The Heathcoat Lace Factory During World War 1

Information pack for artists

DAISI workshop sessions, 2015
Heathcoat's at the start of the war

Tiverton's Heathcoat factory has been making lace and net textiles for nearly 200 years. For a long time it was the largest lace-making factory in the world. When production started in 1816 it was a state-of-the-art factory, making fine lace net, mostly from silk.

The success of the business was built on an invention by its founder, John Heathcoat: the bobbin net machine transformed the lace-making industry from the slow, hand-made 'pillow and bobbin' method to the faster mass-production process.

For its first hundred years The Heathcoat Lace Manufactory (or Heathcoat's as it has always been known by locals) was Tiverton's largest employer. The company built houses, churches and schools for its workers.

By 1914 Heathcoat’s had customers in every part of Britain and all around the world, especially in Europe.

But the First World War brought a kind of chaos to the world's economic system: suddenly, the business of doing business became very difficult. Nations that became enemies stopped trading with each other. The supply of raw materials and machinery became unpredictable. And in an uncertain world, countries, companies and individuals did less and less buying and selling.

Within days of the war starting, the following entry was made in the Factory Log Book:

"... Total cessation of orders from the Continent and greatly diminished demands in our own company, the sad and inevitable results of the terrible war."

Fortunately for Heathcoat’s - and its workforce, and Tiverton – huge orders came from the USA, mostly for fine gauge nets. This work kept the company’s machines going for most of the war years. In fact, by January of 1916, there were almost more of these orders than the factory could deal with.

Under the circumstances, this was not such a bad problem to have: better too much work than too little.
Government Contracts

KILTS

When the war started almost everyone expected it to be over in a matter of months. But those months passed, and still the end seemed a long, long way off. Supplies of important equipment – like ammunition – began to run out.

The Government decided that industry had to be reorganized to completely support 'the war effort'. All over the country there were factories with machinery and skilled workers capable of making ammunition and war supplies: if they could do it, decided the Government, then they should and they would. Everyone was expected to be involved in the war effort. No one could just stand by and watch.

In June of 1915 the army needed some kilts (presumably for Scottish troops), lots of them, and it wanted them made and delivered as soon as possible; and so government contracts were awarded to various textile manufacturers, including Heathcoat’s.

The Tiverton factory certainly had the workforce with the know-how, but what it did not have was enough sewing machines to complete the order quickly. There were no industrial sewing machines available to hire; these were already being used elsewhere to make uniforms, etc. So Heathcoat’s turned to the people of Tiverton and asked if anyone would hire out their own sewing machine to the factory until the order was completed. The response was so great that not all offers of help could be taken up.
GAS MASKS

Both sides used gas as a weapon during the First World War, but it was a German commander (General Falkenhayn) who first ordered its deployment at the Second Battle of Ypres in 1915.

As the war went on the use of gas became more and more sophisticated and more and more deadly. That first gas that was used, at Ypres, was chlorine gas.

The men came tumbling from the front line. I’ve never seen men so terror-stricken, they were tearing at their throats and their eyes were glaring out.

Private W.A. Quinton
2nd Battalion, Bedfordshire Fusiliers

The effect of this gas was to form a sort of foamy liquid in one’s lungs, which would more or less drown you. A lot of the men died pretty quickly, and others soon came down – they were in fact drowning from this beastly foam. Out of the 250 men we started with at 5 o’clock we were very soon down to about forty or fifty men.

Lieutenant Victor Hawkins
2nd Battalion, Lancashire Fusiliers

Suddenly, gas masks were desperately needed.

It is now possible to reveal a fact upon which our chief local manufacturing industry [Heathcoat’s] may fairly be congratulated, viz: that when the Germans first used gas against our brave soldiers at Ypres and the British Government made a request for protective cotton net, a large consignment was made by the Tiverton factory within two days. The Government ordered all available cotton net to be finished in a particular way, and such was the enthusiasm of the workers that the work of from 10 to 11 days was done in 24 hours, and the goods left Tiverton the day after the receipt of the Government’s instructions. As far as is known Tiverton net formed the first respirators to reach the front.

Tiverton & East Devon Gazette
10 July 1917
Respirator, Veil or Pad Type (British)

| History note | This early First World War British anti-gas 'respirator' consisted of a pad of cotton waste enclosed in a pad of muslin that was tied over the nose and mouth of the wearer. The pad was soaked in a solution of sodium hyposulphite, washing soda, glycerine and water (in theory buckets of 'hypo' solution were to be provided in front line trenches). Eyes were protected by a separate pair of (anti-gas) goggles. The 'pad respirator' was issued to British troops in early May 1915, following the first mass use of cloud gas (chlorine) by the Germans at Ypres in April 1915. |
| Physical description | Pad formed of cotton waste, enclosed by muslin with attached ties. |
Description

British Army ‘Black Veil’ respirator. The mask is made from a 1 metre length of 280 mm wide black veiling. The veiling is folded to form a 100 mm wide sleeve, the centre of which is sewn to form a 200 mm wide pocket containing a thick pad of cotton waste. This central pocket is secured at the rear by a single corroded steel pin.

Summary

On the evening of 22 April 1915, near Ypres, in Belgium, the first gas attack on the Western Front was launched by German troops. This attack, using chlorine gas, caught the Allies completely unprepared, and casualties among the French colonial and Canadian troops who bore the brunt were heavy. British reaction was swift, and thousands of home-made respirators comprising cotton wool or lint pads wrapped in muslin or flannel were issued to the troops by 1 May. Unfortunately, these ‘pad’ masks were almost completely useless, as they provided no protection when dry, and formed a completely airtight mass over the wearer’s nose and mouth if soaked in an absorbent solution as recommended. Research showed that a loosely woven material would provide better absorption, while still enabling the wearer to breathe, so a mask of cotton waste was selected. A long piece of black cotton veiling was folded upon itself to form a pocket holding the waste in place, and the ends were simply tied around the wearer’s head. By 20 May, virtually all British troops had been issued with a ‘Black Veil’ mask, which was soaked in a solution of sodium hyposulphite, sodium carbonate, glycerine and water. This solution retained sufficient moisture so that the did not require any further dipping before use, provided that it was stored in its purpose-built waterproof satchel. An advantage of the mask was that a fold of veiling could be drawn up to cover the eyes, providing some protection against lacrimary (‘tear’) gasses. The Black Veil would provide about five minutes protection against a normal concentration of chlorine, and was suitable as a stopgap defence, but the need for a more reliable respirator was clear. By early July, most troops had been issued with the new ‘Hypo’ helmet, relegating the Black Veil to the role of emergency backup. Australian troops on Gallipoli were issued with Black Veils to protect against the possibility of Turkish gas attack, but they were not required.
The Tiverton lace factory, which for a hundred years prior to the war was busy in producing textiles fabrics of beauty, has found a new sphere of usefulness, and is now turning out shells for the use of the Allies. Work goes on, by shifts, day and night, and everybody engaged shows the greatest keenness in thus doing his bit.

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Tiverton & East Devon Gazette
4th January 1916

Put simply, an artillery shell is like a very large bullet. The bottom half is a metal tube sealed at one end (the shell case). Gunpowder is packed into the tube. The open end is plugged with the projectile (the bit that flies through the air). The projectile itself contains material that explodes on impact. The shell is placed into a large (artillery) gun, the sealed end of the shell is struck very hard, causing the gunpowder to explode, forcing the projectile out of the shell case, along the barrel of the gun, and through the air towards the target. Bigger guns had bigger shells to fire bigger projectiles ever-further to cause greater damage.

The idea was to bombard the enemy with artillery shells before attacking on foot.

Britain went to war in 1914 thinking it had enough shells to last until the war was won. But by the spring of 1915 the shells were beginning to run out. (Once fired, the shell-cases could not be re-used; the metal could be melted down and re-cycled, but the shell-cases had to be re-made from scratch).

For a long while it was thought that the winning side in the war would be the one that could produce the most shells. In Britain, munitions factories were established, employing over 700,000 young women. It was a very dangerous industry. The chemicals in the explosive materials caused health problems that were not fully understood at the time. And of course, there was always the risk of accidents and explosions: in 1918, at the National Shell-filling Factory in Nottinghamshire, 134 people were killed and 230 were wounded. All but 30 of the dead were so badly disfigured that they could not be positively identified.

Fortunately, some parts of the shell production process could happen well away from the explosive materials. For example, the shell-cases could be pre-made in any factory that had the right machinery and a skilled workforce.
The Tiverton factory set up a Munitions Department and began experimenting with shell-case production on 23rd July 1915. From start to finish a shell-case pass through eighteen different stages of the manufacturing process. The Government supplied lengths of cylindrical solid steel (tubing), which was cut into shell-length pieces by a machine-operated hacksaw. The factory’s foundry was used for heating the metal, and there were drilling and lathe-work operations involved in the production.

The lathe-work was especially important. A lathe machine rotated the metal lengths at high speed so that cutting tools could be used to shape and thin the cylinders to exactly the right dimensions. This was precision-work. The finished cases had to be accurately made to specifications within a few thousandths of an inch: a small mistake made in the factory could mean a shell exploding in the gun, injuring the soldier using it.

Shells were categorised by their weight, and the most commonly used were ‘eighteen-pounders’; that is to say, the weight of the finished shell loaded into an artillery gun was eighteen pounds (8.16kg). The empty shell cases made in Tiverton were sent to Bristol to be filled and made ready.

Within just a few weeks of starting, Heathcoat’s shell-case production line was up and running. But it took nearly three months to produce the first consignment of just 168 shell-cases. On the battlefield, one artillery gun could fire all of those in just a couple of hours.

The production rate had to increase. And it did. In January of 1916 a shell-case was begun and finished in the record-breaking time of 1 hour and 35 minutes. Production had increased to 700 cases per week. Sir Ian Heathcoat-Amory, the factory’s owner, said that the making of shell-cases was the most important work the factory was doing. A month later the number of cases made weekly had risen to 1040.

The contract to make shell-cases came to an end on the 31st March 1916. The grand total of cases made came to 13,459. The Government paid 11s3d (56p) per case, which was not a lot, but the work had helped the war effort. The contract was not renewed because the Government wanted to concentrate on making larger shells for bigger guns.

The lathes were removed to make way for Heathcoat’s other work, and with the introduction of Conscription in May 1916- some of the skilled machinists were called-up into the armed forces.

After a few months, soldiers overseas started asking for ‘18-pounders ‘again because they were easier to lift and carry than the newer heavy shells. Also, they could be fired more quickly.

So that contract with Heathcoat’s was renewed: lathes were put back and new machinists were trained. But new Government rules meant that things would be different this time. First, the making of shell-cases had to continue all day and all night for maximum production. Secondly, 4 out of every 5 people employed for this work had to be women.

Whether or not Heathcoat’s fully met that target remains unclear. But certainly in May of 1916, 6 women started work in the munitions room. They are named in the FLB: Miss Aslett, Miss Cosway, Miss Elson, Miss Lake, Miss Moore and Mrs W Thorne. And in November of
that year, in the Devon and Somerset Weekly newspaper, women who wished to help with munitions work were invited to contact the manager of the local labour exchange.

Shell-case production resumed: the 50,000th was produced in June 1917 and the 100,000th in January of 1918. The production rate reached a staggering average of 2,328 per week!
The Changing Workforce

Lace-making continued at Heathcoat’s throughout the war years. It was important: it kept the work force employed and it helped boost the country’s export figures.

In the early 1900’s, all manual work was hard work. Whether on a farm or in a factory, workers had to roll up their sleeves, knuckle down and get on with it, often in conditions that would be unacceptable today.

The Heathcoat factory was like most others at that time: in some parts it was deafeningly noisy, cold in the winter and stiflingly hot in the summer. And it could be a dangerous place too. The Factory Log Book is peppered with accounts of accidents where workers were burned or had fingers crushed.

But by the standards of those days, the Tiverton factory was seen as a good place to work. Sir Ian, the factory owner, was supportive of the workforce and paid good wages. He was ahead of his time when it came to sharing company profits and introducing a pension scheme. In return, he was well-liked and respected.

The school leaving age at that time was 14. For a boy or a girl who got taken on at Heathcoat’s, and managed to do the work, it was almost a job-for-life. Many of the factory staff stayed there for the whole of their working lives.

Like many factories, Heathcoat’s had different departments (or ‘shops’): some departments were staffed by men, some by women and others were mixed. In a factory that had big machines with many moving parts, experience was important. It is said that Heathcoat workers could indentify a mechanical problem by the slightest change in sound that a machine was making.

Everyone had a job to do and everyone new their place. But then the war came along, the usual order of things was disrupted. The problem was that experienced men who had important jobs in the production process were leaving the factory to go and serve in the armed forces.

Soon after, the Government announced that the country would need a much larger army, and so began the recruiting drive that produced the famous poster with Lord Kitchener’s picture on it, pointing his finger at the reader with the words ”Your country needs YOU!” The response was overwhelming and many thousands of men rushed to take part in what they thought would be a brief but exciting adventure. And for those who were less keen, there was plenty of persuasion from family, friends and complete strangers.

The flow of volunteers eventually slowed down, but still more recruits were needed. So - in May 1916 - Conscription was introduced. All single men aged 18 to 41 were called up for military service, as were married men and widowers.
By September of 1916 half of the men who would normally be working on lace-production had joined up. If things had carried on at that rate, Heathcoat’s would soon be in real trouble.

Special tribunals were created across the country that could exempt a man from military service if he - or his employer - presented a good enough case proving that his job was crucial to the war effort or the local economy, or both.

On numerous occasions, Heathcoat men went to tribunals, often accompanied by Sir Ian himself. In some cases, they were exempted from military service, but not always. Deciding who should stay and who should go must have been difficult. As the decision-makers themselves often said, almost every man in the armed forces had an important job to do back in Britain.

For those men who were exempted, life could sometimes be difficult. In public, they were sometimes stopped, harassed and harangued by complete strangers who demanded to know why an obviously able-bodied man was not away at war defending his country. Name-calling (and worse) was not uncommon. To solve this problem the authorities issued such men with a badge which informed everyone that the wearer was exempt from military service, being employed in a job that was crucial to the war effort.
WOMEN WORKERS

Even though a few of the Heathcoat men were exempted from military service, so many had joined up that lace-making production at the factory – which was the bulk of its output during the war years – risked being drastically cut.

If there were not enough men to do the work, the obvious solution was to have it done by women. Across the country, women were increasingly doing the jobs that had previously been done by men: they were driving, farming, running small businesses and operating machinery in factories.

At Heathcoat's, Sir Ian did not insist that women do some of the men's work. Instead, he tried to persuade the workforce – especially the men – that it was the best course to take, both for the company and the country's war effort. The men's support for this idea came and went like the tide on a beach.

In January of 1916 he met with the men's committee of lace hands and suggested that it would be useful if women could be put to work on the narrow lace-making machines. He said that it would only be for a while and that things would return to normal when the war ended. But the men voted against the proposal, saying that they would rather work longer hours than have women operating the machines.

Two months later, the following entry was made in the Log Book:

27th March 1916
Today Sir Ian met the lace foreman, the men’s Committee, and finally the whole of the lacemakers, and asked them to accept the help of young women in the lace shops in view of the fact that it is highly probable that all eligible lace makers will be “called up”.
He also asked the men to teach the young women appointed to them all they could and not merely make use of them; and come down a few weeks hence, and report to him the progress made, and to make suggestions as to the best way of utilising females for lace making. Each man acting as teacher was promised 5 shillings per week for a month, and the firm agreed to pay the young women’s full wages for a month.
The men agreed to the proposal, and promised to do all they could to further the plan.

And then, a few weeks later:

6th May 1916
Sir Ian wanted two lacehands to work four 6-yard machines with the help of three young women.

The men resisted, arguing that:
Women were physically incapable of doing much, or at least some, of the work connected with lace-making.

It would take a very long time to make them anything like efficient helpers.

Some doubted it being a good thing to place young women with men and boys, hinting at the danger of possible indelicacy.

There were seasons and times when women were feeble and inert.

Hmm. Clearly, some parts of the lace-making process were strenuous and involved the lifting of heavy weights. But not all of it. So why did those men who remained at the factory resist the idea of women working alongside them? Was it something to do with ‘male pride’? Were they fearful of change?

One thing is for sure: they did end up working longer hours. A 54-hour week became the standard, and it was common for them to work 74 hours a week!

However, little by little women did start to do more of the men’s jobs at the factory. When a government Inspector of Factories visited Heathcoat’s, she especially wanted to know what was being done about employing girls and women to replace male lacemakers. She was told that 23 women were doing work previously done by men, and that 20 of the 23 were learning to become lacemakers. She remarked that Heathcoat’s were doing better at this than any other lace-making factory she had visited anywhere else in the country.

But the basic problem remained: by the spring of 1918, 95 Heathcoat men had joined up and 35 machines stood idle.

In the Munitions Department, men and women had successfully and cheerfully worked together from the start, something that Sir Ian acknowledged as the war drew to a close:

I want to say a word of special thanks to the men in the Munitions Dept. for the consideration and care they have shown to the girls under their charge and for the trouble they have taken to teach them. I know the girls will recognise that it is to these men they owe the training which has enabled them to earn the good wages they have and to do the good work for their country which they have done.

And then, to the Heathcoat workforce generally:

But I really want to say “Thank you” to you all. Through these anxious and difficult times we have remained a happy little family in this factory ...
18-pounder shell
Reserved occupation badge

Women workers at Heathcoat's
Munitions workers at Heathcoats

Women workers wearing reserved occupation badges