

PRODUCING MUNITIONS

ENGINEERING FIRMS

Lincolnshire men enlisted during the first months of the war for many reasons, but among them were poverty and unemployment. As the threat of war increased engineering firms such as Lincoln's Ruston, Proctor & Co. Ltd, Clayton & Shuttleworth Ltd, Robey & Co. Ltd, Wm. Foster & Co., which produced agricultural machines and engines, lost trade from their foreign markets. On 8 August, the Directors of Ruston Proctor advised their workpeople that until further notice, the works would not be open before breakfast, they would be closed on Saturday and that after 10 August employment would be on a daily basis. Clayton & Shuttleworth issued a similar notice.¹ By mid-September there was serious unemployment in Lincoln. Some 300 married men were out of work and over 1,000 working every other week. Ruston's men rushed to enlist. On 24 October, Clark's Crank & Forge reported that about 25 per cent of the employees had offered themselves for active service and nearly 2,000 men left Marshall's of Gainsborough to join up.² It was later thought that the rush from engineering works helped fuel the May 1915 munitions crisis. By then the employment situation in Lincoln had improved because most firms had received munitions contracts from the Government for whom they worked until towards the end of the war. For example, Clayton & Shuttleworth made crawler tractors for the War Department in the western half of their Titanic Works.

What are munitions? *The Times* thought people needed help to understand this apparently new word. Munitions were defined as weapons and appliances required for warlike operations by land and sea, including guns and ammunition, small arms, grenades, bombs, mines, torpedoes, warships, armour and other protective appliances, including new inventions such as the tank. Munitions also included things which can be used for war, such as aircraft and motor-cars. Repairs such as those done for the Navy were included and preliminary processes where they were carried on in the same establishment. Therefore men engaged on them needed to be counted as munition workers. However, raw materials such as coal and pig iron, tools, cannot be called munitions.³ Nonetheless, it is evident that the manufacture of munitions depended on raw materials such as iron ore for which there was increased demand.

Ironstone is a Jurassic rock that results from a sedimentary deposit on ancient sea-beds. Various types of ironstone exist in Lincolnshire. A large area around Scunthorpe produced Frodingham Ironstone but this ore did not extend south beyond Lincoln. Secondly, the Marlstone bed where the ore is warm red in colour and often appears as outcrops at Caythorpe and Woolsthorpe. Thirdly, Northampton Sand, often associated with the overlying deposit known as Lincolnshire Limestone and together forming the geological feature known as Lincoln Edge on which Lincoln Cathedral stands. There were other quarries at Colsterworth and Harlaxton.⁴ Although this work was not defined as munitions, nonetheless armaments could not be produced without it. It was hard labour and on 30 September 1915 a conference of clergy discussed the ironstone workers of Fulbeck in connection with the TT (Tee-total) League. The Bishop recorded: the iron stone workers of Fulbeck drink heavily.⁵

Lincolnshire's factories produced a huge amount of military hardware which was defined as armament production. Ruston's produced four million items, among them 8,000 Lewis guns, 55,000 gun mountings, 500,000 shells and bombs, internal combustion engines for munition and aircraft factories, oil engines for searchlights and hospitals, and steam navvies for extracting raw materials from British soil. Foster and Co. built 12-inch heavy howitzers with 98-100 h.p. traction haulage equipment. They also built the tank, which had been invented in Grantham. In Gainsborough Marshall's produced naval gun mountings, shells and shell fuses in the Britannia Works and over 8,000 military vehicles from their Trent Works, as well as aircraft, tanks, boilers, chemical and engineering plant and five-ton traction engines. There were munitions works at Louth. Lincoln, Boston and other town gas works installed plants to produce toluol and benzol for high explosives because chemicals could no longer be imported from Germany. Dawson's Leather Works in Lincoln produced all kinds of leather goods including fittings for army vehicles and bayonet scabbards. T.G. Tickler Ltd of Grimsby made tins of jam for the troops.⁶ In addition, the Army had over a million horses needing hay and shoes and in order to become more self-sufficient British agriculture needed to increase output so Ruston's kept some of its standard lines such as steam tractors in production. The Government took over their entire output including 600,000 horseshoes and 28,000 wheels. Work was again available in engineering factories and Robey & Co decided in October to advertise in suitable papers for a specialist in the manufacture of steam wagons and other road traction engines. By 3 November 1914 they were advertising in Manchester and South of England papers for additional staff.

AMMUNITION SHORTAGE

The shortage of armaments evident in the early days of the war and spoken of by Colonel Fane became worse, due to the Government's reliance on market forces to supply the need and Kitchener's inadequate arrangements. In May 1915 this led to the formation of the Ministry of Munitions under David Lloyd George and

a doubling of output.⁷ Christopher Addison was appointed Parliamentary Secretary, in charge of supply. Addison was born on 19 June 1869, the youngest son of Robert Addison and Susan Fanthorpe, a farming family from Hogsthorpe, Lincolnshire. He established the Department making use of new methods known as War Socialism to carry out increased munitions production. Private enterprise was brought under control of the Government, which erected its own factories, and the welfare of munition workers, both men and women, was improved. His costing system by the end of the war had saved an estimated £440 million. Addison was sworn into the Privy Council in June 1916, and in July became Minister of Munitions.

The shell shortage meant munitions must be produced quickly and Lincoln was growing in importance as a munitions centre. On 23 June 1915 a Munitions Work Bureau was opened in Lincoln at the Old Free Library in Silver Street to attract men for work in the city foundries.⁸ During the first week 107 men volunteered, mostly skilled workers between the ages of 20 and 50. Statistics regarding unemployment were not kept at that period except for the monthly percentage of unemployed in the Trade Unions,⁹ so it was impossible to calculate what percentage this was of the number available, or even which firms or industries had formerly employed them.¹⁰ On 26 June heads of the Lincoln engineering firms met under the presidency of Colonel J.S. Ruston. They decided to invite workmen's representatives to a conference to consider how best to accelerate output. The Mayor reported that on 14 April an Inspector of the LGB had asked him to supply returns showing the numbers of Council employees who could be released for munitions work. Even the Highways Committee had to comply, due to the cost of material for highway maintenance.

The Government needed to find a way of breaking the deadlock on the Western Front and in July 1916 during the battle of the Somme, which was supposed to achieve a decisive forward movement, decided to use the tank. At first these machines promised more than they performed, partly because when they went into action in September 1916, it was about six months before they were ready. Only eighteen took part in the assault, the others being damaged or bogged down in the mud, but nevertheless it was reported as a British success.¹¹ Hornsby of Grantham and Foster's of Lincoln were both involved at different times in its early development and manufacture and demonstrated it at Aldershot to the War Office. Caterpillar tracks and the first oil traction engines were both designed in Lincolnshire. However, the War Office sold the project to Holt's in Alaska so only nine or ten tractors were then built. In 1914 when Brigadier Swinton was commanded to experiment with 'armoured landships', he purchased examples of Holt's caterpillar-tracked vehicles and William Tritton, Foster's Managing Director, borrowed from Grantham the original drawings of the Roberts chain-track system. Despite this pedigree, the first choice of a company to produce the landships was the Metropolitan Carriage, Wagon & Finance Co Ltd, of Saltley, Birmingham. This contract meant a reduction of other output and on 24 July 1915, Sir Eustace D'Eyncourt, of the Admiralty, notified Major General Sir Percy Girouard at Armament Building, Whitehall, 'I have now been able to get this work done with Foster's of Lincoln.'¹² Although the Birmingham company remained the main supplier of tanks¹³ Foster's were contracted to construct one or more Landships up to a total not exceeding twelve, and then the Admiralty handed over to the War Office for the Ministry of Munitions all new inventions for purely Army purposes, especially the Armoured Tractors.¹⁴ Three weeks later construction began of a prototype known originally as the Tritton after Sir William Tritton, and a modified version, the Little Willie. This was tested on the South Common, Lincoln, in October 1915 using the 105 h.p. Daimler engine and gear box. At the same time a larger machine was being planned and Big Willie was produced. It was issued to the Works as a Water Carrier for Mesopotamia and became known in the workshops, owing to the frequent modifications, as 'that Bloody Tank'. Hence its name.¹⁵ Lord Kitchener and Lloyd George attended secret demonstrations at Hatfield Park on 2 February. By 12 February an initial order for 100 Big Willies was placed; these were immediately renamed 'Mother'. Their purpose was supposed to be secret, but was soon widely known. Helen Fane wrote about the news of 'new armoured cars called tanks'¹⁶

In June 1917, the Lincoln Public Library displayed Tank photographs and Foster's presented a complete set from the official trials of the original Tank.¹⁷ This photo (Fig. 4.1) of one with Russian writing on the side being loaded onto a railway wagon implies that Foster's tanks were exported to Russia.¹⁸ As part of the deception over their purpose they were reputed to be exported in boxes labelled 'With Care to Petrograd'.¹⁹ The man standing near the wheels, watching, is J.A. Wheatcroft, Foster's secretary.



Lincs to the Past reference: MLL 13871

Fig. 4.1. William Foster and Co. Ltd, Lincoln; MLL13871. Tank for Mesopotamia.

<http://www.lincstothepast.com/searchResults.aspx?qsearch=1&keywords=MLL+13871&x=67&y=31>

CONTROLLED ESTABLISHMENTS.

By 23 June 1915, the Munitions Bill was virtually agreed between trade unions and the Ministry of Munitions, which then had power to declare any munition factory a controlled establishment. The Admiralty or Army Council could take over any factory in which arms, ammunition, or warlike equipment were manufactured. Further, any rules or shop customs which might limit output, including strikes, were suspended during the war but these legal powers were soon challenged. However, the Act provided guarantees protecting wages and conditions. War profits were limited to 20 per cent with allowances for machinery²⁰ but these were insufficiently supervised so there was evasion.²¹ From August, controlled factories were required to fly the Union Jack,²² not the wisest rule since this identified them to potential enemies.

The government took control of co-ordinating the supply of materials and the country was mapped into eleven areas. The Midlands area, which included Lincolnshire, had nine munitions committees including Grimsby and Lincoln. The Parliamentary Munitions Committee arranged meetings in different parts of the country, beginning at Grantham on 15 July 1915, to stress the vital necessity for an immediate increase in output.²³ From 12 July 1915 the principal Lincoln engineering firms, Clayton Shuttleworth, Ruston Proctor, and Robey & Co. became Controlled Establishments.²⁴ The Government also took more control of labour. Under DORA, a workman or woman had to obtain a discharge certificate before he/she could leave the employment. Such certificates could be and usually were refused if the worker was fully employed on munitions work. Leaving without one meant they could not obtain work with any other employer for six weeks. The system was open to much abuse by employers and was abolished on 15 October 1917 but was reinstated in July 1918.

MUNITIONS TRIBUNALS

Munitions tribunals were established to ensure the enforcement of rules regarding efficiency and deal with labour problems including bad time-keeping and other breaches of agreements. Compulsory arbitration dealt with disputes between employers and trade unions. Tribunals that covered Lincolnshire were divided between Nottingham, dealing with cases from Grantham, and Northampton, which dealt with Bourne and Stamford. Grantham requested local sittings of the Munitions Tribunal because travelling to Nottingham meant a day's work was lost, and the rail fare cost 6s, a day's pay for most.²⁵ In March 1917, Mr F. Lansdown of 334 High Street, Lincoln, one of twelve employers' representatives on the Lincoln Munitions Tribunal, resigned his position because he had been forced to close down his business because the military authorities had taken all his employees.

In January 1918, sixteen Lincolnshire employees' representatives became dissatisfied with the Tribunal chairman, Mr T.E. Maynard Page.²⁶ Mr Page was Ruston Proctor's solicitor and they considered this led to a lack of impartiality. Every Trade Society in the city, including the Society of Amalgamated Toolmakers and the Amalgamated Society of Engineers, wrote to the Ministry of Munitions demanding his withdrawal. They believed that no justice can be done while he remains in that position.^q The complaint was dismissed.

NATIONAL FACTORIES

The Ministry's second major step to increase munitions production was the establishment of specially built or adapted National Factories in which it was responsible for supplying the labour. By 29 July 1915, sixteen national factories were set up. John W. Jackson, Town Clerk of Grimsby, suggested that a National Shell factory be established there. New fish curing premises in Victoria Street, near Lock Hill, were rented from Sir Alec Black, and the building was taken over on 20 July 1915. Under the chairmanship of the Mayor, Councillor J.W. Eason, JP, a Board of Management was formed. Jackson became the Honorary Secretary, also Clerk to local Tribunals and the registration officer.

By 23 July the Munitions & Light Casting Company of Granville Street, Grimsby, was engaged on making Mill-type hand grenades under contract from the War Office. On 31 July it was decided that a light railway was to be constructed from Marshall, Knott & Barkers' Timber Yard, adjoining the National Shell Factory so that blanks could be forwarded to it. Work on shells commenced in November 1915 and the first consignment was dispatched on 10 February 1916 to be filled elsewhere as the National Factory did not fill shells. In mid-August the Factory asked for blinds to cover the ten windows facing the barracks to improve security. Each night the Voluntary Training Corps guarded the factory with a picket of 12 men. In June 1916, a member of the VTC invented an expanding shell for anti-air guns and put it before the Committee.²⁷

DILUTION - WOMEN

The male labour force, depleted by enlistment, was not big enough to fulfil all the demands made upon it so the authorities increasingly turned to women. Most who worked on munitions had been employed previously.²⁸ They usually heard about the jobs from friends. For some it was an opportunity to escape from the thralldom of domestic labour. Working conditions were hard. Factory Acts were suspended and long hours took their toll, especially for those who carried the double burden of employment and domestic work. Women's reasons for working were rarely patriotism but it was a means of morally supporting their men²⁹ although some husbands disapproved because it released men for the Army and thereby prolonged the war.³⁰ Unions were unhappy about the recruitment of women but the Treasury Agreement of 19 March 1915, with Arthur Henderson and Wm Mosses as union representatives, agreed the principle of 'dilution,' and allowed for skilled men to be compulsorily transferred.³¹ British women became an increasingly important percentage of the munitions labour force. They did work previously done by men but it was classified as 'unskilled' because they had not served an apprenticeship. On 8 April 1915, the Mayoress convened a meeting at the Newland Lecture Hall, Lincoln, attended by many Lincoln women. Miss Beardsley (Board of Trade, Women's Department) explained the object of the War Services Scheme for women and said that any female prepared to take up paid employment must register with the Labour Exchange. This would give a complete picture and census of all women available for any kind of employment, including industrial, agricultural and clerical. The Mayor, Councillor Ashley, thought that women were already employed on armaments.³²

The question of female labour was comprehensively discussed at a meeting of the Lincoln Trades and Labour Council. The men thought it was a menace to trade unionism and another avenue for exploitation arising from the war. It was anticipated that since women were paid less than men, this would result in a lowering of men's pay, or in loss of work for men. Nevertheless, they did not want a woman to be paid the same as a man unless she performed equal work, which by definition they made it impossible for her to do.³³ Equal pay undermined the idea of male superiority, ignoring the fact that many women were 'breadwinners'. Women's so-called 'high wages' should always be considered relative to men's even higher pay; equal pay was never granted as has been suggested.³⁴ Women were usually paid on time rates and although it kept pace with inflation was less than men's pay for the same work.³⁵ Mrs Fane recorded in her journal that 'Wounded men could not get jobs because of cheap woman labour.'³⁶ However, women's organizations such as the National Union of Women Workers, which was active in Lincolnshire,³⁷ were worried about women in controlled establishments being paid at sweated rates.

There were industrial disputes in some areas and delaying tactics despite the Treasury Agreement. In November 1915 employers, including those in Grimsby, were required to furnish detailed information about their labour force and to take immediate steps to replace skilled men by less skilled labour.³⁸ When workers were needed in the Grimsby Factory in May 1916, it was suggested that men should be brought into the town. Jackson thought the Board would be reluctant to agree. Personally, he wanted the Factory to benefit the town

and therefore to see whether women could be employed. At one time there were 616 employees, of whom 480 were women. Helen Fane noted many women working on her visit to a Grimsby munitions factory later that year.³⁹ Women attached to the factory went down to the docks where they sorted empty ammunition cases that had come over from France. (Fig. 4.2). This job did not exist before the war and could therefore safely be categorized as unskilled.



Fig. 4.2. G 727:940:3, 5808. Disc 13. Old Ammunition factory in Victoria Street. Grimsby.
 Photograph reproduced courtesy of North East Lincolnshire Council Library Service

In October 1916, Mrs Ward of St Leonards-on-Sea asked for her two daughters to undertake work at the factory. They expressed willingness to make the necessary arrangements but warned that the work would have to be on machines and the girls should be prepared to work in their own overalls for the first week or two.⁴⁰ Nationality of workers remained key. On 11 September 1918 the Chief Constable was asked to make enquiries about Annetta Florence England, 16 Albion Street, and Annie Lavinia Roberts, 15 Columbia Road. Both were engaged at the factory, but it was alleged that their parents were German.⁴¹

In 1916, Ruston's workforce included 600 women.⁴² They were soon employed not only on light tasks like stitching the fabric of aircraft, but on turning shells and forging ingots and then wore boiler suits and caps instead of their long skirts and aprons. They were shown how to operate their machines but not trained. Most said it took them three weeks to learn the job.⁴³ Munitions work was often dirty and recognised as dangerous. One woman's boy-friend tried to persuade her to marry him before Ruston kills you. Another worked on a turret lathe. She had vivid memories of casting; only finishing because of ill health and went to Skegness for a few weeks to recuperate and then on to another Munitions factory.⁴⁴ Ruston had so many women employees in September 1917 they arranged for the tenancy of Lady Scarborough's home at Skegness for those who were ordered to take a rest from the strain, and we are glad to say that this benefit is being taken advantage of.⁴⁵ Those interviewed by Ann Yeates-Langley were very bright women who valued their experiences of being able to work outside the home greatly and had very mixed feelings when the war was over.⁴⁶ They did not mention the excesses of male hostility suffered by women elsewhere.⁴⁷

Although nationally women made up one-third of the munitions labour force in 1918⁴⁸ there were unacceptable delays in arbitration, men's cases always being heard more promptly.⁴⁹ By the end of 1915, women's organizations were pressuring the government to appoint Welfare Supervisors in national and controlled factories where women and girls were employed. The Government established a Health of Muniton Workers Committee in September 1915, Women's Employment Committee in August 1916 and a War Cabinet

Committee on Women in Industry in 1918 to deal with conditions. At Grimsby, the Welfare Supervisor for female labourers was a local lady, Mrs Cogswell, appointed on 29 June, 1916 at £2 0s 0d per week.⁵⁰

Bishop Hicks was concerned about the 'moral & social welfare of boys and girls whom the Ministry of Munitions has herded by thousands in huts away from their homes, untended & uncared for - save in body.⁵¹ Despite the Bishop's opinion, welfare was not considered. Hours were long; munitions plants were open for twenty-four hours a day. Especially in the early days, breaks were limited and no food provided. Then the Government sent one of the men down and said we must have a tea break, so a nice new place was built and they got a break. This was a significant step in governmental welfare provision. They started at 6.00 a.m. and left at 7.00 or 7.20 p.m. 'Long hours. The nights were the worst. In Clayton & Shuttleworth, one woman working on Sopwith Camels described how a trolley carrying tea and bread and dripping was brought round at about 11 o'clock. It was too expensive for her to buy. During 1918 Ruston's established canteen facilities for 7,600 workers.

Pay varied according to the type of work done and the company that employed workers but was by no means fixed at one rate for the duration. A rise for women might lead to a rise for the men. The Workers Union, which was founded on 1 May 1898 by the Syndicalist Tom Mann who also founded the ASE, was primarily concerned with textiles (uniforms) and engineering (munitions).⁵² It is thought that there were approximately 5,000 members in Lincolnshire. Application was made to the Ministry of Munitions for an increase of wages for women workers at the Gainsborough National Filling Factory. The factory rate for female labour was 8d per hour but the Union demanded 11d. They added that respectable lodgings in the locality cost one guinea (£1 1s 0d) a week. The Ministry Wages Section could not sanction higher rates, but suggested the Union could take the matter up with the Ministry of Labour to go to arbitration.⁵³

Dilution was also applied to refugees, a considerable number of whom, men and women, were employed in war work, chiefly in the manufacture of uniforms and military equipment, and to a lesser degree in munition factories.⁵⁴ The Government began to ask Refugee Relief Committees whether there were possible munition workers among their guests⁵⁵ and Mr Bornemann, Ruston's Managing Director who was of Dutch extraction, was probably responsible for the numbers of Belgian refugees brought up from London to work in Lincoln.⁵⁶ He gave them a splendid gift in the shape of a Belgian workmen's club. The Circle des Ouvriers Belges, which opened on 6 February 1915, was based at Arcadia Gate, High Bridge, Lincoln. It opened in the evenings and Belgian and English newspapers were available for the men to read. Belgians also worked in Grimsby munitions and in the steel works in Scunthorpe.⁵⁷ From 3 August 1915 Belgian women were drawn upon to work in munitions factories but the records that survive give only very limited information about their work in Lincolnshire. One Belgian lady in Ruston's offices married Mr Claud Rhodes, a Lincolnshire man. The Government was originally suspicious of Belgians, despite the fact they were the nation's guests, and was afraid they would turn out to be *saboteurs* or spies. However, eventually the Government decided it was safe to allow the refugees to take up munition work, and in June 1915, a Government Commission requested a list of possible munition workers among the refugees but by December Hull had not received any offer of employment in munitions. Nevertheless, in order to compile such lists, enumerators were needed and women were asked to undertake the task. For example, on 23 June 1916 the Clerk to Grimsby Council, wrote to Mrs Ward, the Secretary of Cleethorpes Women's Emergency Corps, at Corby House, Mill Road. He explained that Ladies were required to find out what women and girls there were in the District who would be willing to come forward and take the place of men who were being called up. The Chairman of the Council thought the work could best be done by the Women's Emergency Corps.⁵⁸ Many refugees then moved to areas where there were munitions factories. Henry Van Meulder, age 33, had been a wood carver, and although he had found work as a French Polisher, nevertheless left Grimsby in March 1916 to go to the Munitions Works at Leicester. This was undoubtedly because he could earn better money and it was a way of bringing the war to an end and helping to free his nation.

On 16 August 1915 Mr Charles Paquet of the Belgian Official Committee for Great Britain and Mr W. A. Colegate of the Board of Trade visited twenty munitions factories where Belgians were employed. These included Clayton & Shuttleworth and Ruston, Proctor. They asked whether Belgians were producing their fullest possible output, and whether there were any restrictions put on their production. At Ruston's, Mr Bornemann said there were thirty-two Belgians in the Ironworks, nine in the woodworks, seven in the Boilerworks and nine in Aeroplane works. Some could earn as much as £7 a week on piece rates. He said they were good workers and by their industry set an example to the English workmen. This view was echoed at Clayton's.

Munition workers' pay affected the wages of other types of workers. Following construction of the Gainsborough NFF a Factory Police Force was set up. The 'slightly generous' wage rate, based on a 56-hour week with one day's leave in ten, was agreed with the Managing Director of the Factory and seemed justified, bearing in mind the necessity of walking five miles a day to and from the factory. They had a weekly annual

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holiday, plus full wages for sickness of up to two months. However, in 1918 comparison was made with workmen's wages. This showed that wages earned by the highest unskilled worker were higher than a Police Sergeant's pay. In 1918 it was proposed to raise the Police pay as follows:

Rank	Now	Proposed
Constable		
On entering	£2.10.0	£2.17.6
After 3 months	£2.12.6	£3.0.0
Acting Sergeant		
On entering	£2.14.0	£3.2.0
After 3 months	£2.16.0	£3.4.0
Sergeant in Charge		
On entering	£2.17.6	£3.6.0
After 3 months	£3.0.0	£3.8.6

Table 4.1: Police Pay, Gainsborough, 1918⁵⁹
Source: National Archive. LAB 2/251/LR17279/1918

Under this proposal a Constable could never earn as much as an unskilled worker, but an Acting Sergeant's pay would exceed it after three months. In September 1918, following a police strike in the Metropolitan area, a new country-wide scheme of pay was agreed with the Home Office and local police authorities.

ACCOMMODATION

Many workers lived at a distance from the factory and some had to lodge with relatives. From Bracebridge they caught a tram up to the Midland Railway Station and got off in Hykeham.⁶⁰ On nights, this was difficult. The number of workers coming into the city resulted in serious overcrowding and shortage of accommodation made getting workers tricky. In July 1917, Addison became Minister of Reconstruction, and began drawing up plans for post-war Britain with social reforms⁶¹ including plans for housing in Lincoln. In October 1917, the Department of Scientific and Industrial Research established a Committee to direct research into the use of new materials and methods of construction in some large housing schemes. Raymond Unwin, Chair of the Belgian Town Planning Committee, was Chair of this Sub-Committee and the Department asked Seebohm Rowntree, well known for his investigations into poverty at York, to be a member. On 23 October 1917 G.R. Sharpley of Ruston Proctor, wrote to Rowntree that:

A great deal has happened in Lincoln since I saw you last and things are now almost at fever heat. The Sugar Control Census has revealed very bad over-crowding; cases of from 14 to 19 people in a 3 bed-roomed house. In addition from 2,500 to 3,000 more workpeople are expected within the next few months to be employed in the city in connection with large new factories which are just being started.

Rowntree replied: ± imagine something will need doing in connection with the housing conditions in Lincoln immediately. We are only concerned with the post-war problem. He suggested that Sharpley contact the Housing Department of the Ministry of Munitions which by February 1918 had erected specimen houses with special reference to the convenience of the housewife.⁶²

On 9 February 1918, Ruston's advertised in the *Lincoln Leader and County Advertiser* for 'Lodgings with or without Board' and guaranteed all payments. The YWCA also provided accommodation and as the war was drawing to a close, on 21 September 1918, the Bishop opened a new YWCA hostel for 'Munitioner girls' in Castle Square.⁶³

NAVAL WORK

In 1916 Lincolnshire factories began producing parts for Admiralty airships. Ruston engines drove 127 British submarines and they made 30,000 submarine mines. Hundreds of drifters and minesweepers were fitted with Admiralty and Scotch type boilers.⁶⁴ To protect British ships against German mines they also produced 2,000 paravanes, a new invention developed by Commander C.D. Burney, RN, that cut the mine's wire rope so that it came to the surface to be destroyed by rifle fire.⁶⁵ Ruston's policy on this was that there should be no restrictive practices regarding technical secrets, and they allowed representatives of other firms to know about its construction. Stamford's factories, Hornsby's of Grantham, Clark's Crank & Forge Co. Ltd of Lincoln all produced a wide range of materiel for the Admiralty who sometimes provided the necessary funds for a factory to be extended.⁶⁶

Mr Rose at the Immingham Labour Exchange, helped by a local Committee under Mr C.F. Carter, found men and women to do war work at Lincolnshire's Naval Base and Admiralty Oil Depot. On 3 October, 1914, Mrs Fane went with her husband and Harry for a long drive in the car to see the docks at Immingham. A man of

war and several torpedo boat destroyers were in dock and she referred to the use of turpentine shells by the Allies.⁶⁷ On 30 June 1915 the Bishop was driven by a colleague to see the Docks where he had lunch and then went to see a Submarine, inside & out. a very curious sight: but the periscope the most wonderful. The Bishop visited Immingham and Killingholme several times, preaching to the soldiers guarding the oil tanks. In July 1915 he met Mr Thomas, the 'representative of L.P. Knott, son-in-law of Walker, who contracted for the buildings, excavations and mounds connected with the Admiralty oil tanks'.⁶⁸ By the end of the war over 130,000 tons of mines were stored and distributed from Immingham.⁶⁹

Repairs to HM Vessels were contracted to the Humber Graving Dock & Engineering Company at Immingham, which was also entrusted with the maintenance of the Patrol of that 'most important section of coast'. Their headed notepaper depicted the dock and trawlers under repair. However, their actions raise questions about corruption and exploitation. Some time in 1915 the Company and members of various Unions, including the Amalgamated Society of Engineers, agreed that a proportion of the employees would work a 24-hours' shift. This was unsuccessful, partly due to air raids and partly because men fell asleep. In April 1916, the Commander Superintendent decided to abandon it but the Engineers Union, concerned at the prospect of losing overtime pay, did not agree despite the fact that its members were the worst offenders. A new set of Rules was drawn up, one of which was that in cases of great emergency, workmen may be required to work a 36-hours shift, but time would be allowed to go to Grimsby between the hours of 5.00 p.m. and 8.00 p.m. to get food. The issue went to arbitration and the new rules, which included further changes to the times allowed for meals on the 24-hour shift, came into effect on 14 August 1916.⁷⁰ From the viewpoint of the twenty-first century, these agreements are highly questionable, but there may be explanatory factors which are not evident from the limited information available.

Then a year later Eric Brotherton of Barton-on-Humber, manager of the Humber Graving Dock Company, with several other Company employees, was charged with conspiring to cheat and defraud his Majesty of large sums of money falsely pretended to be due to the Company for work and labour in repairing his Majesty's ships. Also charged was George William Smith, timber merchant of Healing. Mr Barrington Ward defended Brotherton on behalf of the directors of the company despite the fact that he was said to be head of the conspiracy, which had spread throughout the entire company. It was revealed that time supposedly spent on repairing Navy ships was instead spent on repairing private boats, the company's offices and other non-Governmental tasks. Nevertheless, gradually most of the defendants were discharged and when the case finally ended on 10 June 1918, one was found Not Guilty. Smith was found guilty of fraud and Brotherton was sentenced to 20 months imprisonment. The Government had been defrauded of £25,000.⁷¹ In the light of this, the directors' defence of Brotherton raises unanswerable questions about the company's guilt.

DISPUTES

The Government, in its role as arbitrator did not automatically take the employers' side in industrial disputes which usually centred around conditions of work and rates of pay with dilution and food prices causes of discontent. Strikes occurred again in 1916, very often the underlying cause being an absolute manpower shortage of skilled and unskilled workers caused by military recruitment and conscription. It was bad when a powerful ministry with a strong leader refused to co-ordinate its actions with another. The Ministry of Munitions poached labour from the Admiralty's shipyards; the War Office enlisted Ministry of Munitions' skilled fitters.⁷²

Late that year, there was a dispute between the Ironfounders' Society, Manchester, and Foster's, Lincoln, concerning castings made for subcontractors, who returned the finished machines to Foster's as tank parts. The grievance was about a reported change in working practice over faulty mouldings produced by the workers who were then not paid. The differences could not be resolved and the Society gave 21 days notice to cease work. Clayton & Robey's both informed Foster's that they operated similar systems of deductions for faulty moulds, but the cost was split between the company and the worker. The arbiter, Harry Courthope-Munroe, found that the true issue was whether the castings proved faulty owing to bad work or the quality of the materials used. The award, dated 8 January 1917, was that the loss of £7 13s 6d in respect of the faulty castings be borne equally.

The Ministry's attempts to save money provoked many small strikes, usually settled by small wage increases. In 1916, when even munition workers' wages were rising more slowly than the cost of living, a claim was made by the Newark Joint Board of the Engineering Allied Trades societies including A. Ransome & Co., based largely on the fact that Lincoln employers in November conceded an advance of 2s per week, making a total war advance of 6s per week. It was claimed that Newark always followed Lincoln. The Ministry of Munitions decided to agree largely because it was an advance to time workers only.⁷³

Skilled men on time rates sometimes earned less than dilutees and semi-skilled men on piece-work. This became a national cause of grievance, especially after August 1917 when the Amendment Act allowed the

Minister of Munitions to set wage rates. In January 1918, there were many strikes and the government had to announce an increase to piece-workers.⁷⁴ This differential may have been the root of a dispute which was registered on 8 April 1918. Workers had transferred from No. 9 Filling Factory (Banbury) to No. 22 at Thonock, Gainsborough. The difference in pay between the two factories was as follows:

Job	Banbury	Gainsborough	
Overlookers	10 ³ / ₄ d per hour plus 12 ¹ / ₂ % plus 3s	11 ¹ / ₂ d inclusive	Net loss of approx. 1 ¹ / ₄ d per hour
Lifters	10 ³ / ₄ d per hour plus 12 ¹ / ₂ %, plus 3s	11d inclusive	Net loss of approx 1 ¹ / ₄ d per hour.
Ordinary Filling	9 ³ / ₄ d per hour plus 12 ¹ / ₂ %, plus 3s	11d inclusive	Net loss of approx. ³ / ₄ d per hour
Ordinary Outside	9 ³ / ₄ d per hour plus 12 ¹ / ₂ %, plus 3s	10 ¹ / ₂ d inclusive	Net loss of approx. ³ / ₄ d per hour

Table 4.2 Differences in pay between Banbury and Gainsborough⁷⁵

It was thought that the pay at Gainsborough should have been higher than Banbury as the men were dealing with TNT and although they were National Service Volunteers they should not be receiving less. It was agreed to change the time-keeping bonus to bring the wages level and back-date it for the Gainsborough workers.

Strikes were usually 'unofficial' and led by shop stewards who resented the way in which national leaders who had made the 'no strike' agreement collaborated with the government.⁷⁶ A claim for an increase of 4d per hour, to date from 3 May 1918, was made by the Shop Steward, Mr F. Andrew, on behalf of workmen employed at NFF Gainsborough to Messrs Fred Pitcher Ltd. The matter was referred to the Committee on Production for settlement and a meeting held on 5 June 1918. The Committee decided that the claim had not been established.⁷⁷ Consequently, on 8 July the electricians and mates at the Gainsborough NFF, went on strike. According to the Report, the work force had ~~taken~~ a strong dislike to the last set of men sent from London and the electricians demanded that they be paid the London rate of 1s 6d per hour. The ~~dislike~~ was therefore because the London men were more highly paid. On 9 July the Union received a telegram stating the demands had been met but when the workers turned up to start work at 2.00 p.m. they were refused entry at 1s 6d, as the factory had not been notified of any agreement. The men were told they could work at the rate of 1s 5d. The Union leader then discovered that the improved pay deal had not been agreed and that it would be going to arbitration. The men refused to resume work until after a meeting with representatives from the Office of Works and the Ministry of Munitions. A telegram was sent from Gainsborough on 19 July stating that eleven electricians had gone on strike, including five War Munitions Volunteers.⁷⁸ The situation became tense. On 22 July 1918 it was reported that workers were being intimidated by the electricians who said the factory could explode at anytime, due to conditions when they had left work. This was linked to the explosion at another NFF in the Midlands on 1 July when 134 people were killed. The whole workplace was inspected at 3.00 p.m. by an official not employed on the site, in the presence of Mr Andrews and others. They decided the factory was safe but when the electricians were asked who had said the factory was unsafe because they would be reported and arrested under DORA, they all kept quiet. All work on both construction and production in Gainsborough stopped on 24 July due to the electricians' strike. It is not recorded how this dispute ended.

In July, despite being affected by the influenza epidemic, the Germans renewed their assault on the Western Front. The allies counter-attacked with gas one of the major weapons. At Coventry workers now threatened to strike because the skilled hands were not allowed to choose the particular firm where they wanted to work; discharge certificates having been reinstated, workers' choice of employment, however justified, was still not being allowed by the Department of National Service which was allocating civilian labour.⁷⁹ Mrs Fane called the workers 'extremists and malcontents.' She wrote: 'The strikes threaten to spread to many other munition centres and so paralyse the production for our fighting men! Could anything be more preposterous!⁸⁰' On 24 July she recorded ~~Yesterday~~ morning the young men of Coventry ~~o~~ came out on strike. ~~o~~ Lincoln men threaten to cease work at noon today unless the embargo is withdrawn.~~q~~

To break the strike the Government declared that ~~all~~ men wilfully absent from their work on or after Monday, 29 July, will be deemed to have voluntarily placed themselves outside the area of munitions industries. Their

protection certificates will cease to have effect from that date, and they will become liable to the provisions of the Military Service Acts.' In other words, they would be conscripted into the armed forces. However, the 1918 Register of men aged over 16 employed on protected work for the Army, Admiralty and munitions at Wm Foster's shows that many of their young male employees between the ages of 16 to 24 were discharged from the army for ill health. Between August and October 132 men were taken on and the Army was named as the predominant previous employer. The men came from all over the country, London, Leeds, Nottingham, and one registered as formerly being in Russia. Some had come from other Lincoln engineering works and one from the Austin Motor Co., Birmingham. One 15 year old was employed straight from school. It is impossible not to wonder on how many of such men could this threat be carried out?

DURING THE ARMISTICE

The cessation of hostilities meant the most complete change for national factories producing fuses, shells, and ammunition. These were created specifically for the war and hence closed first. On 30 November 1918 it was announced that the Grimsby National Shell Factory was closing and work stopped at 6.00 p.m. Instead of the one shift, women would work from 7.00 a.m. to 12 noon, and others from 1.30 p.m to 6 p.m. They would be entitled to minimum payment fixed by the Ministry of Munitions, provided they worked these hours. Work ceased in December, by which time the output of 6-inch high-explosive shells had reached a total of 309,074 and 15,785 of 4.5-inch, a total of 324,859 shells. Although it is claimed that munitions business strained local economies, this seems not to be the case in Grimsby.⁸¹ It is therefore probable that Boston suffered even more than Grimsby because it did not have a munitions factory.

The total value of the Grimsby output was £1,091,757; the total cost £887,267, which meant that the country had been saved over £200,000, the factory being one of the most efficient in the kingdom. It is said that 'munitions business strained local economies'⁸² but Grimsby's local economy benefited as a result of this work. £203,810 was spent in the town in wages and bonus, £18,797 in material and work executed locally, £10,573 in electricity, £2,219 on gas, and £2,603 on rent, rates and water, making a total of something like £250,000 spent locally. In December disposal of plant and machinery began to be organized and it was enquired whether Sir Alec Black would want it for peacetime production. By 4 March 1919 the factory was closed and machinery and plant sold by auction. Premises at Victoria Street were given up by the Government on 12 April, 1919. An auction was held on 23 September 1919. Plant, machinery, and timber raised £10,835.5.4. That was the end of Grimsby's Munition Factory.⁸³

On 21 September 1918 news of Ruston's amalgamation with Hornsby appeared in *The Times*. Hornsby, whose works at Grantham and Stockport were extensive, well equipped, with modern plant and machinery, had over 3,000 employees; Ruston's had 7,600 workers. This merger was in anticipation of future difficulties, a wise move in view of the devastation the war had caused in Europe which the terms of the Peace would not moderate. The firm would now be named Ruston & Hornsby Ltd. After the merger, there was a gradual diminishing in the size of the works. Some forty years later came the disposal and eventual closure of the entire premises.⁸⁴

Figures from Ruston's Annual General Meetings, despite being incomplete, show the significance of the year 1917. Trade had increased year on year with the outlay on plant and machinery being at its peak in 1915. Reserves and profit, which was restricted by law, are missing for the years 1917 and 1918. The enforced subscription of as much as £55,000 to War Loans in one year meant that these funds were not available for research and development, or production. Overall, these figures show the dependence of the firm on Government contracts and the decline of this business in 1918.

	1912	1915	1916	1917	1918
Outlay on land and Buildings	£14041	£8835	£2911	£11736	£5168
Outlay on Plant and Machinery	£8434	£21200	£14949	£201	£3164
Total	£22475	£30035	£16860	£11937	£8332
Depreciation and write off Buildings			£4126	£3942	
Depreciation and write off Plant and Machinery			£16870	£16167	
Total Depreciation and write off	£17797	£17322	£20996	£20106	
Trade during the Year	£511298	£660249	£664942	£93992	£1054462
Increase over the previous year	£34711	£48375	£4693	£27498	£114534

Profit	£25000	£25000	£2500		
Reserves	£126679	£151679	£176679		
Outstanding Acc.		£396658			£481883
Increase over the Previous year		£140894			

Table 4.3. Ruston Proctor. Figures from 1912-1919⁸⁵

In February Ruston, Hornsby & Co. Ltd published their list of products for the War on Land, Sea and in the Air. Clayton & Shuttleworth also published a similar list of their War Time Production. Both show agricultural equipment. Clayton's sold patent rights to Marshall⁸⁶ so they could produce thrashing machines with the Clayton name. Wm Foster⁸⁷ survived by acquiring Gwynnes Pumps Ltd of Hammersmith in 1927. They continued to make thrashing sets and traction engines at the Wellington Works and other products at both Lincoln and Hammersmith. Although Lincolnshire made an important contribution to the 5,253,538 tons of munitions sent to France and Flanders between 1914 and 1918⁸⁷ the war hit Lincolnshire's engineering firms extremely hard and they never recovered.

¹ *Lincolnshire Chronicle*. 8.8.1914

² LA. CCF 1/1 Clarks Crank & Forge June 1909 6 January 1930. 101. Neil Wright. 'The Varied Fortunes of Heavy and Manufacturing Industry, 1914-1987' in Dennis Mills, *Twentieth Century Lincolnshire*. History of Lincolnshire Committee. 1989. p. 75

³ *Times*. 14.8.1915

⁴ <http://www.rutlandrailwaymuseum.org.uk/index.php?p=History%20of%20Iron%20Ore%20Extraction> Accessed 7.11.2010

⁵ *The Diaries of Edward Lee Hicks, Bishop of Lincoln, 1910 - 1919*. Selected and edited by Graham Neville. The Lincoln Record Society, 1993

⁶ Wright. 'Varied Fortunes'. pp. 80, 78

⁷ J.M. Winter. *The Experience of World War I*. Macmillan. 1988. p.54

⁸ *Lincolnshire Chronicle*, 3.7.1915, 8.5.1915,

⁹ TNA. CAB 24/112

¹⁰ *Lincolnshire Chronicle*, 17.7.1915

¹¹ Trudi Tate. *Modernism, History and the First World War*. Manchester University Press. 1998. p.122

¹² TNA. MUN 7/224.

¹³ John Turner. *British Politics and the Great War*. Yale. 1992. p.378

¹⁴ TNA. MUN 7.224. 17 July 1915, S.0865/15/3492

¹⁵ W. Rigby, 'The Man who made Tanks.' *Lincolnshire Life* vol. 8 no. 1 Mar 1968 pp.42-43.

¹⁶ LA. 9-FANE/1/1/4/15. 21.9.1916.

¹⁷ Lincoln Library Annual Reports.

¹⁸ The list of armaments supplied to the Allies given by Martin Gilbert, does not include tanks to Russia. *First World War Atlas*. Wiedenfeld & Nicholson. 1970. p.140.

¹⁹ Tate. *Modernism*. p.134

²⁰ *Times*, 18.6.1915

²¹ Turner. *British Politics*. p.106

²² Grimsby Library. G.727:940:3

²³ *Times*, 15.7.1915

²⁴ *Lincolnshire Chronicle*, 10.7.1915

²⁵ TNA. MT 138/1, MT 141/1

²⁶ TNA. LAB 2/52/MT137/1/1918. This folder is now missing from the archive.

²⁷ Grimsby Reference Library. Sheet 3.

²⁸ Ann Yeates-Langley. 'Women Munition workers in Lincoln during the First World War.' *East Midland Historian*, Vol 7, 1997, 29-35.

²⁹ Deborah Thom: 'Tommy's Sister: Women at Woolwich in World War 1' in *Patriotism: the Making and Unmaking of British National Identity. Vol. 2, Minorities and Outsiders*. Raphael Samuel (Ed.) pp.144

³⁰ John Terraine. *Impacts of War*. Hutchinson. 1970. p.173

³¹ J. M. Bourne. *Britain and the Great War, 1914 - 1918*. Edward Arnold. 1989. pp. 185, 189

³² *Lincoln Leader and County Advertiser*. 10.4.1915

³³ *Lincolnshire Chronicle*. 24.4.1915

³⁴ Bourne. *Britain and the Great War*. p.198.

³⁵ Ian Beckett. *Home Front, 1914-1918*. National Archives. 2006. p.89

- ³⁶ LA. 9-FANE 1/1/4/20.
- ³⁷ Neville, Graham (ed) *Diaries of Edward Lee Hicks*, Bishop of Lincoln, 1910 - 1919. The Lincoln Record Society, 1993. 727, 1.7.1915
- ³⁸ W.H. Jackson. *Grimsby's War Work : an account of the Borough's effort during the Great War, 1914-1919, together with the Roll of Honour*. 1919.
- ³⁹ LA. 9-FANE/1/1/4/15.
- ⁴⁰ North East Lincolnshire Archives. Volume One, Shell Factory's letter book ref 1/460. Grimsby Shell Factory. 12.05.1916. 1.10.1916
- ⁴¹ Grimsby Reference Library. G 727:940: 3.
- ⁴² MERL, Reading. TR 3/MAR
- ⁴³ Bernard Newman. *One hundred years of good company*. Ruston & Hornsby. Lincoln. 1957. p.60.
- ⁴⁴ Yeates-Langley. 'Women Munition workers'. pp.29-35.
- ⁴⁵ *Lincoln Leader and County Advertiser*. 29.6.1918
- ⁴⁶ Ann Yeates-Langley to the author. 15.02.2012
- ⁴⁷ Ian Beckett. *Home Front, 1914-1918*. National Archives. 2006. p.86
- ⁴⁸ John Walls & Charles Parker. *Aircraft made in Lincoln*. SLHA. 2000. p.15
- ⁴⁹ *Times*. 20.12.16
- ⁵⁰ Grimsby Library, G 727:940:3
- ⁵¹ *Hicks Diaries*. 946, 25.07.1916. 1057, 892 1.04.1916
- ⁵² www.grahamstevenson.me.uk/index.php?option=com_content&view=article&id=708&Itemid=70. Accessed 24.09.2012
- ⁵³ TNA. LAB 2/251/LR17279/1918
- ⁵⁴ *Times*. 10.1.1917
- ⁵⁵ K. Storr. *Belgian Refugees in Lincolnshire & Hull. 1914 - 1919*. www.yourpod.co.uk. 2011. p.206.
- ⁵⁶ IWM. BEL 6.143/1-3 LINCOLN. 14/2 Printed report. October 1914 to May 1916.
- ⁵⁷ Lincoln Library. Clapham files: L909.
- ⁵⁸ Grimsby Archive, 51/111/94/12, Women's Emergency Corps.
- ⁵⁹ National Archive. LAB 2/251/LR17279/1918
- ⁶⁰ Yeates-Langley. 'Women Munition Workers'. p.32
- ⁶¹ www.bodley.ox.ac.uk/dept/scwmss/wmss/online/modern/addison/addison000.html Accessed 08/11/2010
- ⁶² TNA. RECO 1/575. CAB 24/44. Ministry of Reconstruction Report for week commencing 28.02.1918. C. Addison, 06.03.1918.
- ⁶³ *Hicks Diaries*. 1310, 21.09.1918
- ⁶⁴ Newman. *One hundred years*. pp.54-57.
- ⁶⁵ Wright. 'Varied Fortunes' p.80
- ⁶⁶ LA. CCF 1/1 Clarks Crank & Forge June 1909 ó January 1930. pp. 144, 147
- ⁶⁷ LA. 9-FANE 1/1/4/6. 3-5.10.1914
- ⁶⁸ *Hicks Diaries*. 726, 30.06.1915. 756, 29.07.1915
- ⁶⁹ Martin Gilbert. *First World War Atlas*. Weidenfeld & Nicolson. 1970. p.148
- ⁷⁰ TNA. LAB/39/IC3251/2/1918
- ⁷¹ *Times*. 29.09.1917, 10.06.1918.
- ⁷² Turner. *British Politics*. PP.110-111
- ⁷³ TNA. LAB.104.40. Turner. *British Politics*. p.128
- ⁷⁴ Turner. *British Politics*. p. 377
- ⁷⁵ TNA. LAB 2/251/LR17279/1918
- ⁷⁶ Bourne. *Britain and the Great War*. p.209
- ⁷⁷ TNA. LAB 2/251/LR17279/1918
- ⁷⁸ Turner, *British Politics*. p.371 The War Munitions Volunteer Scheme was an attempt to increase the mobility of skilled labour by enrolling volunteers who would get union rates and conditions and a subsistence allowance if they worked away from home; it had not worked because there was an absolute shortage of labour, but nonetheless there are several occasions when we find such men working in Lincolnshire.
- ⁷⁹ Turner. *British Politics*. p.166
- ⁸⁰ LA. 9-FANE 1/1/4/20.
- ⁸¹ John Turner. *British Politics and the Great War. Coalition and Conflict 1915 - 1918*. Yale. 1992. p.30
- ⁸² Turner. *British Politics*. p.30
- ⁸³ Grimsby Library. G 727:940:3
- ⁸⁴ Michael Pointer. *Hornsby's of Grantham, 1815 - 1918*. Bygone Grantham, 1976 p.38
- ⁸⁵ MERL, Reading. Ruston Proctor. TR RPD/AD/AD2/IX 1907-18
- ⁸⁶ Wright. 'Varied Fortunes' p.80
- ⁸⁷ J. M. Winter. *The Experience of World War I*. Macmillan. 1988. p.95