

A 20th century life in structures

Zoe Flood* interviews her grandmother, Marjem Chatterton (F), now in her 90s and the Institution's first female Fellow, about her work as a structural engineer

In 1954, a letter was delivered to a suburban house in Salisbury, Southern Rhodesia, telling the resident of their successful election as Fellow of the Institution of Structural Engineers in Britain. But for Marjem Chatterton, reading the letter in a home built from her own designs, there was extra reason to celebrate: she had just become the first female Fellow in the Institution's history.

'Naturally I was very pleased,' says Mrs Chatterton, now nearly 93, speaking in her neat, modern house in Exeter, where she lives on her own. 'But by that point I had got quite used to being the only woman around'.

Her election as Fellow followed on from storming success in the Institution's membership exams. Although not the first female chartered member – Mary Thompson Irvine having joined shortly before she did in January 1949 – Mrs Chatterton became the first woman to win the Andrews Prize in the Associate Membership examinations, scoring the highest aggregate marks. She also won the Wallace Premium (Senior) Prize.

'The representative of the Institution in Salisbury was a prominent local engineer', she recalls. 'When I went to see him for the entry forms for the membership exams, he looked me up and down and asked rather doubtfully, "What makes you think you can pass these exams?" I was indignant and showed it. But when the results were published in the local papers, he was one of the first to phone and congratulate me.'

Marjem Chatterton went on to become one of the country's most prominent structural engineers, working through the twilight years of British rule, the troubled era following the Unilateral Declaration of Independence in 1965 and then, from 1980, in newly independent Zimbabwe. Specialising in multi-storey structures, her buildings still define the skyline of Zimbabwe's capital Harare, with her last major project – the Reserve Bank – the tallest office building in the country. But her origins made this distinguished and unusual career even more surprising.

Born Marjem Znamierowska in Warsaw, Poland, in September 1916, Chatterton grew up in a large Orthodox Jewish family. Female education was considered important, but most women of her parents' generation didn't work. 'I was fortunate that my mother insisted I go to a progressive Jewish girls' school, rather



1 Marjem Chatterton, pictured at home in Exeter on a visit by Sarah Buck as President in 2008
2 At the drawing board while a student in Haifa, 1938

than a religious one. It was a *realna szkoła*, a school that particularly focused on the sciences,' she recalls.

A happy childhood in Warsaw was brought to an abrupt end by the tragic death of her young sister. Soon after, in 1932, the family decided to emigrate to Palestine, then under the British Mandate. After her high school matriculation, Mrs Chatterton planned to return to Poland and study chemical engineering at the University of Warsaw. But, on a visit in 1934, it soon became clear that the situation for Poland's Jews was worsening. 'The strict "*numerus clausus*" rule applying to Jewish students meant that places in all departments were very limited. In the end, I was very fortunate not

structural engineering and a zest for life in general. As we talked in her garden last year I was amazed to hear about her career and particularly her work in Zimbabwe. She showed me a framed photo her daughters had given her for her birthday, displaying some of her high rise structures in Harare. I was lucky enough to visit Harare this year and could see for myself the lasting legacy of Marjem's work in the city.

'It is not difficult to imagine the barriers to a young, "foreign", female engineer working in Zimbabwe in 1947 (a time when "women know your place" was more the norm), but Marjem made light of any difficulties and I found her truly inspirational. Besides the high rise work she also worked on the design and construction of a parabolic roof of clay bricks that did not need shuttering. The building could be built using local materials and local labour and this is exactly what was constructed under Marjem's guidance. She was ahead of her time in many ways, not least on sustainability and appropriate technology. I feel very privileged to have met her.'



Past President, Dr Sarah Buck writes: 'When I heard that the first female fellow of the Institution of Structural Engineers lived only 2 miles from my office I could not wait to meet her. Marjem did not disappoint. She is a real pioneer with an enthusiasm for



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to get a place as it meant that I was out of Poland when the war started,' she says.

Training at the Technion

In what she describes as a 'snap decision', she enrolled at the Hebrew Technical Institute in Haifa. Known as the 'Technion', the university was founded in 1912 to foster the study of science and technology among the Jewish population in Palestine. Her cousin was on the point of starting a civil engineering degree there and his aunt – Rahel Shalon, the first female engineer in the country – was a faculty assistant.

'It suddenly seemed a route for me too. I had always wanted to do something practical, but had been more oriented towards chemistry. Civil engineering seemed a really interesting proposition,' she recalls.

'There were just two girls in a class of over 100,' she adds. 'At first, it was good to have another girl for moral support. But we soon felt entirely comfortable and rather enjoyed the special attention of colleagues and lecturers. We had extremely good professors – most of them were escapees from persecution in Germany.'

But the situation in Palestine itself grew ever more difficult from 1936, with rising Jewish immigration – as more and more refugees fled Europe – provoking an Arab uprising that continued for several years. And, in 1939, just as she was putting the finishing touches to her final-year project, Germany invaded Poland.

'The war was certainly the single most significant event of my life', she says. Her parents had returned to Warsaw in August 1939 and then vanished for several months. 'We didn't know if they were dead or alive – I was ecstatic when we heard that they'd made it to Cyprus. But we didn't ask questions when they came back. It was too painful to talk about, because they had left the rest of the family behind.'

With finances extremely tight, she took a job that had been offered to her by a faculty member, Josef Edelman. Having graduated with the first distinction in engineering awarded by the Technion, she was in demand. Edelman managed the Technical Office of the Collective Settlements Association, building some of the country's largest kibbutzim.

'It was excellent experience for a young engineer. The work was very varied and generally under pressure. We had to tackle all types of structures – water towers, bridges, large-span assembly halls and factory buildings,' she describes. 'The supervision involved travelling around the country and frequently dealing with workmen, many of them immigrants and refugees who had never before done building work in their lives, but were highly qualified in other fields. But it was all very dynamic and exciting, and in those circumstances being a woman was not a handicap.'

Move to Southern Rhodesia

After the war, Mrs Chatterton – now married and with a young daughter – decided with her British husband to leave Palestine. 'We emigrated to Southern Rhodesia, arriving there in late 1947

- 2 With some of her classmates (centre front) at the Technion in Haifa, 1930s
- 3 In her Salisbury office with a young trainee, late 1950s

without jobs or a place to live. But the country was surging ahead, with new immigrants arriving in scores and the building industry simply exploding. I found a job as a reinforced concrete designer within 2 days of arriving in the country,' she says. 'There were many opportunities – they were so short of engineers. And my experience with reinforced concrete structures in Palestine was particularly useful, as at that time it was nearly impossible to get hold of heavy steel sections locally.'

For a professional woman with young children, Southern Rhodesia had other benefits. Its tradition of domestic help meant that childcare was affordable and available. 'I had another daughter soon after arriving. Having help with the children really gave me the chance to focus on my work', she acknowledges.

Many in the construction community in Southern Rhodesia, then a traditional society with strongly defined gender roles, reacted with surprise at her arrival. 'On site visits, the workers were generally very shocked. But, despite initial suspicions that I didn't know what I was talking about, their attitudes changed completely when they realised that I did', she says. 'Once people became

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She laughs as she recounts an incident with one worker, an Afrikaner yard foreman whom she describes as 'a conservative and rigid man' who firmly believed that a woman's place was in the kitchen. 'He gave me a very hard time at first; drawings would often return from the yard with harsh comments. But I decided to be humble and learn as much as I could, as he had a great deal of practical experience. His resentment quickly disappeared and we became good friends. I learned to appreciate his practical problems and never forgot the aspects of site execution in future designs.'

Mrs Chatterton worked for Lysaght and Company from her arrival in Rhodesia until 1957, when she got what she called her 'real break'. A local architect had been commissioned to design a prestigious 20-storey headquarters for a mining company. But the



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clients wanted the steel put out to tender and therefore not use a design-supply firm. The architect asked her to do the structural design, but to do so she would have to leave her job and open a consulting office.

'I took on a "sleeping partner" who provided some of the financial backing and was perhaps more "known" than me at the time. Livingstone House, then the tallest reinforced concrete structure in Africa south of the equator, was the start of a very satisfying and interesting consulting career. By 1969, my reputation as an expert on high-rise buildings was well-established and I started my own consulting firm, M. Chatterton and Partners.'

Her major works trace on the one hand the contours of a colonial society, on the other rise of a booming African post-war economy. Distinctive buildings in the capital included the Salisbury Club, the National Library, Museum and Art Gallery, and the renowned Meikles Hotel. Her work highlighted the country's economic strengths – she designed cotton depots, fertiliser factories, sugar refineries and brewery buildings, but also the major banks, building societies and office buildings that reflected the regional role of Rhodesia, and later Zimbabwe, as an economic powerhouse.

An unexpected turn

But in 1976, her career took an unexpected turn. 'The civil war in Rhodesia was intensifying and building activity was dropping off', she recalls. 'I found out that Leeds University needed a lecturer – my younger daughter was then based in the city. I had met Professor Adam Neville, the head of the Civil Engineering Department there, on one of his lecture tours. He liked my professional profile – they were looking to bring in someone with a sound practical background.'

'I had never lectured before so was naturally nervous', she remembers. 'I also had commitments to my own firm, so eventually accepted on the condition that I could spend university vacations working at my office in Salisbury. The original contract was for 3 years, but I so enjoyed it that I stayed for 8, teaching structural conceptual design, steelwork and reinforced concrete design, and theory of structures.'

Mrs Chatterton also became involved in the university's campaign to encourage girls into engineering. 'I often gave careers talks in girls' schools. The biggest obstacle was often the parents' attitude: for many the word conjured up the image of their daughter in dirty overalls under a car. But I could tell them about my own career. I've also always felt that women are better mediators than men. With so many different trades involved on any one job, there was often conflict. I was usually the one to sort matters out, as my mediation was accepted more readily than that of a man.'

4 On site with foreman in Salisbury, early 1960s

5 On site in Salisbury, early 1960s

6 Reserve Bank, Harare, the biggest building she designed

Professor Adam Neville the world authority on concrete recalls: 'I first met Marjem Chatterton in 1972 in Salisbury, Rhodesia when giving an invited lecture to the Rhodesian Institution of Engineers. Some time later she asked me about positions in the UK and I immediately was able to offer her a lectureship in the Department of Civil Engineering at Leeds. Luckily she accepted.'

In the final undergraduate year she provided help and supervision for students undertaking a major design project. As a practising engineer she was admirably suited to complementing other lecturers whose forte was analysis. She was viewed as a top designer, the fact that she was a woman being irrelevant, and the students greatly valued her help and advice. Marjem was so successful in the Department that, when she reached the statutory retirement age of 65, I succeeded in extending her appointment.'

Now that Marjem's seniority in the Institution of Structural Engineers is being recognised, I am very glad to add to the tribute to her.'

In 1984, after a stimulating period in academia in Britain, Marjem Chatterton returned to consultancy in Zimbabwe, also teaching at the national university. 'Zimbabwe's independence in 1980 heralded a flurry of work as sanctions were lifted and investment poured in. I won several significant contracts, with my post-independence work culminating in the 26-storey Reserve Bank headquarters. While it was the biggest building I had designed, I felt well-equipped for the job. I had never built that deep before – the third basement containing the vaults was so strongly fortified that thieves would have needed to import special equipment to break in.'

But by the late 1990s, the political and economic situation had begun to deteriorate in Zimbabwe and for Mrs Chatterton, already in her 80s, there was a case for slowing down.

'I went to my last site meeting in 1999, at the age of 83, and soon after relocated to Britain', she says. 'Already the work was beginning to dry up. The firm I set up continues to operate, now under a new name, but most work comes from neighbouring countries.'

'I have always loved my work – it has been both my interest and my hobby', she concludes happily. 'I always found that each job – large or small – presented special and interesting problems and that each difficulty created a particular challenge. And it was always deeply satisfying to overcome those challenges.'

** Zoe Flood is Marjem Chatterton's only granddaughter and a freelance journalist who has written for outlets including the Independent and the New Statesman. She is working on an account of her grandmother's life.*