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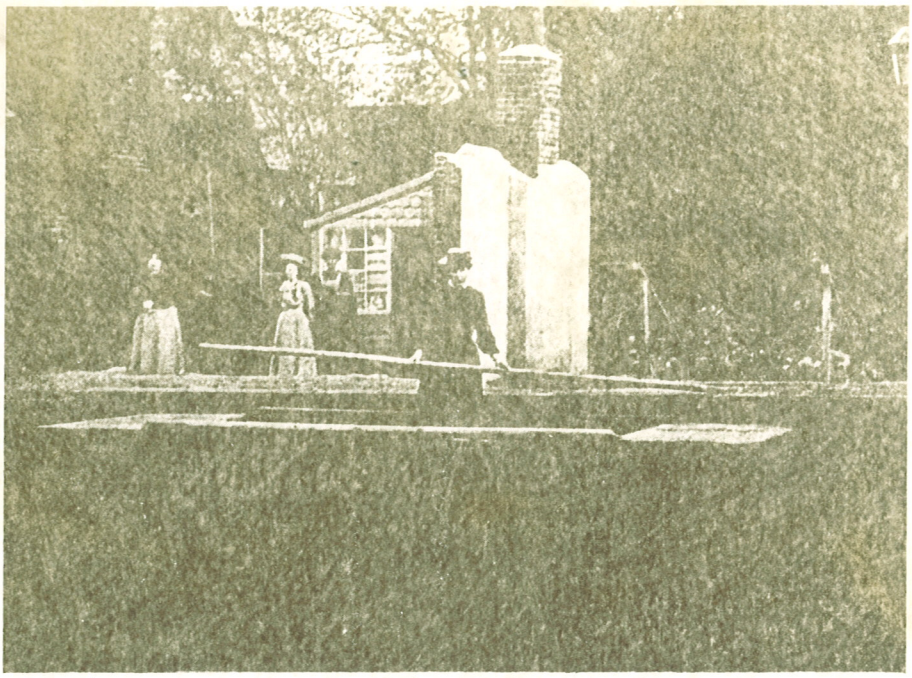

The old ferry used by "Lockies" to gain access to the factory. It was replaced by a bridge during World War I.

THE STORY OF THE
Royal Small Arms Factory

by W. G. Hale

DESPITE the considerable activities of Essex men in the service of king and country in wars of the last 100 years it is doubtful if they were aware that the majority of the small arms which they and all units of the British Army and Navy used were manufactured on the western boundary of their county.

The Royal Small Arms Factory, justly famous, is located at Enfield Lock, Middlesex, but the Middlesex/Essex boundary threads its irregular way through the factory and as a consequence by far the greater area falls within the parish boundary of Waltham Abbey in Essex.

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What considerations led to the decision to build a government factory there? We know that the arsenal was located at Woolwich because of the existence there of unlimited quantities of excellent sand for casting purposes.

The powder mills at Waltham Abbey were almost certainly built there because of the availability of water power to operate the mills, the goodly supply of willow for processing into charcoal, and river transport giving direct access to the naval dockyard on the Thames.

At this time one can only hazard a guess that the Royal Small Arms Factory was built adjacent to an existing government factory for ease of administration; in fact colonels of artillery were in charge of the two factories for many years.

It was within easy travelling distance of the huge labour market of London, but the prime reason is considered to be the River Lea and its access to the Thames and the canal system of the country. The only reliable means of transporting the completed products to ordnance depots was by water, and monkey boats designed to negotiate the small locks of canals shuttled backwards and forwards between the factory and ordnance depots as far afield as Weedon in Northamptonshire.

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Some building was begun early in the nineteenth century, but it was not until 1840 that manufacture got under way. Prior to that date small-arms manufacture had been in the hands of the private manufacturers situated in London and Birmingham, but they were not equipped to produce the vast numbers of weapons required to maintain peace in the rapidly expanding empire. There is some evidence too that they frequently held the Government to ransom.

One very interesting fact comes to light concerning the early days of the factory, and that was the recruitment in 1857 of the chief armourer of the Federal Arsenal at Harpers Ferry, Virginia, U.S.A., to be one of the first managers. This arsenal was the objective of the raid by the fanatical John Brown in October 1859 which was one of the causes of the Civil War and led to John Brown's trial and hanging.

The infusion of American techniques contributed in no small measure to the introduction of an early form of mass production

An early photograph of the Royal Small Arms hotel, which was one of three within 100 yards of the main gate.

The clock tower which stands sentinel over the factory and whose bell has struck the hours for nearly 100 years.

in rifle manufacture in this country. This system was evolved by Eli Whitney, an American who had been given a huge order for muskets by his government but was faced with a shortage of skilled labour

It was the practice at that time for a skilled gunsmith to make a complete weapon, but Whitney broke this system down and trained men to make only one of the components; for example, one man would be engaged the whole of his time on making butts, another on barrels, another on a lock component, and so on. The men became highly skilled on their own components, which were checked by an elaborate system of gauges which the inventor took two years to perfect.

By these means Whitney achieved the interchangeability of components and can be regarded as the grandfather of the interchangeable spare parts system.

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The weapon that brought a considerable reputation to the factory was the Lee Enfield .303in. rifle. It was in production before the turn of the century, was used in the Boer War, and after conversion to the RSMLE No. 1 Mk. 3 was used throughout World War I. The remarkable thing about this rifle was that it did not come from the drawing board. It was developed rather than designed, and as a consequence there never existed fully dimensioned component drawings, but there were a few dimensions given on the major components such as barrel and body.

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All this happened long before the days when the National Physical Laboratory set about determining and making an absolutely exact inch standard. The Enfield factory had early on produced its own standard inch, which in after years was checked by the National Physical Laboratory and found to be inaccurate to the extent of three ten-thousandths of an inch, a remarkably small error. Why was this standard of accuracy necessary when components were so sparsely dimensioned?

It was of the utmost importance in the manufacture of gauges which were made by the hundreds for checking bore and rifling dimensions and similar dimensions in body and bolt. There was, however, an elaborate system of master gauges, standards and checks which was developed from the original master rifle, and by these means every gauge made subsequently was a faithful copy of the original. This system, which followed the Whitney system fairly closely, ensured the interchangeability of components whether made in this country or in the rifle factories of India and Australia.

The system of screw threads employed on the rifle baffles description; it followed no recognized system and was devised, one imagines, to counter any attempt to copy it except by those entitled to do so. To quote only one example, the thread on the armourer's rod was .203in. diameter and there were twenty-six and one-third threads per inch. To the modern engineer this whole system of manufacture must appear archaic, but it produced an output of weapons during World War I that was never equalled in the enlightened days of World War II.

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At the outbreak of the war in 1914 a new rifle had been designed at Enfield and was being prepared for manufacture. It had been designed around a new .276in. cartridge, but the risk of changing over to a new rifle and ammunition in the midst of hostilities was not accepted. The designs were, however, sent to the U.S.A., where rifles were made by the hundred thousand but modified to fire the normal .303in. cartridge. It became familiarly known as the Patt '14 rifle.

It was to this factory in the year 1929 that the Czech inventor brought his light machine gun which was developed and became world-famous as the Bren gun.