yeast in four days, was built as an extension to Market Street Storehouse. This started production on 15 July 1935.

A British patent had been taken out by the Brewers Food Supply Company Limited in May 1923 for "Improvements relating to the Manufacture of Food Products from Yeast". From July 1924, this company manufactured a yeast-extract called "Yeastrel" in both England and Ireland. The Guinness yeast-extract process infringed on this patent, so it could only be manufactured for the Irish market.

GYE was manufactured and stored as syrup before being evaporated to a paste for sale. The new GYE plant was a success, but to supply the Irish market it needed to be scaled up from 0.26 tonne to 1 tonne per day. This was done, and the plant was in full production by the end of July 1936. A small bottling-line filled the GYE into jars.

The capacity of the GYE plant was increased again in 1947, to twelve tonnes per week. However, in December 1968, a decision was made to close the plant the following year. The plant and machinery were removed and sold, and the building was demolished some time later.

Beer Recovery Section (BRS)

Although the patent Johnson yeast-presses worked adequately up to the 1950s, they suffered from a major disadvantage. Their operation was a batch process. The surplus liquid yeast had to be collected over several hours before filtering could begin. Holding barm even for a few hours caused deterioration in the quality of the barm beer. About 17.6 tonnes of surplus yeast was produced each brewing day in the late 1950s. Ten percent of this was used for store yeast, and it was cooled immediately and stored at 1 degrees Centigrade for starting the next day's fermentations.

From around 1919, 16.3 tonnes of surplus yeast was pumped to a new surplus yeast plant beside No. 9 vathouse on Rainsford Street. This area was known as the "Beer Recovery Section" (BRS). Five vacuum rotary drum-filters were installed here **(Fig. 157)**. They were manufactured by a Swedish firm, Aktiebolaget SJA (which gave them their shortened name, the "SJAs"). Filtration was now a continuous process, and barm beer was recovered from fresh surplus yeast. This resulted in a large improvement in the quality of the barm beer recovered, and two more were added. The barm beer was collected and pumped to No. 11 vathouse, where it was centrifuged, pasteurized and blended off with Irish Extra Stout. The yeast cake, being rich in protein and B-group vitamins, was sold as an animal feed, and for the manufacture of yeast extracts for human consumption. In addition to the seven SJA filters, the new BRS also included barm-storage and feed-tanks, a chiller and a heat-exchanger, as well as barm beer and liquid yeast tanks and pumps, all piped together.

The SJA continuous-vacuum filters consisted of a grooved stainless-steel drum which had a nylon filter wound round its circumference. Vacuum at fifteen to twenty-five inches of mercury was applied to the inside circumference of the cloth via hollow spokes mounted on a hollow centre-shaft. Barm was continuously pumped to a trough below the drum. As the drum rotated, it picked up a coating of barm. The barm beer was sucked through the filter cloth via the spokes into a vacuum-pump. The surplus yeast or barm was shaved off the outside of the drum by a finely adjusted knife-blade along the length of the drum. This surplus yeast was liquified to facilitate pumping to the yeast-dryers. The yeast being knifed off the SJAs was subsequently found to contain too much valuable barm beer, and they also required a coating of filter-aid. However, the filter cloths continued to blind after a few hours of operation. Pre-coating with a different filter-aid, Kieselguhr, proved very satisfactory. The SJAs proved superior to the old Johnson plate-and-frame filter presses, and yielded a much higher percentage of barm beer than had ever been achieved before. The quality of the barm beer recovered was excellent.

A small percentage of the surplus yeast, mostly vat bottoms, proved difficult to filter on the SJAs. Two American-manufactured "EIMCO" filter drums were installed for filtering the vat-bottoms. Their operation was somewhat similar to that of the SJAs. Their filter-cloths were, however, coated with a deep bed of filter-aid. A thin layer of yeast-cake was knifed off on each revolution of the filter-drums, always leaving a fresh surface for the filtration of the difficult vat-bottoms.

As the separated yeast-cake contained a mixture of filter-aid, some difficulty was experienced at first in finding a market for this product. An English yeast-extract company whose process included removal of the filter-aid, purchased the lot. Because of the increase in barm-beer recovery, the new BRS paid for itself in just a few years.

Fig. 157

Fig. 158

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