

## LIONEL HOOK & SONS LTD 1904-1974

Barry Harrison

The Stroud area is well known for the many and varied industries that have been carried on there. The main industry over the years was, of course, the manufacture of fine woollen cloth, but engineering, chemicals and woodworking were also very important. Much has been written about the woollen cloth industry and detailed accounts of some of the major firms such as R. A. Lister and Co., Dursley, Erinoid of Stroud and Newman Hender of Woodchester have been published. However, for many of the smaller companies much less has been written and in some cases there are no published accounts for firms which may have been in existence for 70 years or more. The engineering firm that became Lionel Hook and Sons Ltd of Stroud is one such case. The author of this account of Lionel Hook and his firm joined the company as a design engineer in 1965 and between 1971 and 1973 was Technical Sales Director. He was fortunate enough to know members of the Hook family who were able to provide a detailed account of the family and the firm during its early years.

Advances in engineering in the late 19th century and early 20th century created a need for a skilled workforce, both for the manufacture of new machines and the maintenance of existing ones. Many small companies started and closed due to work variability or financial problems, while others, perhaps after a series of amalgamations, grew to be substantial and longer lasting businesses. The story of Lionel Hook is probably fairly typical. He set up on his own in about 1895 looking after estate gas engines and doing various engineering jobs, later he was joined by his two sons who were equally skilled and industrious. Some 60 years later one of the sons developed a product line away from their main line of work which resulted in a business that supplied a wide range of other industrial needs worldwide. The company, seldom employing more than about 20 people, survived until mid-1974.

### Early Days 1868-1937

Lionel Wellington Furmage Hook was born in September 1868, the ninth child, and fifth son of Henry and Elizabeth Hook, in Eastcombe. Henry was a builder, and partner in Wall & Hook, well known through his work in building 24 new churches, and restoration work on 79 others around the country. Henry was a great admirer of the military hero of the century and gave his son a second name of Wellington, and the third Christian name, Furmage, was the surname of



Early home: Merry Pebble Terrace, Westward Rd, Ebley (Left hand side of Cytek).

Henry's best friend William who was a butler to a baronet, Sir Lionel Darrell, at Fretherne Court. A family tree is shown in an Appendix.

Lionel's background was not in engineering - grandfather was a baker, and father and older brothers were builders. Lionel's parents died in 1885 when he was still a minor. Despite his interest in engineering his older siblings insisted on him taking up a commercial apprenticeship with

Frank G. Gill, Furnishing and General Ironmonger of 15 High Street, Stroud. This training lasted four years, but the interest in engineering persisted, and in 1889 Lionel re-apprenticed himself to Humpidge & Holborow, better known as the Dudbridge Iron Works for another five years. In the 1891 census, Lionel is shown as an apprentice steam engine fitter, lodging at a house in Bath Road, Stroud.

Aged 24 in 1892, his second apprenticeship completed, he was at last able to marry his childhood sweetheart, Sarah Elizabeth Gardiner of the Bourne, Brimscombe. They went to live at No 5, Merry Pebble Terrace, Cainscross, (SO83390490) adjoining the then Cainscross & Ebley Co-operative stores.

He started carrying out maintenance work on his own but shortly after entered into a partnership to manufacture and maintain engines at Stafford Mill, Thrupp, for a couple of years before the partnership was dissolved. Lionel then set up a workshop at the back of the house in Cainscross and started his own business. In the 1901 census he was a visitor in a house in Streatham, London, staying with his sister, the wife of a woollen manufacturer. His stated profession was 'Mechanical Engineer on his own account'.

Lionel still did engine maintenance work and machined spare parts for bicycles - bearings, spindles and cotter pins. The house backed on to a tip where the Dudbridge Iron Works dumped their waste. This proved a cheap source of furnace coke for the heating stove, scrap brass and other metals for the workshop. There was no gas, or water - other than that collected in rain water butts - and electricity was yet to be heard of in the district. Lighting was provided by hurricane lamps and the first job every morning was to clean the lamp glasses and fill the lamps with paraffin. New lamp glasses for the frequent breakages were available at the Co-op next door. When there was insufficient heating additional coke was bought from the local gas company for 6d (2.5p) a bag.

Power for the workshop came from an oil engine built from parts bought from various sources, or made by Lionel Hook himself. This engine generated about 3 horse power (2.2kW) and was similar to the earliest type of internal combustion engine. The air intake valve and fuel valve, fitted with very light springs, were 'sniffers', opened by the suction of the piston on the intake stroke. The spring tension needed frequent adjustment, by means of a lock nut on the threaded valve spindle end - none of the cams and rocker arms present in modern 4-stroke engines. A cam shaft operated pendulum type governor partially opened the exhaust valve to reduce the intake suction and hence control fuel/air mixture and the running speed.

Lionel engineered his own gravity fuel feed system using an arrangement similar to that used to dispense water to chickens where a reservoir is filled with water and inverted and automatically replenishes the drinking bowl as the birds drink. Most other engines of the time used a pump or a float control (as in the later well known SU carburetor) for fuel supply. Oil burning engines were started by heating the vapouriser tube and short iron ignition tube with a blow-lamp and many engines, made locally by Fielding and Platt and Dudbridge Iron Works amongst others, were only kept running by continual use of a blow-lamp. After much experimentation with compression ratios and vapouriser tube design, Lionel Hook engineered an automatic ignition system with an internal coil of wire. This adaptation was also taken on by Fielding and Platt and Dudbridge Iron Works for their own engine manufacture.

Lionel made good use of this innovation by buying obsolete gas engines and converting them to oil engines, usually selling them to farmers and small businesses. The automatic ignition had one disadvantage in that there was tendency for the vaporiser tube to overheat and pre-ignite,

or 'knock', if the engine was working a full power for a long period. There was a simple solution which was to slowly drip water into the vaporiser intake valve. This practice was continued until modern fuel injector systems were developed for higher compression engines using better refined fuel oils.

Business grew, as did complaints from neighbours about noise and smells. The family had grown as well, there were five children, including the eldest son Stephenson, (named after George Stephenson) born 1893 and the youngest Robert, born in 1900, who were to join him in the business later.

Stephenson, or Steve or Stivvy, as he had become known, joined the workforce at the age of fourteen in 1907. Working hours were 6.30 am to 5.30 pm with two breaks for meals, on Saturday work finished at 1 pm. Pay was 2/6d (12.5p), a week and he attended the Stroud School of Art in Lansdown three evenings a week studying Machine Drawing, Mathematics and other related subjects.

At that time, the first articled apprentice, G Tyler, had been with Lionel Hook for about three years, and also working with him was an "improver", A Rice. They were both paid the full rate of 22s (£1.10) a week. A trainee local shoemaker also joined the workforce, and a couple of men paid to work at Lionel Hooks to gain engineering experience. Lionel must have provided good training - one of them went to work for a Torpedo manufacturer and another to the Bleriot Aeroplane works at Brooklands, while a third moved to High Wycombe and started his own business.

When working away from the shop the men either walked or rode a bicycle, carrying their tools, although on rare occasions they might be collected by a pony and trap. When the local railcars started to run, this was a great boon for collecting castings from Brimscombe Foundry, (later to become R. J. Lugg, then H. Hewins). The railcar was also helpful when visiting the various mills and factories up the Chalford Valley and down to Stonehouse. The 1911 Census shows the whole family living at Cainscross although no specific address is stated.

Lionel went into partnership again in 1910 to try to revive the Trusty Engine Works. The Trusty Engine Company made oil and gas engines, and had moved from Cheltenham to Stroud, 'which district' they considered 'offered better facilities for carrying on the work'. The parent company Shillingford Engineering Company of Cheltenham had failed, and Lionel and his partners had high hopes of the project, but unfortunately promised financial support failed to materialise and this venture had to be terminated. All the drawings, patterns and the 'goodwill' were later sold on to T H & J Daniels Ltd.

The failure of the partnership meant a return to his general engineering business at Merry Pebble Terrace and the neighbour's complaints! But by 1915 the workshop had been moved a short distance to a Cainscross Brewery building. Land Valuation records in November 1915 record it in a two storey building with the ground floor being used as an engineering shop, cooperage, and blacksmith's shop, with storage above. Rent was 12s 6d (63p) per year with a half yearly tenancy agreement and the rateable value was £4-10s (£4-50) which resulted in a £3-00 per year charge for the buildings.

The site belonged to Carpenters, the owners of the brewery, and was part of a gravel pit. The pit was still active and an interesting way of charging customers for gravel supplied was used. From the bottom of the pit to road level was quite an incline and this slope set the price for a load of gravel. Customers went to the Cainscross Brewery Co. office and paid cash for a cart

load of gravel, no weight or quantity was specified, but it was limited to the capacity of one horse to haul a cart up the slope. Should two horses have to be employed then the price per load was doubled!

The factory equipment comprised a furnace, for casting gunmetal and brass, with a mould bench and tools for foundry work, a 3½in (89mm) lathe that could be treadle or belt driven, a small planer used for machining flat surfaces such as bearing blocks, and for water wheel repairs, and a larger 6in (150mm) lathe which was modified to 12in (300mm) by raising the head and tail stocks. This larger lathe was used for screw cutting, turning wooden washing mangle rollers and adapted to grinding lawn mower cylinders. Machinery was powered through line-shafting with leather belts and pulleys. Most of the pulleys and bearings in the workshop were made in-house from wood. The bearings were made of elm and lubricated with an oil drip feed.

1915, of course, was wartime, and the Ministry had commandeered the larger lathe for munitions work, and with some modification, it was used to machine 4in (100mm) shell cases. War work took over much of the engineering industry capacity at this time. Steve stayed with the business as he was unfit for military service.

Around this time the youngest son Robert joined the workforce and the company became Lionel Hook and Sons. Robert did serve for a short time in the Naval Air Service but was invalided out after an injury sustained on duty. At the end of the war local business had to be rebuilt. Lionel, his two sons, and a couple of other employees worked hard in times of severe industrial depression.

Sometime around 1920 the family and business moved to Ebley, opposite the Coach and Horses - a house named Glenville - where an old stable block was rented and converted to a workshop (SO826047). A couple of years later as business started to improve, land around the house and workshop was purchased by the Cordwell brothers to build a garage under the Vauxhall dealership, install petrol pumps for the new 'motoring experience', and Hooks needed to find another site for their business.



Westward Road premises in Ebley (Formerly Jehu Shipway & Sons) late 1930s.

The depression had hit businesses hard but fortunately a hundred yards further along the road in Ebley was a possible solution. Another local company Jehu Shipway & Sons, established in 1812, known as Ebley Iron Works until 1876, had premises that they were looking to sell. Shipways was well established in traction engine repairs, engineering, machining, steam and gas pipe fitting and as general smiths, including shoeing horses and they also built

special machines for other companies, in addition to making and selling their own flock-making machines. The site extended from the main road back to the canal (SO824046).

A new company Shipway, Hook and Co was formed, but shortly afterwards Mr Shipway decided to retire, and the Hooks were faced with buying him out. The company name then reverted to Lionel Hook and Sons. The roadside position provided a good site for petrol pumps of their own, petrol selling at between 1s-2d and 1s-9d per gallon (1.3p and 2p per litre). They finally had five pumps selling different grades of fuel and did good business with the local transport firms - Cordwells up the road only sold petrol to the private motorist!!

Steve had taken medical advice and decided to have his troublesome right foot amputated in 1935 and with an artificial limb in its place enjoyed a more active life. Steve raised two children, a boy and a girl, who did not get involved with the business, but Robert had four children - Stanley, born in 1922, Norman, Douglas and Miriam, and the three boys joined the company in due course.

In the mid-1930s Lionel Hook's health deteriorated and he left the workplace to his sons. He learnt to play the violin and occasionally spent time designing new engines. Lionel died in early 1937 and is buried in Eastcombe churchyard.

## **World War II**

Lionel Hook & Sons was a very busy place during World War II. During the First World War most of Lionel Hook's production capacity was given over to defence work and the private clientele tended to take second place. The result of this was that by the end of the war many of these former customers had taken their business elsewhere. This hard won lesson was still in the minds of Stephenson and Robert Hook when World War II began, and during 1939-45 a better balance was maintained between government and private orders. Even so, the machinery worked round the clock on defence contracts. For a long time Stephenson supervised one 12 hour shift, and Robert supervised the other. Edith Hook, Robert's wife, and his sister Nellie Shipway, put aside their aprons and donned overalls to work in the business. Four of the five petrol pumps and the storage tanks beneath them were requisitioned by government departments for military supply use.

The wartime endeavour brought a measure of prosperity to the firm of Lionel Hook & Sons which it had never previously enjoyed. They had acquired two more planing machines just prior to the war these had been fully employed machining flat plates for Gloucester Aircraft Company generating welcome revenue. Funds were generated with which to erect new buildings and invest in additional machinery. After the war the planers provided steady business machining large flat base plates for Fielding and Platt, and for Redlers.

In 1936, Stanley, aged 14, the eldest son of Robert Hook, had started work with his father and uncle at Lionel Hook & Sons. From the start he showed aptitude in both mechanical and radio engineering. Classified as unfit for military service in World War II, he was permitted by the Ministry of Labour to remain with the family firm since most of its activities were concerned with production for the war effort. However, one day a Ministry of Labour official dropped in and found young Stanley repairing somebody's radio. He was cautioned that repairing radios was not work of national importance and advised to return forthwith to his prime task of making components sub-contracted from the Gloucester Aircraft Company. Some months later the official called again and once more caught Stanley fixing a radio. No warning went with the second offence. Stanley was ordered to report immediately for employment at Sperry Gyroscope Company at the Redler's Conveyors site at Dudbridge.

## Post War Developments

One of the first post-war projects was to build new offices and a radio showroom and workshop close to the road. Manufacturers would not supply radios or spare parts unless there was a shop to display and sell their products. Stephenson's pre-war radio interests were renewed fully integrated into Lionel Hook & Sons, aided by the interest and capability of nephew Stanley.

However, the major development in this period was to be the manufacture of "dipping" machines to apply decorative or protective coatings to components and later to produce items such as rubber gloves, balloons and baby teats by dipping a former into liquid rubber latex.



MkI-M Rising Tank Dipping Machine – Powered Machine.

In the closing months of World War II, Robert Hook had seen a request in a trade magazine for a dipping machine for lacquering woodware and concluded that the best way to do this was with a hydraulic cylinder lifting a tank of paint or lacquer to immerse the brush handle or whatever, and then to control the speed at which the tank fell by using a flow control valve. Stephenson and Robert Hook spent many hours devising a machine which would give a high quality finish in the manufacture of wood ware products. They called their initial machine the 'Cotswold Dipper' and patented it.

Wooden furniture, and products such as brushes and tool handles, were brush lacquered or painted. With the development of suitable paints and lacquers the tedious hand brushing application had turned to dipping. To get a quality surface finish by dipping the speeds of immersion and extraction need careful control to avoid air bubbles and drips and runs. Between the wars the Germans had developed this market with counter-weighted clockwork mechanisms, fitted with

propellers with baffles which could be adjusted to control the speed at which the mechanism worked. During and after the war this supply route had been stopped and anyway there was reluctance to buy from Germany.



Original Lionel Hook Machine Nameplate.

This same type of control was used for early blueprints of engineering drawings. A carbon arc lamp rolled along a track pulled by a cord with a weight, which in turn passed around a pulley with a pair of adjustable propeller blades attached. Wrapped around one side of the arc lamp at about 18in (450mm) radius was a sheet of curved glass supported in a cast iron frame. The drawing original, backed with a sheet of photosensitive paper, was wrapped around the glass and held by a canvas sheet, and the lamp was switched

on and slowly traversed the length of the paper exposing the backing sheet to show the drawing outline. The time of traverse controlled the exposure and adjusting the propeller blades varied the air resistance and hence the speed. At the end of the travel the lamp was switched off and manually pulled back to the start position. The photosensitive paper was either brushed with a weak ammonia solution or fed through a pair of driven rollers (hand turned or powered) with ammonia vapour to fix the image. There was one of these machines in the drawing office at Critchley Brothers in Brimscombe as late as 1965 in regular use - a far cry from the automated multi-roller drive and fume extracted print machines in Dowty's drawing office where the author had worked previously!

The first dipping machine was built about 1948 and tested at Ryeford Sawmills, Stonehouse, who made handles for the brush trade. It was successful, but there were several improvements to be made. The table and tank were raised with a hand-operated pump, and using a pump like a car jack only supplied a small amount of oil and took a large number of strokes to lift the tank. The machines were often operated by female workers so the effort required had to be kept reasonable. The answer was to design a new lower pressure pump that delivered more oil each stroke, and putting a crank in the handle improved the operating height.

Another problem was speed control - the simplest valve was a needle valve - but at low speeds (and lacquering needed slow speeds, around ½in -1in (12-25mm) per minute is used for lacquer dip-coating) there was erratic movement as oil flow becomes intermittent when the annular hole is nearly closed. This required a new design of speed control valve. A tapered plug valve with a varying dimension V-groove proved to be the answer. There was also a problem with flotation effects, when fully immersed wooden components would try to float, and 'push' the tank down at a faster speed - this was overcome with a special compensating valve.

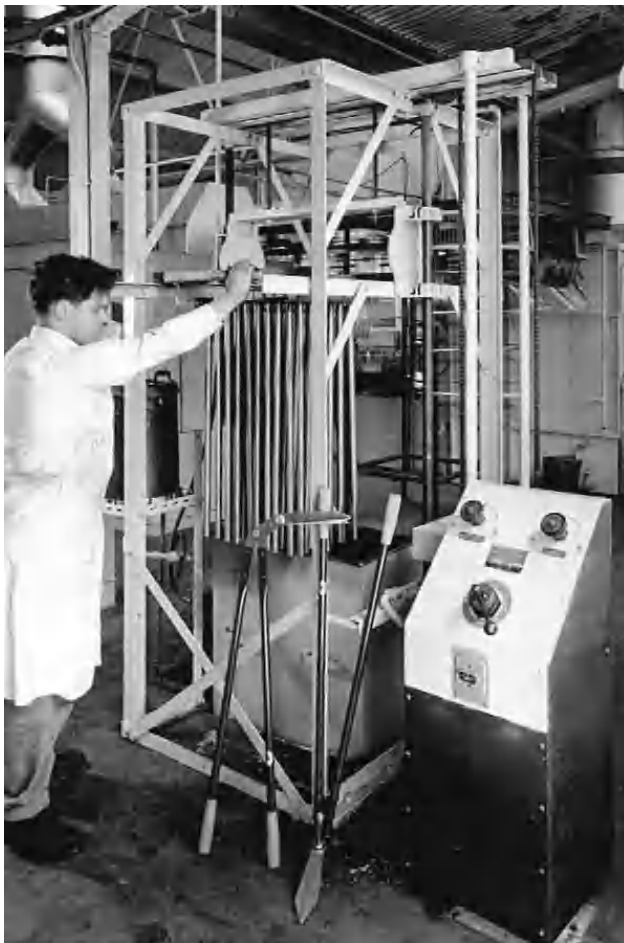
Ultimately this hydraulic system proved capable of working very smoothly and continuously at speeds down to 1/8in (3mm) per minute, and within a 180° turn of the valve a speed range of 1/8in-20in (3mm - 500mm) per minute could be obtained consistently with a wide range of



Typical Woodware Dipping Shop – James Constance & Sons Ltd, Stonehouse, Glos (1960s)



Chair leg Lacquering at Christie Tyler Furniture.



Finishing Metal Tool Handles – Wilkinson Sword, Acton, London (1960s)

loads. The flow of oil also varied with temperature, but the low operating speeds and relatively constant temperature conditions in the dipping shop meant that the oil temperature and the speed set remained more or less constant. Word got around and other local companies, Hoopers, woodturners next door, Stonehouse Brush Works, then further afield, and the paint suppliers bought their own machines to prove their paints and lacquers worked well for dipping, which resulted in more custom.

A twin table version was introduced so that one hydraulic cylinder was immersing one product while the other was extracting another, saving cost and improving productivity. A single operator could load components and attend to two or three dipping units at a time during the dipping cycle. These rising table machines had a stroke of 20in (500mm) and were suitable for articles up to around 17in (430mm) long. Longer articles required the development of the lowering batch machine, which had the tank on or even in the floor. The longest stroke machine Hooks ever made



had a stroke of 15ft (4.57m), which moved at a constant speed over the whole distance, and coated drills for oil-well drilling.

A lot of pumping was needed to raise the tank or lower the dipping frame these longer distances, and power operated machines were introduced. Careful design avoided the problem of oil pumped by a motor heating up and power was only used in one direction (for immersion of the components). Extraction was always under gravity. Machines for paint and lacquer dipping were exported to many European countries, Australia, India and elsewhere.

About 1958 there was competition in the hydraulic dipping machine market - and it was local! Completely unknown to each other a small company in Bridgend, Stonehouse, RS Patents was also producing a fully power operated hydraulic dipping machine of a different design, the result of some work with a plastic coating manufacturer. Rodney Shephard, the owner of this company, and Robert Hook found themselves in direct competition and whoever got to see the client first often got the business. In 1961, RS Patents and Lionel Hook and Sons decided to merge their businesses under the better known Lionel Hook & Sons name.

Norman and Douglas, Robert's sons, both did National Service, after which they joined the company. In the mid-1960s they were appointed to the board of directors, together with Dennis Curry, a long term employee who became Works Manager and Rodney Shephard from the merger. The tradition of Lionel Hooks being a good company to work for continued. Several employees completed 20 years or more with the company and one stayed with them for over 40 years.



Lionel Hook Staff c.1966/7 – Retirement of George Knight long serving employee  
L to R: Back Row: Norman Hook, Peter ?, Douglas Hook, Ron Waite, Joe Bishop, Philip Surridge, Barry Harrison, David Wynn, Tom Herbert, 'Willie' Wilkes, Dennis Fisher, Iris Burford, Dennis Curry; Front Row: Stanley Hook, Stevenson Hook, George Knight, Robert Hook and Rodney Shephard.

### Expansion of Dipping Products and Diversification

During the early 1960s, a Tewkesbury based farmer had contacted Lionel Hooks with a view to producing and selling machinery he had developed for hay bale handling. One part of this was a trailer attachment for tractors to collect rectangular bales and drop them in groups at various parts of the field, and the other part a hydraulically operated attachment, the Perry Loader, to pick up individual bales for stacking and then to pick up an 8 bale stack and load it on to a trailer for transportation. Lionel Hooks undertook to manufacture the equipment and



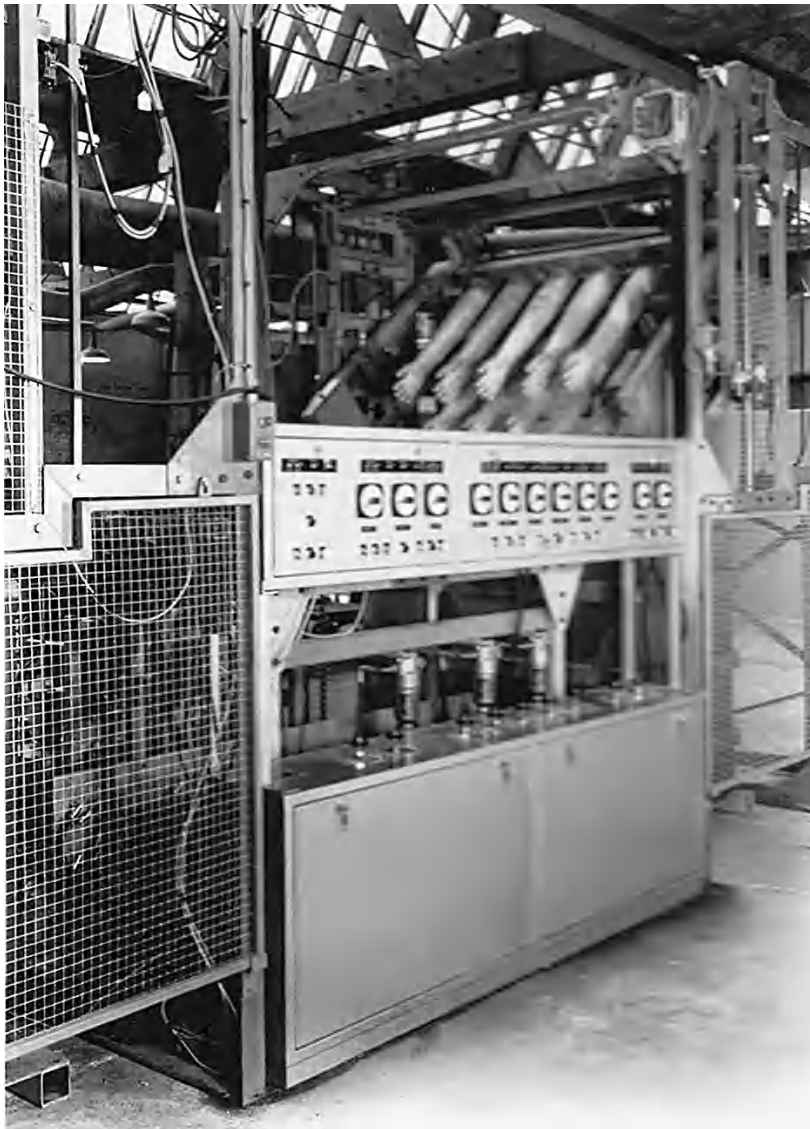
Farm Implements Ltd – Perry Bale Collector.

formed a separate marketing company called Farm Implements Ltd. Some new products such as various powered tractor attachments were developed and improvements were made to the design of the bale handling equipment. Perry Loaders and Bale Collectors sold well in Britain and also in Canada, Australia, New Zealand, and there were some sales in Europe.

Most people, whether they know it or not, will have had contact at some time with coatings applied by 'Cotswold' Dipping Machines, typical customers and their product ranges were - Stanley Tools; Wilkinson Sword; Spear & Jackson (garden tools); Winsor & Newton (artist brushes); Harris Brushes (paint brushes); Gray-Nicholls (cricket bats); Phoenix Walking Sticks; Peter Drennan (fishing tackle); Christie Tyler (furniture); Electrolux Ltd; Kenwood; CP Witter (car towbars); Norville Optical (glass lenses); Plessey Company (electrical components); Addis



Some typical products made by dipping in PVC and in Latex Rubber. Gloves (latex and pvc fabric lined), balloons, baby teats, babies dummy bulbs, catheters and latex tubing.



The first automated dipping machine for gloves for Dunlop (1965). Long Gauntlet Gloves for Nuclear Power Industry.

Co; and many of their competitors and associates. There was a continuing connection to the textile trades as well - Bancroft Shuttle & Bobbins who made textile machine parts including lacquered wooden spinning bobbins and a lacquer coated rolled paper bobbin with metal ferrule ends for the cotton industry.

Although many of the dipping machines supplied up the mid-1960s were relatively small, many of them are still in use today. However in 1973, when Britain was on a 3-day working week, there was an unprecedented surge in demand for twin table dipping units from fishing tackle manufacturers as workers had extra free time to spend on their favourite sport!

Dipped rubber products, for example surgical gloves, had been produced from the 1890s but they were made from rubber solution, with benzene as the solvent. It required multiple dipping to

build up the film thickness, and the solution was highly inflammable, so no powered machinery could be permitted anywhere nearby.

In the 1930s the technical problems associated with handling rubber latex were overcome and wet rubber was being shipped to England and other parts of the world for rubber goods production. These included gloves, balloons, baby teats, and various medical goods. There were only very limited supplies of rubber available during World War II but the situation improved soon afterwards.

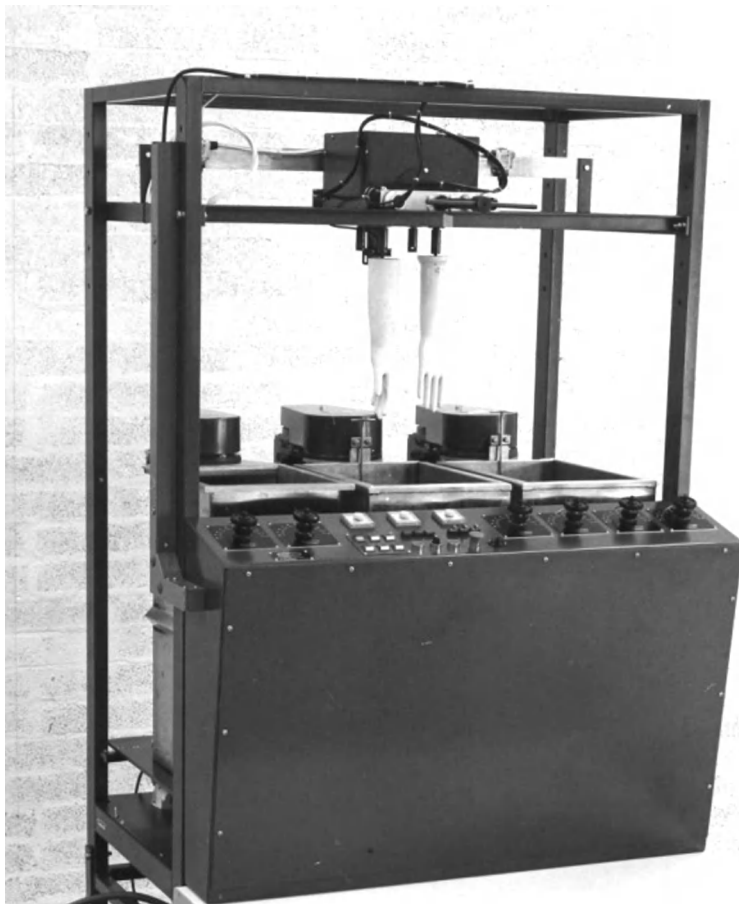
By the 1960s latex was readily available and machinery was required to progress from simple hand dipping methods to mass production, and this provided another market for various sizes of powered dipping machines. The first automatic glove plants were designed for companies like Dunlop in the mid-60s. The latex and plastics industry had another important requirement as well - to stop the surface of latex tanks drying out and forming a skin. Latex has to be circulated to stop skinning, to keep the surface clean from dust and insects, and to remove any bubbles that occur from filling, or dipping too fast. Robert Hook and another member of the

team looked at this problem and came up with an improved tank design that was very effective. Lionel Hooks did not make the sheet metal work themselves (which was done by Dipples in Nailsworth) but they designed the tanks, and made and fitted the most important parts to the tank body and drive system.

'Cotswold' dipping tanks, generally made in stainless steel, can be seen worldwide, many of them are genuine ones, but many are counterfeits (copies) unfortunately, but they never work as well as the tanks made in Stroud! The largest tanks made were about a two metres cube, and the smallest around 15cm x 15cm x 18cm deep for circulating liquid silver and various special mixtures. A number of tanks were made for medical coating applications with materials costing up to £3200 a litre!

By the 1960s, Lionel Hooks had a worldwide reputation for dipping machines and tanks in the latex and plastics dipping field. Full production process plant involved a number of dipping units, ovens, washing processes and various adaptations which were needed to make a good quality product. The tanks were also used for emulsion or suspension type liquids which required even and homogeneous circulation and stable temperature control.

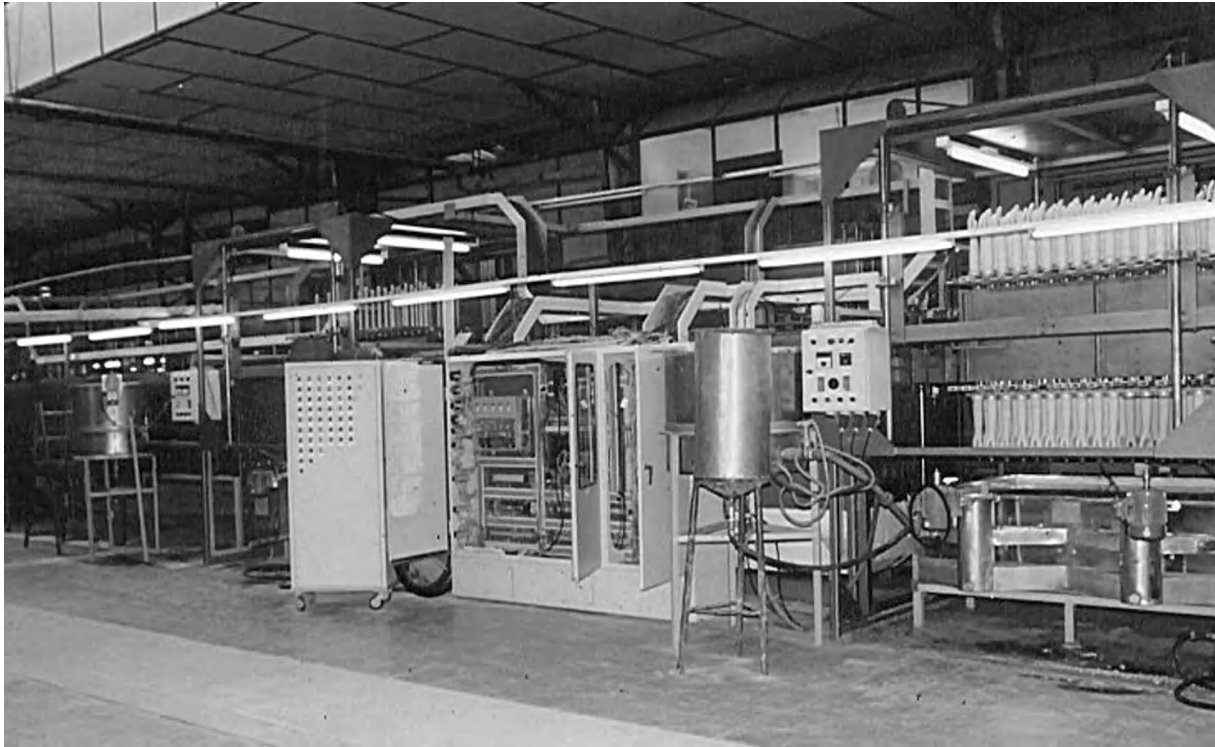
Lionel Hook's machines were mostly batch type machines moving groups of formers through the process stages, and they also made specialist laboratory dipping units for different applications. They even developed machines to carry out dipping in a vacuum to make sure hollow and wirewound components were fully coated with no air entrapped to expand and blow holes in the coating during curing.



Automatic Laboratory Dipping Unit for latex product development ( (Dipping Equipment Ltd 1986).

During 1963-1968, a design team had been built up to develop the dipping machine side of the business as many clients required special features in their machines. Full process plants required multiple controlled dipping stations, washing and powdering stations and extensive oven space as well as ancillary equipment of different types. Plant and processes, although seeming very similar, could vary considerably. Again a number of household names bought plant such as: Dunlop, London Rubber (Marigold gloves), Maws and Lewis Woolf Griptight (baby teats), James North (industrial gloves) and a wide range of dipped specialist medical and industrial products in rubber latex and plastic materials.

Continuous chain conveyor machines were used by some manufacturers but were usually



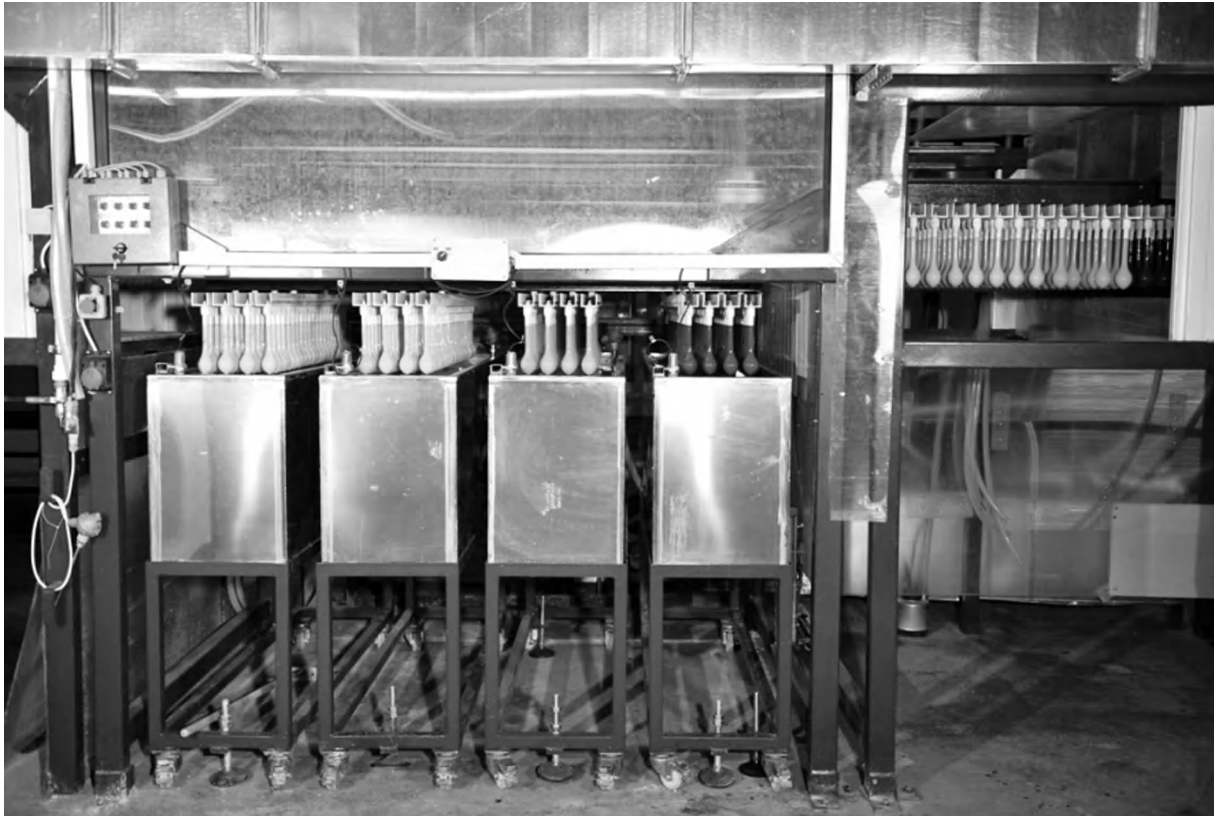
Automatic Production Plant for Surgical Gloves – Chile (Diptech (UK) 1991).

developed in-house by large scale manufacturers. Lionel Hooks did not move into that market as it required considerable chemical expertise to deal with process control and materials as the continuous process is inflexible – a change in the dipping speed at one station changes all the timing of the process stages of the rest of the machine.

The late 1960s and 1970s saw the start of single use medical products. Previously, undamaged products were washed, re-sterilised and re-used. Single use was safer, but it resulted in a huge increase in demand and engineers in the Far East started copying plant from the west to help meet the demand. Continuous chain plant made by a manufacturer in Holland was a particular target of copying because it looked simple and was cheap to produce, but it was very inefficient in the use of, what was then cheap, energy. Much of this plant did not work very well but successive factory owners spent money on improvements until by about the fifth owner most problems had been resolved! There was a further huge demand for gloves, and condoms, in the mid 1980s with the AIDS problem and some of the latex and synthetic rubber products became commodities rather than technically made products - anything could be produced and sold and all sorts of cheap and inefficient plants entered the market.

Health and Safety considerations has meant the introduction of many new products especially gloves. These are made from both latex and synthetic materials as they have different chemical resistant properties. It also introduced the need for some special coating techniques. Dipping has always been seen as an alternative to spraying which is cheaper to start with and can be used for many shapes where dipping is practical. Paint and lacquer suppliers do not particularly like dipping because even with the most advanced electrostatic spray plants up to 70% of the paint goes in to the exhaust system. However, with dipping there is little wastage.

During the late 1960s both Dipping Machinery and Farm Implements equipment were in demand and selling well, and in 1971 Lionel Hooks moved to bigger premises in Upper Mills



Automatic Balloon Production Plant, Latex Dipping Station 4 colours –Turkey  
(Diptech (UK) 2011)

Estate (SO806047) in Stonehouse. In the 1970s there were only a few companies in the world specialising in dipping plant, three were in the UK - Lionel Hooks and two in Sheffield, one was in Holland, one in Japan and a couple in the USA.

The economic problems nationally in the early 1970s caused many financial strains. Dipping plant was becoming bigger and more complicated, calling for more finance during design and construction. Many of these plants were sold to international customers using UK Government supported credit where the customer paid over 5-7 years at low interest rates. Most of these export credit arrangements stipulated that the customer had to pay 5% on signing the contract, 10% or possibly 15% on shipment and the balance over the stated period. The UK finance source would then pay the supplier on presentation of shipping documents. These generous terms for purchasing equipment meant the manufacturer had to fund the design and build for a machine costing between £300,000 and £850,000 and taking around 7-8 months to complete, and then pay the expenses of the client's inspection team to check the machine was to specification, often taking them to visit other companies, and do a grand tour, before the machine could be shipped! Payment was guaranteed on shipment but UK banks would not lend without comparable security and guarantees from the supplier and often held on to the 5% downpayment.

The Farm Implements Ltd range of products were mainly for harvest time and only sold in summer, and that also required costly marketing at exhibitions. The seasonal demand meant year round manufacturing and stocking of products for the brief selling season, or otherwise allowing large discounts to distributors to store and sell equipment in season. Interest rates were at their highest since the war and survival in both areas was a major issue.

In 1972 financial support was negotiated with Newman Industries in Bristol, electric motor manufacturers, who were themselves owned by a financial securities company. This resulted in several changes of policy at Lionel Hooks, one of which, in September 1973, was to conclude existing contracts and close down the dipping machine division. After considerable negotiation, involving the threat of the main employees of the dipping division leaving immediately, the author and chief designer took over the dipping machine business starting a new company on November 1973 with a couple of employees and others staying to complete existing work. By March 1974 the dipping contracts were completed, but in May 1974 Newman Industries withdrew financial support and Lionel Hooks was put into liquidation to close the company completely.

### **1973 to Present Day**

Process Dipping Equipment Ltd, owned by the author and Philip Surridge, designed and built dipping machines for customers worldwide and made many innovations to dipping processes. At one period there were 45 employees. Process Dipping Equipment closed in 1983 after the company bank called in overdraft facilities at 24 hours notice. It was re-established a few weeks later as Dipping Equipment (Cotswold) Ltd, and continued to supply machines for a wide range of industrial applications. The author left the company in 1987 and started a new company primarily for consultancy and product development. Dipping Equipment (Cotswold) Ltd was liquidated in 1989 after trying to start a subsidiary in the Far East where most of the latex machine business had moved to.

During 1978-1985 the main latex dipped goods producers in Europe moved to the Far East, to be where rubber was produced. Cheaply built plant in that region took a large part of potential business and major plant manufacture ceased in the UK in the mid 1980s, although one company does continue to make plant in the UK for export in Chesterfield, a residue of the Sheffield companies where the sons of the owner have come into the business. Several European companies continue in the dipping machine supply field, primarily for latex and synthetic rubber goods: one in Holland mentioned earlier making continuous chain plants, two German companies, one of which later moved its business

The author's company became Diptech (UK) Ltd in 1991 and carries on the tradition of Lionel Hook and Process Dipping Equipment, providing consultancy, and designing plant for customers overseas to build versatile and reliable machines in their own country. This saves time, avoids building and testing, dismantling, shipping and re-installation. Diptech typically handles one or two, or sometimes no installations, each year. It is interesting to note that there are currently dipping machines originating from Stroud, in more than 40 countries worldwide. These include 14 in Europe, 6 in Africa, 4 in the Middle East, 10 in the Far East and 7 in North and South America.

The most recent major projects were a glove plant in the USA, and a new design of balloon dipping machine for a client in Turkey (2010) making more than 11,000 balloons an hour. It operates 24 hours a day, 7 days a week - that's nearly 100 million balloons a year! The company is currently assisting the same client to build a new more advanced plant.

### **Concluding Remarks**

It must have been a great disappointment to Stephenson who died in 1977 and Robert who died in 1979 to see the Lionel Hooks close, but Lionel, his sons and grandsons can be proud of what they achieved over some 70 years of business. Norman Hook died in his 80s in 2011 and Douglas Hook in about 1997. In 2013, Stanley Hook, now in his 90s, was living in Leonard

Stanley, after an interesting life travelling extensively in his early years in England on machine maintenance and repair. However, life really began at 50 for Stan, when he started travelling the world, Scandinavia, North Africa, South America, China, and the United States in 1998 at age of 76 helping to install machines and make use of his expertise.

In 2013 a model of the Mark I hand-pump 'Cotswold Dipper' machine, made by Stanley Hook in the 1970s, was on display in the reception area of Stroud District Council Offices at Ebley Mill. It provides a small, but fitting memorial to Lionel Hook and Sons Ltd., a local engineering firm with fairly humble beginnings as general engineers. However, they emerged to take a significant role in the development of plant, for a wide range of coatings and dipped products, which has been installed all over the world.

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**Appendix: Hook Family Tree - members involved in the company**

