

THE MALTINGS OF ALLIED BREWERIES: A PERSONAL HISTORY OF TECHNICAL EXCELLENCE, AMBITION, AND LOST OPPORTUNITY

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I joined Allied Breweries as a Research Biochemist at Walker's Warrington brewery in 1969. I left Carlsberg-Tetley in 2000 after seven years as Director of the Tetley's brewery in Leeds. In between I spent 23 years in Burton on Trent involved in malting: in research, technical and managerial roles. I have first-hand knowledge of the machinations of joy and misery that characterised that time. A history of the maltings over this period should include analysis of the influence of the people involved in the shaping of that history.

Allied Breweries was a major brewing group in the U.K. covering a period from 1961 to the time its breweries were merged with Carlsberg in 1993 to form a 50:50 joint venture: Carlsberg-Tetley. Its market share was variously estimated at various times at 18 to 21% of the U.K. beer market. But by the time of the merger it was probably considerably less. This merger came about as a result of the investigation by the Monopolies and Mergers Commission into the brewing industry resulting in the 1989 report to Lord Young which he was 'minded to accept'. The nub of the recommendations of the report which became known as the 'Beer Orders' was to place restrictions on the number of pubs which companies could own. The major brewers sought different ways of gaining some measure of shareholder advantage from the new restrictions. Whichever method was chosen it was painful to employees. Jobs were lost and breweries and pubs were closed.¹ And none of those major groups exist today.

The formation of Allied Breweries and other groups

Why should major brewing groups have come together in the mid 20th century? And what was the consequence

of this for maltsters? It is axiomatic that from 1959 a period of intense merger took place in British brewing. Up to this point mergers in brewing were between small breweries and frequently involved gentlemanly negotiation amongst friends.

Everything changed with the realisation in the City that brewers had hold of undervalued property assets. Charles Clore bid unsuccessfully for Watney Mann and the Canadian brewing magnate Edward Plunket Taylor (known to everyone as E.P.) launched into Britain with the Canadian beer, Carling Black Label. Life would never be the same again. As a result of these interventions panic ensued and a series of defensive mergers took place which were not the result of the gentlemanly conduct of times past. The 'Big Six' national brewers were formed: Allied, Bass Charrington, Courage, Scottish and Newcastle (much the smallest of the six), Watney and Whitbread. By 1967 together with Guinness these groups accounted for around 75% of total U.K. beer production.² Of these six brewers, four (Allied, Bass, Courage and Watney) inherited considerable malting capacity. This merger activity was a classic case of a defensive competitive strategy against a threat from outside the known industry. The paradigm was shifted. In the next ten years 200 breweries were closed. Major capital investment by the big six resulted in the concentration of brewing on large sites: Allied and Bass in Burton, Courage in Reading, Whitbread in Luton etc. A stable industry was the result for 30 years until the terrible events of 1989.³

The consequences for maltsters were profound. Brewers concentrated production in large batches and demanded fast throughput in the brewhouse. This required large amounts of malt of consistent quality. Some sales malt-

sters did not have the plant from which to supply this malt. Consequently mergers took place in malting as well. The position of the large malting groups: A.B.M. and Pauls was strengthened. But some brewers took the strategic view that they should remain in malting after merger. This was in the belief that this would provide security of raw material supply and hence competitive advantage.

Clearly Allied Breweries picked the worst name of the big six. What was allied about it all? What did the name convey to the customer? It is likely that the regional strength of the companies coming to form Allied precluded any one of them giving up their own name to the greater good of the whole. This decision was to curse the company for evermore. Allied was formed by the merger of Ind Coope (strong in the south), Tetley-Walker (strong in the north) and Ansell's (strong in the midlands). But it was not Allied at first. Opening discussions between the three companies were held in February 1961 at the 'Grouse Inn', Hayfield near Kinder Scout in the Peak District. The representatives of the companies were: Brigadier J. Noel Tetley (Fig. 1), W. Nicholas Herald and Thomas Walker from Tetley-Walker, Edward Thompson and Gerald B. Thorley from Ind Coope and Archibald E. Wiley and Garnet W. Cornwell from Ansell's. Lest anyone should think that the venue and numbers should provide one up to Tetleys a subsequent meeting was held at Edward Thompson's house in Derbyshire.⁴ From these meetings emerged an 'impregnable group' capable of fighting off any takeover bid. The original name Ind Coope Tetley Ansell Ltd. (ICTA) was chosen for the new group. For the next eight years the merger was loose and companies took individual decisions about capital development. This all changed in 1969 with the re-formation of the company as a centrally driven organisation with the even more original name: Allied Breweries. The activities of merger were known internally as the 'October Revolution'. I was appointed to Tetley-Walker Production as a Research Biochemist at Warrington and within a year I was an employee of Allied Breweries Production Ltd and on my way to Burton. Many people at high level were moved around. Which company was going to come out on top in the power struggle? Well, the headquarters were established at Burton; a tribute to Edward Thompson's stature, the entrepreneurial skills of his brother, Neville and the fact that Noel Tetley was now 71 years old. Noel was to retire within the year. Noel's

son, Richard (Production Director of Tetley-Walker) was moved unceremoniously from Leeds to Burton to become Services Director whilst the power of production was firmly vested in the steely hands of Bernard Crook Kilkenny (ex Ind Coope) and Robert (Bob) Dickens (ex Ansell's). Richard Tetley was a gentleman with an engineering science degree from Oxford and was steeped in the traditions of the family dynasty which had run the company for almost 150 years. He believed in enhancing the skills of people to drive the company forward. Some of his colleagues in the new company were not gentlemen. Richard's considerable skills were not fully appreciated in the new environment and in the ensuing struggles as Tetleys were outmanoeuvred and the Leeds power base was damaged.

It might not have been had the undoubted abilities of Reginald Roland Edward Heslewood, now almost forgotten, prevailed. Heslewood was a pupil brewer at Leeds and Wakefield breweries Ltd. and continued



Figure 1. James Noel Tetley (1898-1971). He led the Tetley delegation in the Allied Breweries merger talks in 1961.

training at analytical chemists, Briant and Harman before becoming a brewer at the Star brewery in Eastbourne. After the war he joined Melbourne Brewery in Leeds and became Head Brewer. After the merger of Melbourne with Tetleys in 1962 (mostly gentlemanly) Heslewood's star rose and by 1967 after commercial experience in Walker Cain he was Managing Director of Tetley Walker- a natural successor to Noel. So far so good because, by 1971, he was Deputy Chief Executive of the Beer and Hotels division of Allied Breweries. In 1972 he was gone. The Leeds voice at the top was gone and the men of Ind Coope were to prosper. But that is another story worthy of study- our interests lie with the maltings where again the ambitions of Tetley men came to be thwarted.

The origins of the maltings of Allied Breweries

By 1969 we have a brewing group that can claim to be the biggest in the U.K. with perhaps 20% market share. Up to this time the maltings were being run as separate groups with management responsible to production directors of the individual companies. Hence we had: William Jones and Son Maltsters (Ansell's), Tetley-Walker Maltings and Ind Coope maltings. In 1969 this organisation was changed. Walter Richard Hyde was appointed Head Maltster of Allied Breweries (Production) Ltd. responsible for all production and purchase of malt and responsible to Bob Dickens, Production Director.

Walter Hyde lacked technical skills but was capable of very hard work and was a man of vision. He also had the knack of being in the right place at the right time. Walter Hyde rose rapidly from office boy to Sales Director at G.F. Milnthorpe's Maltsters at Barnby Dun near Doncaster under the harsh tutelage of Sydney Crampton. After financial problems in the mid-1960s part of this business was bought by Tetleys. Walter Hyde was not given a job by the then Tetley Head Maltster, J. Kenneth (Ken) Fergusson. Instead Walter came to Ind Coope in Burton as Deputy Head Maltster to the legendary Gerald Otho-Briggs, a bon viveur and driver of very fast Aston Martin cars. Tragically Briggs was killed in a road accident near Mistley in Essex in 1968. Much to the concern of all malting employees Walter Hyde was made head maltster of Ind Coope. And having impressed Bernard Kilkenny with his capacity

for work in contrast to the languid skills of Otho-Briggs, Hyde was made Head Maltster of Allied come the October revolution in 1969.

To grasp the full effect of this appointment we need to examine the history of the maltings that made up the group.

William Jones and Son, Maltsters and Ansell's Brewery

William Jones established a malting business in mid-Wales in 1869. He quickly recognised the malting quality of barley in the Shrewsbury area and started to take over existing small malt houses. Jones's first major development was the establishment of the Belle Vue maltings in Shrewsbury in 1888 (Fig. 2). This malting was designed by the most famous maltster and malting engineer of the time, Henry Stopes, author of the great treatise, *Malt and Malting*.⁵ Demand increased for Jones's malt and in 1897 he took over the Ditherington flax mill. This is one of the most famous buildings in the world; arguably the prototype of steel framed skyscrapers. The building was established as a flax mill in 1797. It was the first major construction with an iron frame. This raw material was available in the area following the development of Abraham Darby's works at Coalbrookdale.⁶ And this was the inspiration to the architect of the building, Charles Bage. Huge advantages of fire resistance in the building were gained. The flax business continued at Ditherington for 90 years. The building lay idle for ten years when William Jones recognised its potential for conversion to a Malthouse (Figs. 3,4, 5 & 6). This is an early example of the innovative spirit that was to characterise the continuous development of Allied Breweries' maltings.

Jones's business continued to develop and in 1903 became a registered company with a registered capital of £100,000.⁷ Jones died in 1914 but the business continued in the hands of his son, R.E. Jones and a third major malthouse was developed in 1920. This was the Castle maltings (Fig. 7) which was originally a flour mill.

By 1935 the business was bankrupt. Downturns in the market and a series of poor business decisions took their toll. Many maltsters struggled at this time and a number of mergers took place. Financial help for William Jones came from the Alliance Insurance Company and mana-



Figure 2. Belle Vue Maltings, Shrewsbury designed by H. Stopes.



Figure 3. Ditherington Malt House, Shrewsbury, with William Jones sign.



Figure 4. Ditherington Malt House showing Canal floor.

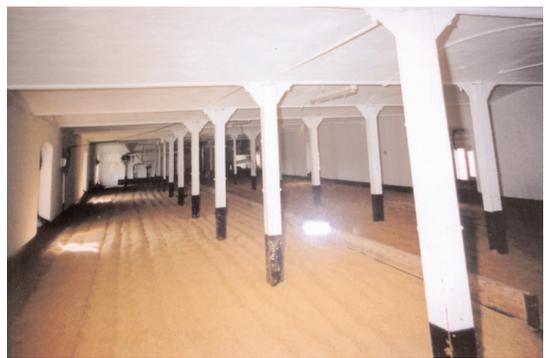


Figure 5. Ditherington 'Little End' germination floor showing iron cruciform pillars supporting roof.

gerial help in the form of D.R. Tamplin. Richard Tamplin had established Tamplin's brewery in Brighton in the early 19th century. Richard's son, Henry, continued the business and was also a director of the Suffolk maltsters, S. Swonnell and Son. Our Tamplin (D.R.) as so often happened subsequently fell out with other directors at Swonnells and came to the struggling William Jones in 1936 after attempting to pursue his own malting business in Suffolk. The exact nature of his forenames has caused some interest. It seems that his names were Douglas Roynon but he was always D.R. at Shrewsbury! He did not know much of the scientific basis of malting but was very active in talking to farmers and educating them in the needs of the maltster. He gave a paper on the 'Malting of 1951 crop barleys' to the Midland Counties Section of the Institute of Brewing. Working seven days a week he saved the business.

Tamplin saw the need for secure sales for his malt and the economies of scale that could be achieved by merger with other maltsters. His approaches were rejected by Associated British Maltsters (A.B.M.) but increasingly he sold his output to Ansells brewery in Birmingham. By 1948 the whole output of William Jones was being sold to Ansells and Tamplin persuaded the board of Ansells to buy the company.

Tamplin appointed Bill Turrell from Gilstrap-Earp (subsequently renamed as A.B.M.) as manager of the maltings in 1947. Tamplin in his time was an innovator. Turrell was not but provided solid managerial skills. The major technical improvement of this time was the installation of air conditioning in one of the Castle malt houses in 1950. We shall discuss technical aspects of malting development in Allied later but suffice it to say that air conditioning in floor maltings in the immediate



Figure 6. Rectangular conical bottom steep tanks, Ditherington Malt House to the design of H. Stopes.



Figure 7. Castle Maltings, Shrewsbury.

post-war period was relatively rare. Air conditioning provided better temperature control for barley germination and thus more consistent development of hydrolytic enzymes and improved malt quality. It also allowed an increase in output as malting could be continued into the months of June and July.

The business was now secure under the protection of a major regional brewer. Ansells was founded in 1857 by Joseph Ansell who was a maltster and hop merchant. He began brewing in 1881.⁸ Ansell had maltings at Aston, Birchfield, Handsworth, Moseley Road and Darwin Street as well as at Leamington Spa. None of these maltings were significant in relation to the William Jones business and were progressively closed.

William Jones and Son was now a brewer-maltster with sales secure; no need for advertising or salesmen and with the ability to supply Ansells at lowest cost. This suited Ansells who were known as being particularly tight in dealings with all suppliers.

The next significant 'player' to arrive in the business was William Albert (Bill) Preen who joined the company in 1952. Bill Preen was brought up in a children's home in Shrewsbury next to Belle Vue maltings. He learned shorthand and typing skills at the local technical college and joined Jones as a clerk. Preen progressed rapidly as Tamplin's mind turned more to matters Ansell when he became a director in 1957 and Turrell's technical ability was found wanting as brewers started to demand more from their maltsters.

There was a huge increase in the scientific knowledge of brewers in the 1950s and 1960s following the establishment of the Brewing Industry Research Foundation at Nutfield in Surrey and the Birmingham Brewing School. Outstanding research in malting was carried out at Nutfield in the 1950s by Essery, Kirsop and Pollock.⁹ This led to much reduced steeping and germination times in malting with the understanding of the benefits of interrupted steeping. This work was developed at A.B.M. by Alan Macey and Keith Stowell¹⁰ and at Paul's by Oliver Griffin¹¹ who joined Pauls in 1958. Tamplin knew he had to act and sent Bill Preen to see Oliver Griffin. This had a profound effect on the receptive Preen to the advantage of William Jones. Interrupted steeping and a method of germination known as 'strip malting', where the piece is laid out on its entire ground after steeping was introduced. Steeping and germination times were lowered and production increased.

Changes were in the air as Tamplin's and Turrell's retirement approached. Christopher J. Marchbanks was appointed Assistant Manager to Turrell in 1967. Marchbanks was a graduate of the Birmingham Brewing School and a friend of Oliver Griffin. He was the first graduate to be appointed into an 'Allied' malting. Tamplin was seeking to put technical expertise into the maltings. This seemed like sensible planning. Everything changed with the events of 1969. Tamplin and Turrell retired. Marchbanks was sent to Burton as an Ansells man to fight the cause under the protection of Bob Dickens, named Production Director of Allied Breweries. Bill Preen did not become manager. Eric

Cooper, former colleague of Walter Hyde at G.F. Milnthorpe's, was despatched to Shrewsbury to be manager as Hyde became Head Maltster of the newly formed Allied Breweries.

There was ambition here as Hyde sought to put his own man in charge. Was there lost opportunity to promote the innovative Preen or the technically astute Marchbanks?

Ind Coope and Allsopp and Free Rodwell and Company

Ansells maltings derived entirely from those of a sales maltster; the brewery's maltings having been progressively closed before 1965. Ind Coope maltings in 1969 had been formed from the considerable brewer-maltster interests of Ind Coope and Allsopp and the sales maltster, Free, Rodwell and Company.

It was established in the nineteenth century that there were essentially three ways of developing a malting business: as a brewer-maltster, sales-maltster or commission maltster. The objectives of the first two are obvious. Commission malting was a mixed business; a sales maltster produced the malt but used the brewers' working capital.¹² Normally the brewer would buy the barley and hand it over to the maltster to produce an agreed amount of malt at an agreed quality. This system could work well for a brewer. The malting business owned by the barley breeder, E.S. Beaven produced malt entirely for Guinness and the business was not bought by Guinness until Beaven's death.

As brewing companies developed in the nineteenth century however there was a suspicion that some sales maltsters used poor barley and dubious techniques to yield inferior malt. The same comment was applied to the production methods of commission maltsters. This led to the 'big' brewers of Burton upon Trent deciding to establish their own maltings. This was the case with Ind Coope and Allsopp's and for that matter with their great competitors, Bass and Worthington.

Ind Coope was founded in Romford. In 1799 Edward Ind acquired the Star brewery and was joined in 1845 by Octavious Edward Coope and George Coope to establish the business, Ind Coope. A brewery was opened in Burton in 1856.

Allsopp's history started much earlier. The development of brewing in Burton has received much attention from industrial historians.¹³ The year 1740 was significant in that it marked a change in the organisation of many breweries from inn-brewhouses into bigger and better equipped premises. Men of vision and capital began to enter the town. Such a man was Benjamin Wilson who was probably born in the Derby area around 1712. He married Hannah Walker who was the daughter of John Walker, landlord of the 'Blue Stoops' inn in High Street. Here Benjamin learnt about brewing. By 1750 with astute management Benjamin Wilson had increased the output of the brewery to around 1,000 brls per annum.¹⁴ By 1773 Benjamin handed over the business to his three sons. Of these the most competent was Benjamin jun. Benjamin Wilson junior was an outstanding figure in the development of brewing in Burton. He had an entrepreneurial spirit but was also meticulous, persevering and honest in all his business dealings. He developed considerable markets for his beer in the main in the Baltic rather than the home trade. In contrast to some of his competitors he appreciated the importance of 'sound' malt as the basis of yielding a beer with good keeping qualities which was essential in the export trade. Accordingly Benjamin set out to secure his malt supply by developing his own malt houses and taking great care in the selection of his barley which he demanded should be bought 'sound and dry'. He personally supervised the work in the maltings and was particularly keen on temperature control in germination believing rightly that this was important in overall malt quality. He established that the better the quality of the malt the greater amount of wort that could be extracted from it. This was the basis of his business success.

By about 1800 Wilson took his nephew Samuel Allsopp into the business. In 1807 the Baltic trade collapsed as a result of the Napoleonic blockade and Wilson sold his business to Samuel Allsopp for £7,000. On Wilson's death in 1812 the business went entirely into the Allsopp family. Benjamin's feel for malting and his knowledge of the process was passed to Samuel and his descendants. Throughout the nineteenth century the Allsopp brewery lurched from feast to famine. By 1911 the business was in the hands of receivers. Capital was restructured and merger attempted. In 1935 the business was merged with that of Ind Coope to form Ind Coope and Allsopp Ltd.



Figure 8. Mistle Maltings, No. 7 Malt House: 5 germination floors with barley storage above.

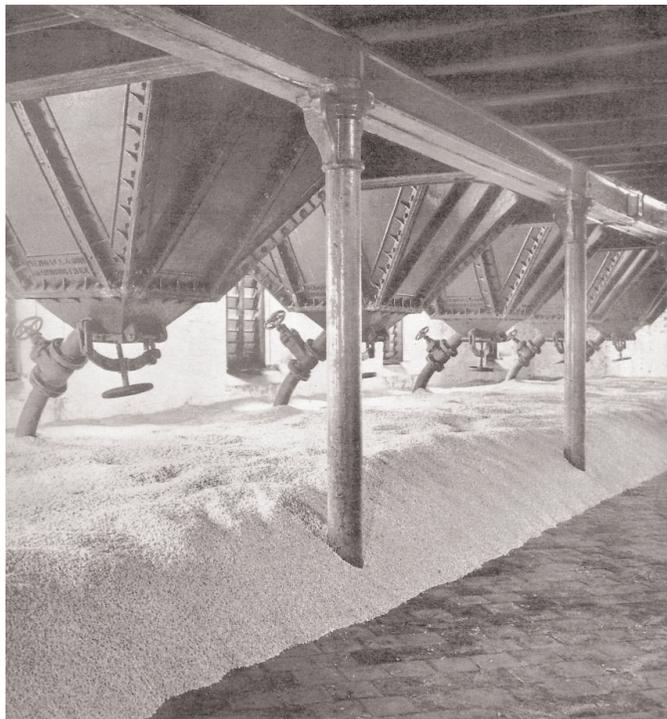


Figure 9. Self-emptying conical steps at Mistle designed by Robert Free.

A constant and successful factor throughout all this turmoil was the development of the maltings. Samuel Allsopp operated 21 malt houses in Burton. Four of these, nos. 18, 19, 20 and 21, were being operated at the time of the formation of Allied Breweries in 1969. A fifth (no 13) had been developed into a pneumatic Saladin malting plant in 1948 and was also still in production in 1969. This development was a good example of early innovative spirit to match Tamplin's air conditioning of the Castle floor maltings. The pneumatic malting box was invented by a Frenchman, Charles Saladin in 1881. This was a brilliant invention and the basis of all modern malting systems.¹⁵ British and especially English maltsters were slow to take up the development. And by the mid twentieth century few systems were in operation. Gerald Otho-Briggs T.D. joined Ind Coope in 1938 and was Head Maltster by 1949. Briggs was a charismatic and enterprising man. He drove forward the development of the Saladin plant recognising the potential for improved quality and lower costs.

Houses 18, 19, 20 and 21 were situated on Shobnall Road in Burton and were always known as Shobnall maltings. These four malthouses were operational for over 100 years until closure in 1981. I was manager from 1978 and had the painful experience of managing the closure. Shobnall maltings were the last floor malthouses to be operated in Burton.

We thus have maltings established entirely by the brewery which survived to the time of the formation of Allied Breweries. This was in contrast to the maltings established by Ansells which had all been closed by the time of merger. To complete the Ind Coope malting business in 1969 we have the considerable malting capacity formerly established by the sales maltsters Free Rodwell and Company.

Free Rodwell was set up in Mistley, Essex. Malting has been carried out in Mistley since at least the seventeenth century.¹⁶ Mistley lies on the banks of the river Stour and a quay was established there by the late eighteenth century. This provided export opportunities for malt to be supplied to the countries of Western Europe and to be shipped to the brewers in London. The other significant factor in the location was the superb barley growing land all around Mistley known as the Tendring Hundred; quite simply along with north Norfolk the best barley growing land in the country.

Partnerships in malting were being set up in the late nineteenth century.¹⁷ And in 1893 Robert Free, William Hunter Rodwell, Robert E. Free and E.N. Heneage merged their malting interests to form Free Rodwell and Company. The new company had a subscribed capital of £85000 and in its first year of operation made a gross operating profit of £5,817, £4,937 of which was retained in the business! It is significant that brewing contact was established very early in the company history in contrast to William Jones. The initial board included JA Ind and E.M. Ind, direct descendants of Edward Ind who had established Ind Coope and Company in 1845.

The initial operation included four malthouses; number 5 was commissioned in 1898 and then burned to the ground the following year. But the Company had great resilience and number 6 malting was planned and built before the end of the century with the biggest of all the houses, number 7 being completed in 1904 (Fig. 8). These seven malthouses were still operational in 1969 and were yielding 20,500 tonnes of malt.

Robert Free was the driving force of the business. He was a thoughtful and entrepreneurial maltster not unlike William Jones and Benjamin Wilson. Free designed a kiln in the mid nineteenth century which Stopes noted had a perfect height in relation to the loading so resulting in excellent even drying of the malt.¹⁸ Free published a pamphlet in 1888 which related to self-emptying conical steeping cisterns the use of which resulted in lower labour costs. These cisterns were still in use in 1969 (Fig. 9). He introduced wedge-wire kiln floors and mechanical handling systems for conveying barley and malt. And he saw the need to invest in storage capacity for barley to allow immediate removal of the grain from farms at harvest thereby safeguarding quality. All these factors together with Rodwell's commercial acumen gave the business competitive advantage.

All discussion so far has related to the production of pale malt. This malt would provide the basic extract of the beer ie the soluble material (mainly sugars) that would be acted upon by yeast to produce ethanol and carbon dioxide. Robert Free also established a business in Thorpe-Le-Soken near Clacton to produce crystal malt. This malt provided flavour and some colour to the beer but did not contribute to extract. This malt house was built between 1874 and 1878 and was the only malt

house to produce coloured malt in those coming to form the maltings of Allied Breweries. Crystal malt is made by roasting highly modified green malt in rotating drums. In the Thorpe process green malt was bagged and allowed to saccharify at temperatures of up to 65°C prior to loading to the roasting drum. Malt with a colour on the E.B.C. scale of 120 to 150 degrees was produced. And the endosperm was converted to a crystallised, 'glassy' mass. This process required skilled control. Production continued for over 100 years at Thorpe and was latterly in the hands of Dick Fairweather. The problem was that when Fairweather retired there was no-one suitable to be trained to take over and capital investment in new roasting drums was going to be needed. A business case to continue production could not be made and the malting was closed in 1980. All supplies of crystal malt and other coloured malts needed for Allied's breweries were then bought from sales maltsters.

Unlike William Jones, Free Rodwell and Company did not go bankrupt. Robert Free died in 1902 and his son who inherited his father's skills died in 1928. The company was at the forefront of malting development in the early to mid-twentieth century. Its markets in contrast to those of Jones were established and secure. This was through the presence of members on the Ind family on the board and the quay on the tidal river Stour providing export opportunity. By 1957 Ind Coope wanted to secure their malt supply and Free Rodwell recognised the changing environment of post Second World War European brewing as large groups started to form in the UK with increased purchasing power and hence the potential to drive down malt prices. Take-over was agreed with the minimum of fuss.

Management in Free Rodwell and in the Ind Coope maltings in the twentieth century could not have had greater contrast. At the top was Gerald Otho-Briggs who was Head Maltster from 1949 until his death in 1968. His interest other than malting was fast cars and he was killed near Mistley whilst driving an Aston Martin. He lived in Harwich. He did not concern himself with the detail of management but saw the big picture clearly and entertained his brewers well. At Free Rodwell, Otho-Briggs made a key appointment when long serving maltster Ivan Garwood was made manager in 1961. Garwood was still manager in 1969 and did not retire until 1978. Ivan Garwood was an exceptionally skilful maltster. He was also a fine hockey player and cricketer

and confidante of the Essex batsman Frank Rist. He saw his management role as forging a spirit of 'esprit de corps' a concept he pursued vigorously. He developed a strong management team headed by Technical Maltsters Keith Pollard and Geoffrey Cooley and Chemist Brian Bennett who was trained at the Alfred Jørgensen laboratories in Copenhagen. As a measure of his stature in the local community Garwood was able to persuade the farmers in the Tendring Hundred to deliver their barley to the maltings at harvest straight from the combine. A fair market price would be agreed later when all local barley was in. The system worked to mutual advantage for years.

He hugely developed the quay and established a separate business, 'The Mistley Quay and Forwarding Company'. All sorts of goods were imported and exported and parts of the maltings became stores to service the quay activities. Excellent malt was made at Mistley from a combination of the superb local barley and the maltsters' skills.

Malting in Burton was different. There was no local supply of good malting barley and so no close relationship with farmers. Employees were hard working but recalcitrant and in the 1960s swiftly embraced the Trades Union movement. Principles of 'work study', working to 100 B.S.I. stifled productivity. Management was difficult and at times attritional. Into this environment came Ronald Harry Bishop schooled by his father as a piece walker at Shobnall; another fine cricketer, gentleman and sound maltster but without Ivan Garwood's health, resilience and motivation. On Briggs's death Ron Bishop was an unhappy and apprehensive figure. But what happened at Tetleys?

Joshua Tetley and Son

Joshua Tetley was born in 1778 and was the fourth child of William and Elizabeth Tetley. William Tetley was a maltster at Armley near Leeds. This is the earliest malting reference to a business subsequently to form Allied Breweries. William Tetley built a large malting in Armley in the late eighteenth century (Figs 10 & 11). The malthouses impressed Alfred Barnard when he visited in 1889 when they had been in operation for over 100 years.¹⁹ William Tetley lived until 1834 but in 1822 the business had taken a different turn. Joshua Tetley (Fig.12) bought into brewing in 1822 when he pur-

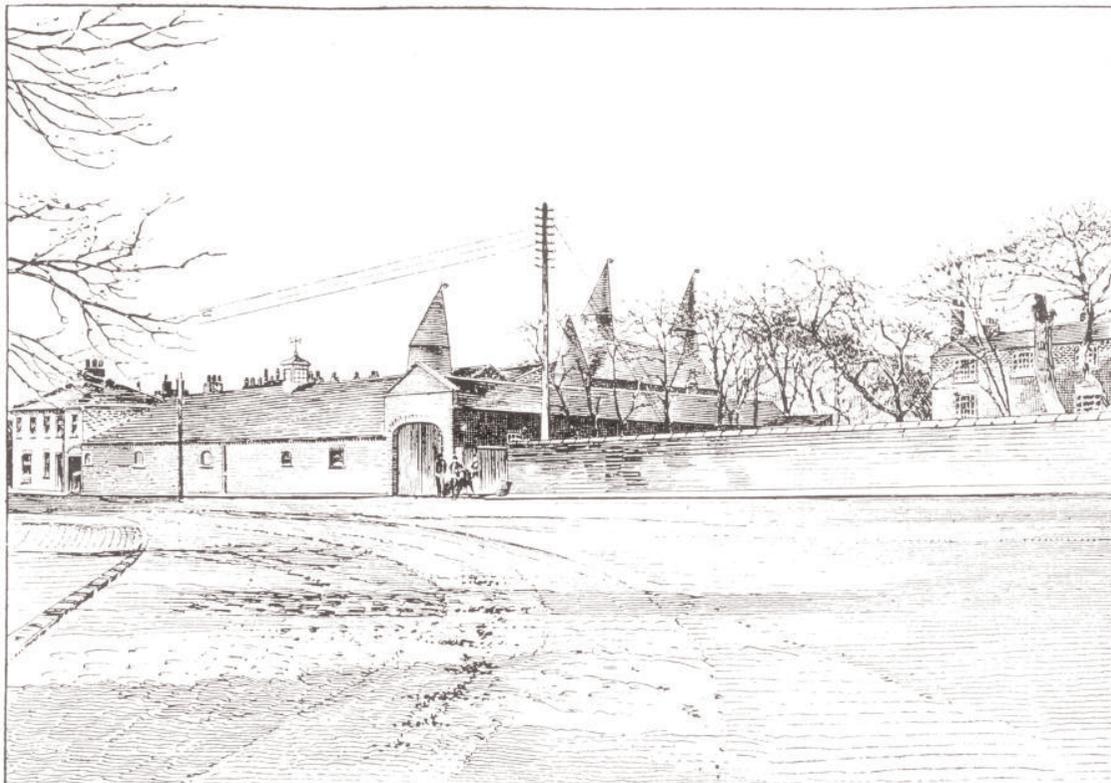


Figure 10. William Tetley's Armley Maltings.

chased the brewery of William Sykes in Salem Place, Hunslet Lane, Leeds for £409.²⁰ Joshua continued his father's sales maltster business until the 1860s but after that his efforts were devoted to brewing. But Joshua inherited his father's feel for malting and decided to continue to produce malt for his own beer. We thus have a circumstance where a maltster for sale became a brewer maltster. Joshua Tetley and his family descendants continued their interest in malting and developed considerable malting capacity throughout the 19th and 20th centuries as demands for Tetley's beer grew. James Noel Tetley (the father of Richard) was the last Tetley to be chairman of the company and served on the board of Allied Breweries from 1961 to 1968. He joined the business in 1923 after education at Pembroke College, Oxford. Noel started in the malting department working for the legendary Percy Goff and was deputy head maltster for 16 years. Malting was very important to the Tetley family. Noel studied barley growing and merchanting in the USA in 1925 and also spent time 'com-

paring notes' with maltsters R and W Paul in Ipswich in the 1920s.²¹ As employers Tetleys were innovators. Flexible working rosters were negotiated with the maltsters in the 1920s reflecting the seasonal nature of the business. Great interest was taken in the welfare and well-being of employees and standards of behaviour were expected to be high. Percy Goff famously posted a notice that 'foul language is not necessary in the making of malt'.

Crown Point maltings was built in 1866 (Fig. 13 & 14) and Barnard noted that he had seen, 'few maltings to equal these in appearance and structural quality'. I can vouch that the maltings at Crown Point were still structurally sound when closed in 1972. A further large floor malting was built at Meadow Lane and there were malt-houses at Sherburn in Elmet still operating in 1964. Seeds of Worksop were acquired along with the purchase of Ramsden's brewery of Halifax and this malt-house was still in operation in 1969.



Figure 11. William Tetley (1749- 1834), father of Joshua, from a picture dated 1794.

Of most significance was the construction of the drum maltings at Chadwick Street in Leeds about half a mile from the brewery. In the 1950s Tetleys saw the need to secure their malt supply by investing in modern production methods. This was akin to the Saladin box development at Ind Coope and to some extent to Tamplin's introduction of air conditioning to the William Jones Castle maltings. Essentially there were two ways of securing control of barley germination in large batches: the box invented by Charles Saladin and the drum invented by a Belgian brewer Nicholas Galland for whom at one time Saladin worked. Galland's first pneumatic malting plants were not wholly successful.²² Developments were made notably by the engineer Julius Henning and much later the British engineers Robert Boby of Bury St. Edmunds and J. and E. Hall of Dartford, Kent combined to produce the Boby-Thermotank drum malting. Tetleys installed such a plant in 1955 (Fig. 15). At this time Tetleys could lay claim to having had a major position in UK malting for almost 200 years.

All the maltings developed by Tetleys were subsequently demolished with the exception of the buildings housing the drum malting at Chadwick Street. On closure in 1984 the maltings were sold to the Sales Maltsters J.P. Simpson of Alnwick. Simpsons never operated the maltings and only used the site for barley drying and storage. The site was then acquired by the Yorkshire Design Group (Y.D.G.) and was expertly re-developed. The Malthouse refurbishment was completed in 2000 using Baumann Lyons as architects and was used as the site for 'Freeserve', the U.K.'s first subscription free internet

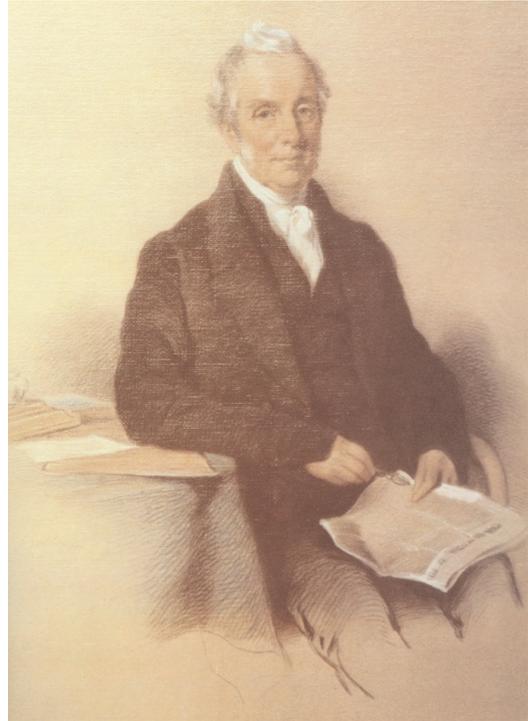


Figure 12. Joshua Tetley (1778- 1859) by J. Gilbert, 1852.

service provider. The barley storage buildings which had come to be known as 'Small Mill' were also redeveloped and were once occupied by Arup engineers. Even the 200 tonne metal barley storage silos were converted into three storey office space. These buildings are now owned by 'Epiphany Solutions', a company which specialises in search engine optimisation (S.E.O.) and pay per click (P.P.C.); techniques associated with optimising customers' impact in their business development. We see a huge change from manufacturing to optimisation of digital systems. But at all times the businesses carried out at Chadwick Street from Tetleys to Epiphany have been in the forefront of their areas of expertise.

Percy Goff ably supported by Noel Tetley was probably the doyen of Head Maltsters in the 20th century but the man who shaped the business in to the modern day in the way of D.R. Tamplin at Ansell's and Gerald Othobriggs at Ind Coope was J.K. (Ken) Fergusson.

Fergusson was in charge of Tetleys maltings at the time of the initial merger discussions in 1961. Just after this

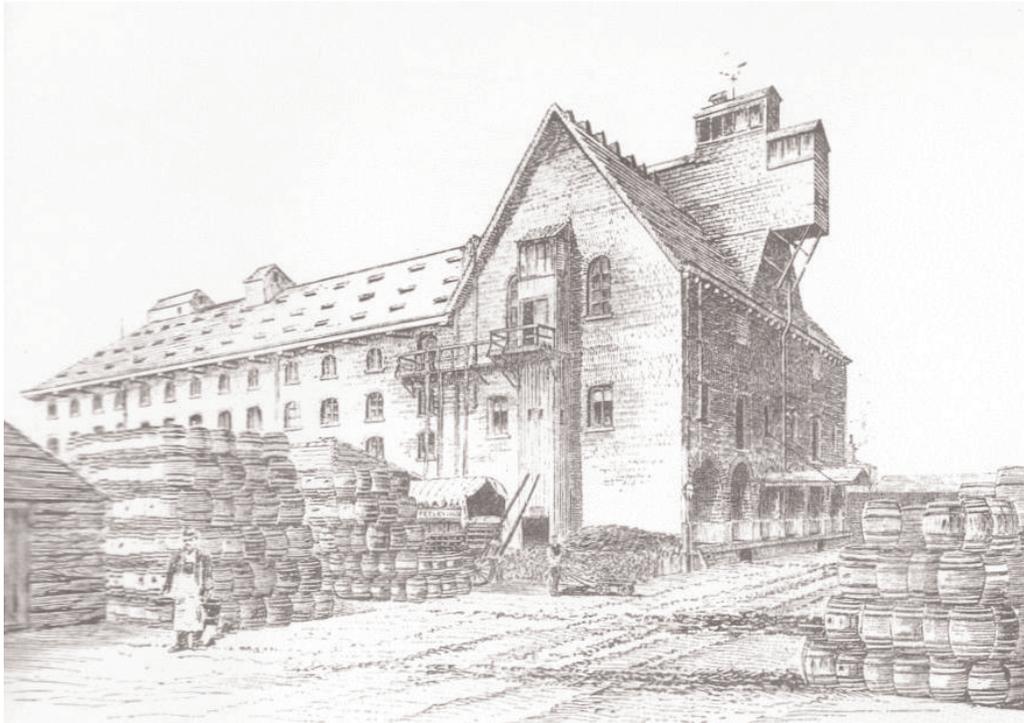


Figure 13. Tetley's Crown Point Maltings in 1866.

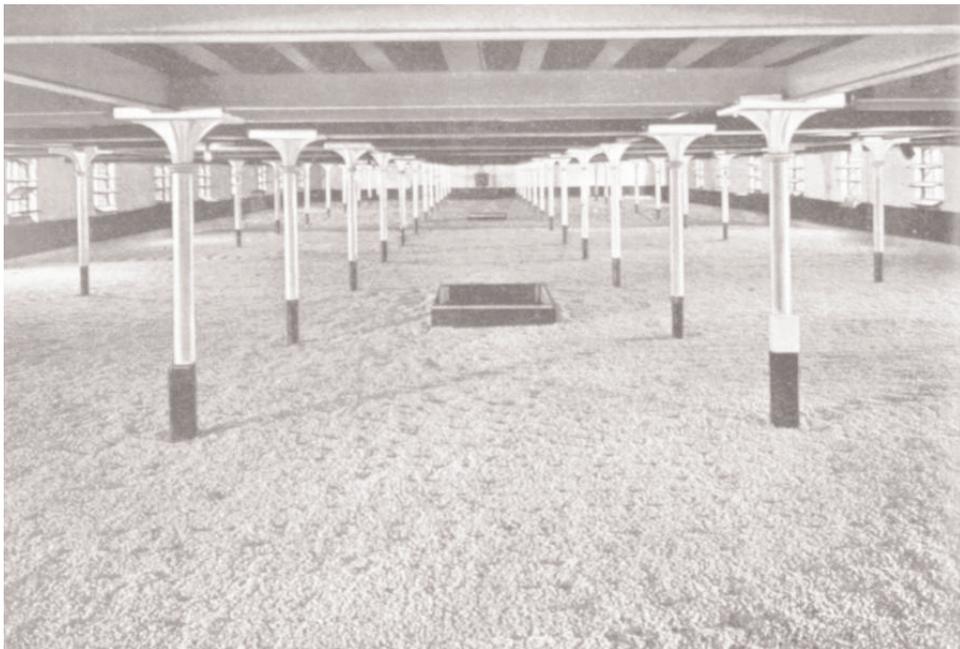


Figure 14. Germination floor at Crown Point.

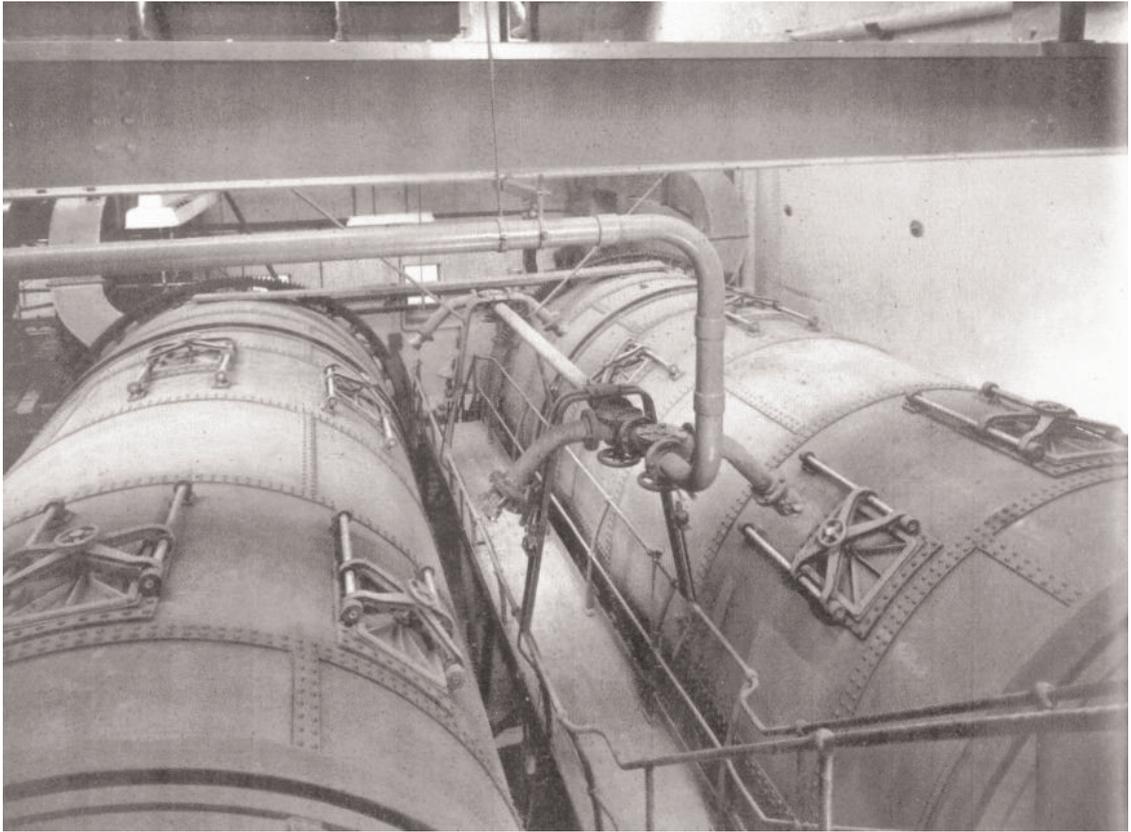


Figure 15. Boby-Thermotank germination drums, Chadwick Street Maltings, Leeds.

time there were to be significant acquisitions and an important joint venture.

G.F. Milnthorpe's in Barnby Dun near Doncaster were sales maltsters and operated six floor houses in the village. They were suppliers to Tetleys and were run by Sydney Crampton, an uncompromising and sometimes harsh man. The Sales Director was Walter Hyde. Financial hardship struck the business in the 1960s and Crampton wished to sell the business to Tetleys. Tetleys agreed to buy two houses, numbers 6 and 7 by the station and known as Station Maltings. The other five malt houses were closed. Crampton retired and Ken Fergusson said he had no job for Walter Hyde in Leeds. But Fergusson persuaded Otho-Briggs to take Walter Hyde as his deputy in Burton.

C.E. Seed of Clayton, Bradford were maltsters in Worksop, Nottinghamshire. They had acquired the busi-

ness in 1931 from William Glossop and Bulay and operated the maltings until 1963 when they were taken over by Ramsden's of Halifax. Ramsden's were duly absorbed into Tetleys in 1964 and hence another malting business was acquired by Allied Breweries. There was just one malt house with three floors, a brick-built steep and a phenomenal kiln with turners.

Noel Tetley and Ken Fergusson were also instigators of the joint venture with Sandars of Gainsborough known as the Gainsborough Malting Company. In 1963 about 10,000 tonnes of malt were being delivered from Gainsborough maltings to Tetley Walker. This worked favourably for both companies. Tetleys needed the malt and this was a secure supply for Sandars at a good margin. The joint venture continued until 1969 when Sandars were taken over by Pauls and the ownership of the supply proved uncomfortable for Walter Hyde who negotiated release from the contract. Fergusson was

then promoted to production manager of the brewery by Richard Tetley and the Tetley maltings came under the control of the Bass trained Douglas Michael King, a highly ambitious and driven man. At the time of the formation of Allied Breweries the Tetley contribution to the whole malting business comprised the floor maltings at Crown Point, Barnby Dun and Worksop and the drum maltings at Chadwick Street.

The effect of the malt tax

Malt was taxed continuously from 1711. From 1830 the only tax levied on beer was that on the malt.²³ This tax lasted for 50 years until it was repealed by Gladstone in 1880. The unit was the bushel defined as 2,150.42 cubic inches and the rate for most of the 50 year period was 2/8½d per bushel.²⁴ This tax had a profound effect on the malting industry. Excise officers were determined to prevent fraud and so highly prescriptive measures were introduced to the malting process primarily focussing on the presentation of the barley to the steep and the subsequent steeping process.

If steeping more than 8 bushels of grain (448 lbs, 1 quarter) it was required that the steeping cistern must be permanently made and be rectangular in shape. The depth must not exceed 40 inches nor the width eight feet (Act 7&8 Geo.IV cap 52). This vessel prepared the barley for the couch frame where the steeped grain took up more volume and so was subject to more tax. It was in the couch frame where the excise officer made his gauging of volume on which the tax was levied.

The abolition of the malt tax gave a stimulus to the industry and allowed innovation in steeping and an increase in batch size. By 1885 Stopes is adamant that only one type of cistern for steeping is to be considered and that is a self-emptying vessel with hopper bottom. Stopes had his own vessel for sale in that year.²⁵

It is significant that the main development of William Jones's business took place after the repeal of the tax. He built the Belle Vue maltings with Stopes in 1888 and the acquisition and conversion of the Ditherington flax mill was 1897. Ditherington maltings was 'full' of conical self-emptying steeping cisterns. Jones was not much affected by the malt tax. Free Rodwell was established in 1893 and so this was again after the abolition

of the tax. Robert Free designed a self-emptying steep in 1888 and these vessels were still in use when the Mistley floor maltings closed around 90 years later. These are examples of entrepreneurial development arising as a result of a change in the legal environment.

Developments in Allsopps would be influenced by the tax. In Benjamin Wilson's time malting would be on a very small scale associated with small scale 'inn-brewing'. But the major expansion of Samuel Allsopp's malting business occurred after 1880. Nevertheless the steeping cisterns in the Shobnall floor maltings (numbers 18-21) were rectangular ditches holding 175 quarters each. They were not self-emptying. This reflects Allsopp's more traditional approach compared to the sales maltster innovators: William Jones and Robert Free.

William Tetley died in 1834. He was thus to see the time when the only tax levied was that on the malt. He would have been directly influenced by some form of malt tax all his working life. The best of the maltings, Crown Point, was built in 1866 and contained the same rectangular steeping cisterns right through to closure in 1972. We thus see a contrast in the history of the maltings coming to form Allied Breweries. The old floor maltings of the brewers (Allsopp, Tetley) were built either at the time of the malt tax (before 1880) or were influenced by the strictures of the tax. In contrast the developments of Free and Jones reflect the more stimulating business environment occurring after the repeal of the tax.

The merger process of 1969

All mergers are painful to some people and are happy events to others. Walter Hyde was in the right place at the right time. Gerald Otho-Briggs was dead. D.R. Tamplin and Bill Turrell retired and Ken Fergusson was 'promoted' and soon to become Tetleys Brewery Director. Hyde was Head Maltster of Ind Coope and Douglas King Head Maltster of Tetleys. Hyde was in Burton and had the ear of Bernard Kilkenny. King was in Leeds and saw the retirement of Noel Tetley and the move of Richard Tetley to Burton; he had no one to fight his cause. Walter Hyde was appointed Head Maltster of Allied Breweries and Douglas King 'demoted' to Malting Manager, Leeds. King never forgot this act which fermented in him a bitterness which was to

last for the rest of his career. Ambition satisfied and ambition frustrated.

Hyde moved quickly to strengthen his position. Eric Cooper, his old friend was moved from Barnby Dun, working for Douglas King to fill the vacancy for a manager at Shrewsbury. Ivan Garwood and Ron Bishop were confirmed in position as managers at Mistley and Burton respectively. Hyde established himself an office at Mistley in the room once occupied by Otho-Briggs.

Production and technical aspects of the maltings

In the environment of the 'loose' operation of ICTA in the 1960s there was realisation in Ind Coope, Tetleys, and Ansell's that something needed to be done with the maltings. Tamplin undertook a survey of all the maltings in 1963/64 to compare costs.²⁶ This was ambitious and revealed some interesting figures. The value of the assets held on the books of the constituent companies varied widely and Tamplin found it difficult to make meaningful comparisons. But he was a determined man and keen to show the efficiency of his William Jones operations:

Cost of malt (per quarter in shillings and pence) based on 1963/64 budgets and 1963 crop barley:

Mistley 137/8
 Burton 156/7
 Ansell's 138/7
 Tetleys 157/4

The figures reveal the lower barley and wage costs at Mistley and Ansell's and the higher wage costs at Burton and Leeds; the brewery sites. Similar work was carried out by Ken Fergusson of Tetleys with similar results. Little seems to have been done with these figures. There simply was not a management structure in place in which the figures could be discussed or actions planned. A follow up report was made by Chris Marchbanks on the mechanisation of floor maltings.²⁷ The object was to lower the largest fixed cost, that of labour. Marchbanks pointed out that wages costs were accelerating faster than energy costs and he could perceive a day when floor maltings would be uneconomic. Again there seems to have been no action on his report; there was no forum available for the discussion of its con-

tents. Following the merger process of October 1969 there now was a mechanism in place for plans to be assessed and actioned.

Walter Hyde thus inherited a mixed bag of maltings. Investment had been neglected as directors of Ind Coope, Tetleys and Ansell's sought to dominate the new group and malting was not seen as a major issue. Bernard Kilkenny and Bob Dickins had other things on their mind as they sought to focus and centralise the control of beer production. Dickins' knowledge of malting was scant. Hyde realised his opportunity and set about putting together a malting development plan to invest in new capacity, to close outdated plant and to secure the future of Allied's malt requirements. This was not to be popular with the U.K. sales maltsters who strived hard to thwart the plan and prevent its completion.

The production outputs of the maltings making up Allied Breweries in 1969/70 was:

Management Location	Plant	Output (tonnes)
Burton on Trent	Shobnall	16,000
	Saladin	11,000
Mistley	Houses 1 to 7	21,000
Leeds	Chadwick Street	9,000
	Crown Point	3,000
	Worksop	3,000
	Barnby Dun	4,500
Shrewsbury	Ditherington	6,500
	Castle	4,000
	Belle Vue	2,500
	Total output	80,500

This production volume of malt would require about 96,000 tonnes of dried and screened barley ready for steeping. This would in turn equate to about 105,000 tonnes of green barley requiring to be bought. At this time around 10,000 tonnes of malt was also supplied from the Gainsborough Malting Company (G.M.C.) as result of the Tetley contract.

This total volume of malt represented about 80% of Allied's malt requirement for a production volume of 7.5m brls in 1969. The remaining quantity of around 34,000 tonnes was bought from U.K. sales maltsters. This quantity of malt made up approximately 75% of the extract of Allied's beers. The remainder being derived from sucrose, hydrolysed starch syrup and flaked barley.

The bulk of the output (75%) was being produced by floor malting and the two mechanised plants were 20 and 15 years old and were in poor states of repair. A watershed was faced in planning ahead for the malt requirement; should the maltings be closed and all the malt bought in the market place or should new plant be designed and built? Of course there simply was not 100,000 tonnes of malt available to be bought and to meet this need A.B.M. or Pauls or someone would need to build new capacity. As we have seen considerable malting expertise was inherited from the constituent companies of Allied and in Walter Hyde there was a man driven by ambition to see his 'own' new plant built. But as Hyde set about his development plan in the early 1970s his problem was an almost total lack of scientific knowledge of the malting process and how it could be controlled. But work was getting underway elsewhere in the now focussed Group.

The research background

I joined Tetley-Walker at Warrington in 1969 with a degree in biochemistry. I was put to work in the small research department under the direction of the Laboratory Manager, P.A. (Tom) Martin. Tom Martin, a Surrey man, had started his working life at the Brewing Industry Research Foundation at Nutfield and subsequently worked at Tunnel Sugar Refinery in London. At Nutfield he had worked alongside legendary figures such as R.E. Essery, B.H. Kirsop, J.R.A. Pollock, J.R. Hudson and A.H. Cook and more directly with Ron Hall and George Howard. These three men: Ron Hall, George Howard and Tom Martin were to have a profound effect on the technical development of Allied over the next 20 years.

Ron Hall was a visionary and inspirational scientist from Alloa. George Howard was a first class organic chemist educated at Manchester and Cambridge universities. Tom Martin worked for them both at times and

was able to hone the abilities of Hall and Howard into his own approach of pragmatic excellence. No one could appreciate the relevance or significance of a piece of brewing research like Tom Martin consequently he was axiomatic in the technical development of Allied's breweries and maltings.

I started work with Tom Martin's guidance on the study of β -glucanase enzyme activities in finished malt. This was a follow on of the work of Derek Bourne and John Pierce at Guinness.²⁸ What Tetley-Walker and Guinness had in common was the use of unmalted adjunct in the mash. Hence there was a need to study the breakdown of barley gum materials (β linked polysaccharides) so that they did not impede mash tun drainage and malt extraction. The work proceeded rapidly and a full survey of β -glucanase activities in all of Allied's malts was quickly established. The next step was to understand how to control and optimise this activity.

Inevitably power struggles were underway on the technical side of the business as the October revolution took hold. It is remarkable that Hall, Howard and Martin all subsequently left Nutfield for Warrington. Ron Hall was the first of the Nutfield scientists to enter industry. In many ways his ideas were too radical for the conservative management of Tetley-Walker. He was interested in continuous brewing and questioned the need to use Yorkshire Square fermenting vessels to produce Tetley Ales. George Howard was recruited to provide a scientific basis to Ron's ideas and to temper his enthusiasms. Howard needed Tom Martin to provide more substance and rigid discipline to the work. There was a considerable technical power base at Tetley Walker as Allied was formed. By 1969 however Ron Hall was in Burton and running the Ind Coope research department. George Howard who fitted much better with the Tetley ideal was Chief Chemist and Technical Director of Tetley Walker; he was close to Richard Tetley. Tom Martin was his right hand man. As Bernard Kilkenny took a grip of the whole of Allied's production he came up against the mercurial Hall. He was unable to tie him down. Kilkenny wanted a more straightforward and organised man. In a move of breath taking swiftness Hall was moved to 'special projects' and Howard was moved from Warrington to be Research Director. Howard took Tom Martin as his Technical Manager. Technical power was removed from Warrington and firmly established in Burton. I was given two options: move to Burton and

continue my research or stay in Warrington in quality control. I moved.

There followed five years of malting process research in the Allied research department in Burton. Work was closely coordinated with Walter Hyde and his team. The development of the β -glucanase enzyme system was studied in all maltings in the group under production conditions; unique research. Methods for optimising enzyme development were established. This included the use of gibberellic acid and bromate.²⁹ Papers were published and lectures given.³⁰ The technical basis of Hyde's plans came to be established. Some background is necessary to understand the significance of this work.

Malting is a process of controlled seed germination. The barley corn desires to develop into a green plant in a field. The maltster seeks to control germination to obtain breakdown of high molecular weight polysaccharides and proteins in the endosperm of the barley grain whilst minimising the development of roots and the shoot. First studies on the physiology of barley germination were by Brown and Morris.³¹ They suggested that hydrolytic enzymes produced in the embryo caused the breakdown of starch in the endosperm of the barley corn. Haberlandt however suggested that it was in the endosperm where the enzymes were produced.³² Confusion continued until 1937 when Linderström-Lang and Engel³³ showed that in germination enzyme activity increased in endosperm tissue adjacent to the aleurone layer (the layer of cells three deep surrounding the endosperm) and that this could be due to the release of α amylase. However this work was overlooked by practical maltsters. The early work was re-assessed by Kirsop and Pollock at the Brewing Research Foundation.³⁴ Embryos were removed from germinating de-husked barley on successive days. Germination was incomplete if embryos were removed on the first or second day. Removal at a later date had no effect on grain modification. Some material was thus released by the third day in amounts sufficient to cause normal modification. Overlooking the work of Haberlandt this material was assumed to be enzymic. But at this time Yomo³⁵ demonstrated that enzyme-free filtrates from germinating excised embryos could induce amylolytic activity in endosperm fragments. And this work was confirmed by Briggs.³⁶ Yomo suggested that this activation was owing to a hormonal factor. And subsequently Yomo³⁷ and Paleg³⁸ showed that gibberellic acid could

also induce the production of a amylase in isolated endosperm. Yomo succeeded in partially purifying the hormone and showed it had the characteristics of a gibberellin. This work provided a valuable unifying link to understanding the work of early Japanese workers on gibberellins. Gibberellins were first recognised as metabolic products of the plant pathogen *Gibberella fujikuroi*. Rice plants infected with the fungus showed overgrowth symptoms. Kurosawa³⁹ showed that this elongation also occurred after treating seedlings with culture filtrates from *G. fujikuroi*. This work was neglected and so its significance in the metabolism of higher plants was overlooked until Margaret Radley⁴⁰ showed that extracts from plants could produce similar effects to authentic gibberellin. And she showed that gibberellic acid is definitely synthesised by barley.

The first demonstration of the effect of gibberellins in malting was by Hayashi.⁴¹ But again British maltsters were slow to react to this until the co-ordinating work of Radley and Kirsop and Pollock in the U.K. was understood. Gibberellins are produced in the embryo of the grain and migrate to the aleurone layer where the production of hydrolytic enzymes is initiated.⁴² This was a light-bulb moment for maltsters and resulted in the major commercial exploitation of the use of gibberellic acid first by Sandegren⁴³ and then by Macey and Stowell⁴⁴ and provided the fundamental background for our own work. In early work with gibberellic acid it was found that the hormone stimulated the development of proteolytic enzymes more than that of the carbohydrate degrading enzymes. In quite brilliant work it was found by Macey and Stowell⁴⁵ that the use of bromate salts applied to the steeped barley could mediate this action and result in the production of a balanced malt in a shorter time than if the compounds were not used. Bromate was used in the baking industry where it acted as a flour 'improver'. This was owing to its action as a powerful oxidising agent resulting in the oxidation of sulphhydryl groups in wheat gluten to form disulphide bridges and so stabilising the protein. The detailed mechanism of its action in malting has not been explained but its oxidising activity is likely to be important.⁴⁶ Enzymes involved in the glycolytic pathway have sulphhydryl groups. If these were oxidised by bromate then the enzyme would be inactivated thus interrupting energy production in the cell. This would mean less energy available for protein synthesis and hence a lowering of proteolytic activity resulting in

lower soluble nitrogen in the malt.⁴⁷ Gibberellic acid and bromate came to be known as malting aids and were in extensive use from the 1960s through to the 1990s.

As our work proceeded there was a threat. Some brewers in the late 1960s and early 70s were experimenting with brewing beer from raw barley, hammer milled and treated in a hot water mash with external enzymes of fungal and bacterial origin. If successful this could mean the end of malting. At about the same time malting work at B.I.R.F. at Nutfield continued in the hands of the compelling Godfrey Henry (Geoff) Palmer. Palmer (who subsequently became a professor at Heriot-Watt University) developed the concept of malting abraded barley. He carried out experimental malting of barley abraded at the distal end of the corn.⁴⁸ Palmer's theory was that the abrasions allowed greater uptake of externally applied gibberellic acid and this stimulated the development of hydrolytic enzymes and resulted in higher hot water extract in the malt. The barley corn was essentially malted from both ends. Of greatest significance to the practical maltster was the potential to save malting time. Pilot scale work confirmed the results and the first commercial work was reported by Paul Northam of Watneys at the European Brewing Convention in Salzburg in 1973.⁴⁹ I was present at Northam's talk and reported to Tom Martin and Walter Hyde. This was just what Hyde was looking for. The shortest process time in Allied maltings was seven days. On this basis Hyde was finding it difficult to make a financial case for investment in new plant. But if malt could be made in six days with no loss of quality then a return on investment could be achieved.

On leaving process research with my PhD⁵⁰ my job was to demonstrate that sound brewing malt could be produced in six days total time. Trials were carried out using barley abraded with the two commercial machines available: Simon Entoleter and the Richard Sizer Barley Abrader.⁵¹ It became clear that it was difficult to produce malt to the Allied Breweries' specification from abraded barley by floor malting. Water uptake in steeping is enhanced by abrasion and the husk of the corn is weakened. This leads to the development of excessive germination temperature, increased soluble nitrogen and high colour on the kiln. It is difficult to control these factors on the malting floor. This was not the case in the pneumatic maltings: the Saladin boxes in Burton and the Bobby drums in Leeds. Steeping times and germina-

tion temperatures were lowered and kiln temperatures were reduced. Colour and soluble nitrogen were thus controlled and this control was finessed by using less gibberellic acid and more bromate. We furthered the work of Macey and Stowell to our own advantage. Sound brewing malt was produced.

I believed that neither machine produced barley with exclusively distal end abrasion. Was Palmer's theory wrong? Did this matter? Dennis Briggs working at the British School of Malting and Brewing at Birmingham University had a different explanation of the benefits of the process.⁵² Briggs' work suggested that the benefits of abrasion were as a result of a loosening of the husk and increased oxygen accessibility to the embryo and aleurone layer rather than the provision of extra entry points for gibberellic acid. These different views provoked an intense debate in the letter columns of the *Journal of the Institute of Brewing*. The matter is not resolved and is unlikely to be resolved with the paucity of brewing research now taking place. But to the practical maltster the explanation really did not matter. The fact was the process worked and properly carried out could lead to a saving of one whole day of malting time. The Simon entoleter was a robust machine but if barley throughput and rotor speed was not carefully controlled the barley could be excessively damaged. The Sizer machine yielded a very gentle abrasion but the machine was prone to breakdown and despite intense efforts by George Porteus (the designer) these problems could not be rectified. We decided to proceed with the Simon machine and on this was the malting development plan founded.

The technical background to the malting development plan

As a result of this work in the Burton Saladin plant and in the Bobby drums at Leeds I confirmed to Walter Hyde that he could base the malting development plan on six days total process time. Before I joined the maltings in 1975 to carry out this early development work on abrasion Walter Hyde undertook a visit to the U.S.A. to look at malting plant. His trip was intensive and he produced a series of idiosyncratic reports. There was little technical content in the reports but he was impressed with the batch size of American plants and realised economy of scale was to be a big factor in developing a plan for

Allied Breweries. At this time Hyde also forged a friendship with Jan Menu from Kloosterzande in The Netherlands.

Menu, a brewer, had designed a malting using a large rectangular box for germination. The batch size was 100 tonnes of barley. In this plant Menu combined germination and kilning in one vessel with a separate vessel for steeping. He produced a standard lager malt for European mainland breweries. Menu took advantage of liberal Dutch building regulations to build at low capital cost. He financed much of the work himself.

A major factor in achieving the production of malt to Allied Breweries' specification in six days process time was to ensure the maximum efficiency in application of the malting aids, gibberellic acid and bromate. Small scale work and production work at Leeds and Burton had suggested that this was best achieved by applying the materials to the barley *en route* from the steep to germination. This work implied that a separate steeping vessel would be required. This design was thus similar to that developed by Menu.

The dilemma was to balance the lowest capital cost with a plant meeting the quality requirements. Capital could be saved by reducing the number of vessels. This had been achieved in the most spectacular way by Oliver Griffin.⁵³ Jim Pollock⁵⁴ had worked on a re-steeping process and had shown that prolonged aeration in which germination took place followed by further steeping resulted in malt production with very low malting loss. Alan Pool⁵⁵ suggested that this re-steeping process could obviate the need for grain turning in germination. Root growth was virtually eliminated. Griffin brilliantly exploited these ideas to build a maltings at lowest possible cost; malting in a single vessel with no grain transfers. This was at Mendlesham in Suffolk. This was bold stuff and was too risky for us. We simply could not take the chance of malting without turners. The risk was subsequently too great for Griffin as well. Variable barley quality made it difficult to achieve consistent malt quality from the re-steeping process. In a further development turners were installed at Mendlesham.

Another issue which taxed maltsters in the mid-1970s was the cleaning of the germination vessel. Up to this time cleaning was often given scant attention. The high humidity conditions in germination were suitable to

allow considerable growth of various moulds. Often germination vessels were in a very bad state. And food hygienists were beginning to take an interest in these conditions and their potential to result in 'contaminated' malt. It was realised that by combining germination and kilning in the same vessel mould growth could be eliminated. This was seen as a major advantage.

An effective solution was thus emerging from my trial work, Hyde's American visit and the developments by Jan Menu: combine germination and kilning in one vessel and steep in a separate vessel. This realised the advantages of cleaning, effective application of gibberellic acid and bromate and elimination of transfer of germinating grain to the kiln thus maximising process time. This was the plan. Where should the maltings be built?

The Mistley development

In the mid-1970s Allied had breweries at (in order of output): Burton, Leeds, Warrington, Birmingham, Romford, Wrexham and Alloa. Production at Wrexham was entirely of bottom fermented lager beer. Alloa production was almost entirely lager with a small volume of keg ale for the Scottish market. Maltings were at Burton, Mistley, Leeds and Shrewsbury. The dilemma is always do you build maltings where the breweries are or where the barley is. In any event a transport bill must be faced. Do you move barley long distances at 12% moisture or move malt at 3% moisture? There was no doubt that Mistley was in the best place for barley and Burton in the worst. It should also be recalled that 'Ind Coope' management was in the ascendancy in the Group. Walter Hyde liked Mistley and had an office there. Industrial relations problems were non-existent at Mistley but at Burton in a strongly unionised environment they could be tough. Hyde did not relish direct involvement with the Unions and his Burton manager, Ron Bishop was ailing. Bernard Kilkenny was supportive of the maltings development and was also keen to see development at Romford brewery to increase output to around two million barrels per year, 'it is where the chimney pots are'. Mistley got the vote.

A project team was set up between Engineering Services and the Maltings. This was how it was then done. This was the legacy of Neville Thompson, Edward (subse-

quently Sir Edward) Thompson's brother. Edward Thompson was the Chairman of Ind Coope at the time of the 1961 merger talks. Neville Thompson was an entrepreneur and a visionary developer and enjoyed his brother's patronage. He got things done and put Ind Coope on the map. He established a huge projects department with specialists in all disciplines: Mechanical, Civil, Electrical engineering and Architecture. By the mid-1970s Neville was retired and the department was under the control of the sophisticated skills of Malcolm James (Mac) Barlow. Barlow very much had the ear of Kilkenny and was oriented upwards. He did not deal with day to day problems. The effective management was in the hands of Leslie Roberts, a Londoner with a mind as sharp as a razor and all the manipulative skills of an east end street trader. Roberts put together a team headed by John Snaith, a blunt Yorkshireman and former Chief Engineer of Tetleys. He always called himself, 'a black-hand engineer'; he was supremely practical and highly experienced. Snaith had learned his craft with George Porteus in Leeds. He could be irascible and awkward, qualities often needed in a project manager. I learned huge amounts from him about conveyors, shear pins and Allied Breweries survival techniques.

A design brief was rapidly put together. Inevitably allocation of capital was tight. The project had to compete with other production projects at the breweries of the Group. Allocation of capital was decided by the Capital Projects Committee, an august body chaired by Bernard Kilkenny. The trick for success was presentation. This was undertaken by John Leslie Dunwell, Walter Hyde's boss's boss. Dunwell was a bright star and formerly the youngest ever Head Brewer at Burton. He was Chief Executive Production and next in line to Kilkenny and the boss of Bob Dickins. Hyde was frustrated that he could not present his plan but that was how it was done; hierarchy prevailed.

Initial work had suggested a modular approach to the development. In 1975 around 1.2 million barrels of beer were being brewed at Romford annually. This required about 20,000 tonnes of malt. From informal discussion we reckoned that a barley batch size of between 100 and 150 tonnes was 'safe' for the development. We were already committed to 6 days processing time. A figure of 140 tonnes was plucked from the air for the batch size.

Thus:

Production Yield = batch size x number of batches.

Consider a 350 day production year

We have 4 days residence in the box (3 days germination; 1 day kilning)

Number of batches/box = 87.5

Assume yield of kilned malt from barley is 84.5%

Yield from one batch = 140 x 0.845 = 118.3 tonnes

Production Yield = 87.5 x 118.3 tonnes/box

= 10351 tonnes

For two boxes we have:

Steeping Vessel 100% utilised

Box 100% utilised

Kiln equipment 50% utilised

Annual Production 20,702 tonnes

This output would satisfy demand at Romford. The plant could be easily extended. Adding a second steep vessel would allow the construction of two more boxes and would result in 100% utilisation of all the plant. The output would be around 41,400 tonnes and this would easily take care of planned development of Romford brewery to two million barrels annually.

This was the plan presented to the Capital Projects Committee. Vague 'fag packet calculations' had indicated a capital cost of around £1.75m. Mistley floor maltings would be closed and a satisfactory discounted cash flow (D.C.F.) rate of return would be achieved. The project was approved.

Which company would build the plant? There were nebulous assumptions around in Allied Breweries in the mid-1970s that capital projects should be carried out by U.K. companies. There were two British malting engineering companies: Redler of Stroud and Vickers Boby. The Sales Manager for Vickers Boby was the charismatic Quentin Bone. Bone appeared able to sell anything but in reality he had little to sell. The design engineer was Jim Rockley who was hugely talented but very diffident. Rockley had designed a circular germination/kilning vessel but none had been built or sold. We wanted a rectangular box and Vickers could not do it. Quentin Bone was right when he said the way forward was with the circular vessel but we would not take the risk. It was too soon.

The success of Redler was based on the en-masse conveyor. This was a brilliant design by the founder of the

Company, Arnold Redler in 1920. Materials were made to flow like a liquid through enclosed dust-tight cases by means of light weight 'skeleton' type flights. There was no pressure on the material and breakage was minimal. The machine was ideally suited to moving barley and malt. The conveyors could operate horizontally or vertically. For use in the vertical mode the term 'elevayor' was coined. These machines could often act singly and replace a conventional conveyor and bucket elevator. In some applications the machine would be inclined at 60° to the horizontal. It worked just as well.

The Redler sales team was led by Doug Drake and Peter Cook but the real star was Richard John Dangerfield. Dick Dangerfield was a man of great charm who spoke carefully in a measured, soft Gloucestershire accent. He was a clever malting engineer and a complete master of psychrometric charts and fan design. The mid-1970s was a time of great activity in the U.K. malting industry. Redler were actively tendering to build malting plant for Hugh Baird at Pencaithland, Munton and Fison at Stowmarket and for Midland Malting at Banagher in Ireland. In all these contracts they were successful. In all cases germination and kilning was to be in a rectangular concrete box. After protracted negotiations Allied Breweries awarded the contract to build Mistley maltings to Redler. Surprisingly the capital cost agreed was to meet the budget: £1.75m. There was a contingency set at £0.5m.

The next key design decision was the shape of the steep vessel. The self-emptying conical steep vessel was described by Stopes⁵⁶ and had been the prime choice of maltsters for 100 years. However Redler considered the maximum size they could build would be 70 tonnes. Before this decision was taken Walter Hyde played a master stroke. The germination equipment was to be designed to control germination temperature on a batch size of 140 tonnes of barley. But Hyde insisted that Redler made the box to hold 158/160 tonnes of barley. This could allow around 15 extra tonnes of malt to be produced over budget for each steep. In a year this would yield 2,625 tonnes of malt and annual production would increase to around 23,300 tonnes. Hyde regarded this as malt for 'free'. This is typical sales maltster thinking. But this would mean the construction of three conical steeping vessels of about 53 tonne capacity each. I was worried that germination would subsequently be uneven after splitting the batch in three ways.

About this time the French company, Nordon developed the 'giant' flat bottom steep. This could be built to hold at least 200 tonnes of barley. The barley was supported by a perforated floor above a plenum chamber. The barley was cast from the steep by a cleverly designed machine called a giracleur. These vessels were installed at Union Champagne Malt at Vitry Le François 70 miles east of Paris. I went to look at them and was impressed. It was clear to me that to make satisfactory malt in 6 days required a rapid and even germination. The flat bottom steep vessel allowed the barley to be aerated during wet periods of steeping and ventilated during dry periods. The barley could be dry cast from the steep in an active state of growth. The grain was 'chitted' with the rootlet emerging from the proximal end of the corn. Research work⁵⁷ had shown that only about 25% of externally added gibberellic acid applied after steeping entered the barley corn. This uptake was enhanced if the barley was in an active state of growth on leaving the steeping cistern. The case was made and the flat bottom steep was chosen.

The next concern was to ensure the consistency of germination. Malting was to be in the box at a depth of one metre with a batch size of 140 to 158 tonnes. I was worried about consistency of enzyme development and modification in a batch of this size. It was beyond our experience. Our biggest batch size prior to this was 32 tonnes in Shobnall floor maltings.

The problem was discussed with Dick Dangerfield and extensive calculations of heat output of the germinating grain were made. We reckoned that the rise in temperature across the bed of germinating barley should be no more than 2°C. In this way we believed that consistency in barley starch modification could be achieved. To achieve this Dangerfield designed a fan capable of delivering 80cfm/qr (1586m³/min to the whole box) of barley steeped. This was about 30% more airflow than normally used in germination boxes. It worked. Temperature rise was controlled on a 140 tonne batch to ≤2°C.

Another novel feature of the development was the use of abraded barley. Abrasion is a slow process and with two machines in parallel a rate of 10 tonnes/hour was safely achieved. It would take 14 hours to abrade a batch of barley and this could not be done en-route to the steep. Four garners were installed above the steep vessel into

which the abraded barley was collected during the steeping of the previous batch. The barley was dropped from the garners into the partly filled steeping vessel with dust quenched by water sprays on the garner outlets.

After the awarding of the contracts there followed two years of intense work. From time to time Redler were bemused by the sheer number of engineering experts employed by Allied Breweries. But the main protagonists of the engineering team: Peter Marks (mechanical) and Frank Mitchell (electrical) were outstanding (Figs. 16, 17 & 18).

Mistley management was led by the charismatic Ivan Garwood who after having spent 40 years in floor malting was naturally suspicious of the 'new' plant as it was always called at Mistley. It was my job to convince Garwood that satisfactory malt would, in the end, be made.

Our first steep was scheduled for the spring of 1977. One of the great advantages of malting at Mistley over the years was the abundant supply of superb barley from the area known as the Tendring Hundred. No matter what variety was grown barley seemed to be endlessly produced with a fine wrinkled skin and high starch content giving a pure white mealy 'cut' to the grain with little hint of steeliness. This barley was the basis of the high quality malt for which Mistley was famous. But we were extremely unfortunate that in 1976 we experienced one of the hottest and driest summers then on record. The 1976 crop barleys were of high nitrogen content (> 1.80%) and were extremely thin. Barleys could contain in excess of 15% screenings (grains passing through a 2.2mm sieve under the conditions of a standard test). Much of the barley available from the 1976 crop would, in a normal summer be rejected as being unsuitable for malting. To prepare barley for steeping (98% of corns held by a 2.2mm sieve in a standard test) meant that losses were high. It was clear that hot water extract in the malt prepared from this barley was going to be lower than normally expected in Allied Breweries.⁵⁸ Garwood was concerned and was prone to predict that only 'pig food' would be produced.

The first batch of 140 tonnes of barley was cast to steep on 28 March 1977. It was steeped for 48h and germinated for 96h. It was off-kiln on 6 April. The total nitrogen

content of the barley was 1.81% and a hot water extract in the malt of 280 brl^o/qr was achieved. The malt was not pig food. In subsequent steeps germination time was lowered to 72h and so malt was produced in six days total time. The objective was achieved. Given the quality of the 1976 crop barley sound malts were produced throughout.

How did the malts perform at the breweries? There were difficulties. Abraded malt is very friable and prone to shatter in the brewery mill. Changes to mill settings had to be made to avoid too much fine material in the grist and hence run-off problems in the brewhouse. Brewers do not like to make these changes. They were persuaded to do so by the herculean efforts of John Wain, Project Brewer in George Howard's team. No brewing technologist in Allied history was more charismatic or had more practical and persuasive skills and determination than John Wain. He was subsequently to spend much time overseas in the Allied cause and was sadly lost to U.K. business. Sound beer was eventually produced from abraded malt.⁵⁹ Indeed co-incident with the Mistley development a mash filter was installed at Romford brewery. This machine could handle malt ground more finely.⁶⁰ The result was that soluble extract in excess of that predicted by laboratory analysis was obtained in the brewery wort.

The Mistley project could be judged as a success both technically and financially. Prior to the development 120 men were employed in the seven malt houses producing around 21,000 tonnes of malt annually. After the development the floor malting houses were closed and the same amount of malt was produced by 16 men including two fitters and two electricians. The plant was operated on a two-shift system covering 16h, seven days per week. Mistley maltsters were used to weekend work but did not like working nights. No grain movements were scheduled between 22.00h and 06.00h. Temperature control in steeping, germination and kilning was automated. There was a roster in place for emergency night call. Because of the inherently good nature of Mistley employees the system worked well.

Management matters

Ronald Harry Bishop was a good man and a meticulous maltster. But the industrial relations situation in late



Figure 16. Albrew Maltsters' Mistley 'New' Plant, 1978.



Figure 17. Sampling Germination/Kilning Box, Mistley, 1978.



Figure 18. Flat Bottom steep tank (158 tonne capacity), Mistley. Aeration is shown during a wet period of steeping.

1970s Burton drove him to distraction. No changes could be made in production practice without extensive discussion with the shop stewards of the Transport and General Workers' Union. Bishop did not have the patience for this and disputes were frequent. The malting shop steward, Bernard Todd, had infinite patience coupled with a sharp mind and sometimes a streak of vindictiveness. In the main Bernard Todd exhibited the traits of extreme frustration with what he saw as recalcitrant management and a work force with no imagination. Walter Hyde was not sympathetic to Bishop's plight. And further would never seek to meet the Unions. Eventually in 1976 Bishop broke down and left the building entrusting to me his 19th century French Marble case clock which I still have. He never returned.

Ivan Garwood was also coming to retirement and changes were needed. Keith Ewart Pollard was moved to Burton from Mistley to fill the vacancy left by Bishop's demise. Keith Pollard was urbane and sophisticated and a fine amateur actor; a talent he often used to

good effect in his management life. He could talk for hours with Bernard Todd and fitted in well to the institutionalised meetings of the Burton site. But things did not change much and the Burton maltings were falling apart. Then after over 40 years of service with Free Rodwell, Ind Coope and Allied Breweries, Ivan Garwood retired in 1978. Against Garwood's wishes Pollard was returned to Mistley as manager. I was hanging around as Technical Manager after two years intense work on the Mistley project. It was time for me to get industrial relations experience. I became Burton manager in 1978.

And it was a great experience; changing concerns about germination temperature control for concerns about safety boots and 'hot box' money for kiln farming (forking the crusted malt on the kiln surface before curing).

The malting development plan was temporarily in abeyance. But it was clear to me that Burton maltings had a limited life. The four houses at Shobnall (18, 19,

20, and 21) formed a considerable floor malting complex. Annual production was 16,000 tonnes with a work force of 32. The maltings was run on days (07.30h to 15.30h) with a 5 over 7 roster covering weekends. Kiln firemen (four of them) worked on 168h cover and so were theoretically available for night ploughs. But they were reluctant to do this work. Wage costs were high because weekend working attracted premium payments. By 1982 Shobnall maltings had been in operation for over 100 years. Structural problems were becoming evident. A civil engineering survey revealed that the kiln roofs were in danger of immediate collapse. This was not believed by the work force but was certainly believed by Walter Hyde and this was what he wanted to hear. It gave him the ammunition to focus the development plan and precipitate the board into decision.

Allied Breweries was now a very different company from when the money was obtained for the Mistle development. Bernard Kilkenny was gone and with him Mac Barlow and tight central control. The new regime under Douglas Strachan, son of a Scottish Law Lord, favoured profit centres competing for capital with the most successful coming out on top. Accordingly Hyde was no longer Malting Director of Allied Breweries but was Managing Director of Albrew Maltsters, a company selling its malt at profit to the breweries.

I had to close the Shobnall Maltings in 1982. It was a painful experience. But a number of the maltsters were approaching retirement age and so were pleased to receive a redundancy payment; others were transferred to the brewery. I was left managing the Saladin maltings and with some time on my hands. Meanwhile the Board of Allied decided that people in key positions had to have deputies. Walter Hyde was forced into this and named his old friend Eric Cooper as Operations Director and Deputy to himself. Cooper left Shrewsbury for Burton. The vacancy at Shrewsbury was filled by Geoffrey H. Berry who had been languishing in Hyde's team as Administration Manager. Berry had long experience of barley intake and supervision of Shobnall and the Saladin maltings before my time. He had followed a course at the Birmingham Brewing School but had no formal technical qualifications. This appointment was a blow to Bill Preen who finally realised that he was not to be appointed to the manager's position at Shrewsbury. That is how it goes. He would have made a sound manager.

Walter Hyde was coming towards the end of his career but was still fighting hard for Albrew in the harsh competitive environment of Allied. And developments in malting technology were taking place. It was realised that although capital cost could be saved in a two-vessel malting plant like Mistle there was a premium to be paid in increased fuel costs in kilning. The vessel was alternately cold and wet and hot and dry. Bass had been trailing Allied in malting development but sprang into life in the late 1970s with the construction of a Tower maltings in Burton. In this system steeping, germination and kilning vessels were arranged vertically and so the kiln was separate and could be designed entirely from the viewpoint of energy efficiency. Hyde was impressed. Other tower maltings were built in Europe notably in Sweden by Pripps and in the Netherlands by Koen Swinkels (a great innovator) of Bavaria. We visited them and began to see a way forward for the Albrew plan.

Before things could be completed a period of bumpy management was to occur. Finally Walter Hyde had to retire in 1982 at the age of 64 but not before he persuaded the Allied Board to give him a consultancy on the basis that the business could not succeed without his expertise.

Things were happening elsewhere in Allied. Douglas Strachan was now firmly in place as Chief Executive of the Beer Division. The market place for beer was changing. The days of the huge volume keg ale brands (Draught Double Diamond, Worthington E, Watney's Red) was coming to an end. The Burton brewery of Allied was geared to produce such large volume brands. And to meet the new demand of smaller volumes of different particularly cask beers radical change in the plant and workforce organisation was needed. The charismatic David Leslie Cox persuaded Douglas Strachan that he was the man for this job. Thus was established the 'GIBB' plan - Greenfield Implementation Burton Brewery.⁶¹ Burton Brewery now known as I.C.B.B. (Ind Coope Burton Brewery) was transformed as a brewery designed to meet the market place of the early 1980s. Many small volume cask beers were produced by a flexible work force (also much reduced in numbers). Some succeeded some failed. This major change resulted in the replacement as Brewery Director in Burton of Norman Christison Crow. But Walter Hyde was retiring from the maltings and so the new M.D. of Albrew was Norman Crow. The management of this

move being attributed to John Dunwell as a last gesture before departing the U.K. for Labatt's in Canada.

Norman Crow was a highly competent technical brewer. He read brewing and biochemistry at Heriot-Watt gained an honours degree with distinction and was awarded the Watt Medal. He joined what was Ind Coope in 1955 and had periods at Wrexham, Romford and most notably in Spain before taking over Burton brewery in 1976. He had seen it all. He was a combative and astute manager of the brewery in a time of strife with the Unions. As manager of the Burton maltings I sat on the Joint Consultative Committee under Crow's chairmanship and I marvelled at the bloody-minded management of a meeting with 57 shop stewards; periods of sharp humour mingled with outcomes of despair. Norman Crow was to be a very different leader of Albrew from Walter Hyde.

Management job grading was always a problem in Allied. How can jobs be compared? To gain promotion I left the maltings and returned to the central technical department as Development Manager under my old boss, Tom Martin. This was to be a short lived move. And a move that coincided with a major problem for Norman Crow. The summer of 1982 saw an outbreak of gushing. A beer gushes when on releasing the over-pressure, innumerable minute bubbles appear throughout the volume of the beer which rapidly expand and displace the contents of the bottle.⁶² In this case gushing was manifest in 16oz cans of Long Life, brewed at Wrexham. It was a painful experience to watch this in the company of an irate Douglas Strachan. There has been a considerable amount of work on the causes of gushing.⁶³ There is little doubt that a common cause is the use of malt contaminated with moulds particularly *Fusarium* spp.⁶⁴ Beer at Wrexham was brewed with malt from Shrewsbury. The presence of *Fusarium* was detected in malt from Shrewsbury. The tests ironically were carried out in the department I was now running! It transpired that malting at Shrewsbury had been continued too far into the summer and germination was out of control. Mould growth had been observed on the pieces but this had been ignored and pieces were loaded to kiln.

Scapegoats had to be found. The blame was attached to manager, Geoffrey Berry. Eric Cooper, now in Burton, and supporting Norman Crow was distraught and became ill. He subsequently was grateful for early

retirement. Norman Crow was vulnerable and I was called in to help. I was then back to Albrew to succeed Cooper as Operations Director to Crow.

In the interim approval had been gained to build a new malting plant in Burton. The problems at Shrewsbury with floor made malt merely supported the cause. The plant was designed on the back of a 'fag packet' (though neither of us smoked) by Peter Marks and myself on the company plane following a visit to Pripps maltings in Stockholm in 1982. Peter Marks was a perceptive and innovative mechanical engineer trained at Briggs, the brewery engineers in Burton and he had been much involved in the Mistley project.

Board approval was one of the last achievements of Walter Hyde though to his chagrin the presentation to the Board was again made by John Dunwell as one of his last achievements in Allied.

In my brief absence in the technical department Norman Crow had to make an appointment to my old job as Burton maltings manager. Geoffrey Berry applied for the job. But Crow was convinced new blood was needed. Thus was recruited George Philliskirk from Holgran in Burton. George had been around the brewing industry for some time. He had read bacteriology and biochemistry at Newcastle followed by an MSc in food science in Leeds and then a PhD under Tom Young at the Birmingham Brewing School where his subject was killer yeasts. He came with a reputation as a sound manager. By his own admission he was not a maltster. He was to have an uneven relationship with Norman Crow as time went by.

Norman Crow was quick to size up the remainder of his management team. It was clear that when the new plant in Burton was on stream old plant would be closed. This meant eventually Shropshire maltings, Chadwick Street in Leeds and the Burton Saladin plant. There were too many managers. Douglas King remained frustrated and cantankerous in Leeds. But his bluff, combative style of management appealed to Crow. Keith Pollard's more refined and subtle skills did not appeal. Crow acted swiftly and Pollard was out and King moved to Mistley. Berry's days were numbered as Shropshire maltings were ear-marked for closure. John Belton, Technical Maltster at Barnby Dun held on at Chadwick Street until it was closed along with Barnby Dun. Thus Norman

Crow had a management team in the mid-1980s of me, Douglas King and George Philliskirk. Of course Walter Hyde remained for one year as a Consultant. He was never consulted and spent a year in a remote office sending memos to Norman Crow which were never looked at let alone answered. And so the next phase of technical development could take place.

The Burton development

Malt had been made at Mistley successfully in six days total time. This was as a result of the abrasion process and the superb quality of the local barley from the Tendring Hundred. But times were changing and the quality of barley available at reasonable cost to the Burton maltings was not equivalent to that from Tendring. Some brewers remained sceptical about the quality of abraded malt. The company was now organised into profit centres which were not subject to the strong central technical control of the days of George Howard, Tom Martin and the arch persuader John Wain who was working overseas.

In these circumstances I did not want to be tied to a rigid six day malting regime. Accordingly we set the production output of the Burton plant based on two days steeping, four days germination with two days available for kilning.

We needed to decide on the production output. In the early 1980s the Burton brewery was producing around 2 million barrels of beer annually. This was from a grist of 75% malt and 25% adjunct. The adjunct was split between micronized cereal⁶⁵ used in the mash and sugar and hydrolysed starch syrup added to the copper. The average gravity of beers produced was around 1040°. This volume resulted in a demand for malt of about 33,000 tonnes.

Building a malting close to a brewery eliminates the malt transport cost. This had to be balanced in the case of Burton with the high cost of barley. Local barley supplies were simply of insufficient quantity and quality to satisfy demand. After considerable thought it was decided to size the Burton plant to meet the requirements of the Burton brewery only. Malt would not be sent to other breweries in the Group. But once a Tower malting is designed it cannot be easily extended and any further

development in malting output would likely be made at Mistley.

Batch size at Mistley had been 140 tonnes of barley. It was considered that this could be safely increased to the region of 200 tonnes. The design of the plant thus fell into place (Figs. 18, 19 & 20):

Batch size: 206 tonnes of barley; steeping every two days based on a 350 day year.

Therefore we have 175 batches/year and if we assume a malt outturn of 84.5% we have:

Production Yield 30,462 tonnes

This regime would allow for 15 days of maintenance shutdown and would allow the plant to be kept in full production. Additional malt required by the brewery would be brought in from sales maltsters or from Mistley. We thus had our batch size and planned output. On a restricted brewery site the tower construction format gave the best option in utilising the available space. This system meant that the vessels of production would be circular; a contrast to the rectangular boxes at Mistley. Considerable development of the principle of operation of circular malting vessels had taken place in mainland Europe. The French Company, Nordon and the German Company Buhler-Miag could offer 'turn-key' malting plant in this format. However around this time, the parent Company now known as Allied-Lyons was being subject to take-over rumours from amongst others Australian entrepreneurs such as John Elliot of Elders-IXL. Suddenly Allied-Lyons became a 'great British Company' in a startling defensive measure to appeal to shareholders and the trading companies making up the whole were encouraged to buy British. This was very good news for Redler. But Redler engineers did not have the skills to design and build circular malting vessels for germination and kilning. They rectified this problem very quickly and signed an agreement with the German company, Hauner, led by the compelling and brilliant engineer Rudolf Hauner; it was his company. Hauner had designed a system for germination in a circular vessel in which the grain screw turners were fixed and the floors were rotated by drives and supporting rollers positioned in the plenum under the perforated deck. This system had a lower energy demand than if the floor was fixed and the turners allowed to rotate. Redler were thus equipped to tender as main mechanical contractor. They got the job. The

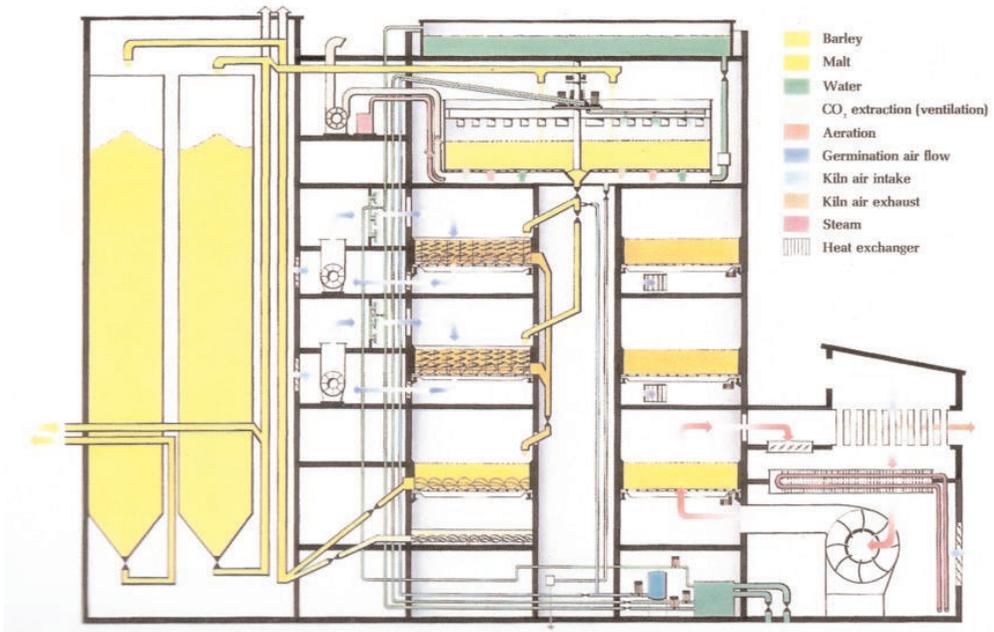


Figure 18. Schematic diagram of Albrew Maltsters' Burton Tower Malting.

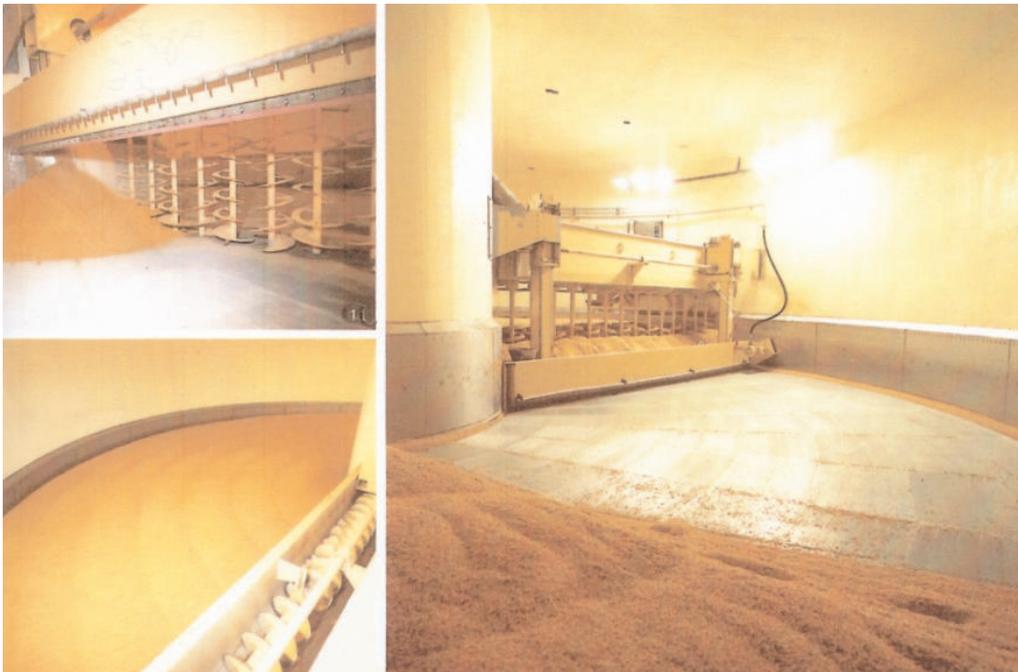


Figure 19. Pictures of the Burton Tower: (Top left) Steeped grain is discharged through the central core of the tower to a germination floor, (Bottom left) Full germination vessel with level grain bed effected by the cross worm, (Right) Grain being discharged to the kiln by the cross worm through the central core.



Figure 20. Stripping the kilned malt, Burton Tower.

project was managed by the personnel of the now profit centre, Allied Breweries Engineering Services (A.B.E.S.). And Les Roberts and his team skilfully managed the interface between all contractors: the main civil contractor being French Kier and electrical contractor being W.T. Parker of Burton upon Trent. Mention should be made of the project manager, Brian Kilburn, former Chief Engineer of Ansell's and a bluff, direct Yorkshireman, not unlike John Snaith who had managed the Mistley project but with smoother inter-personal skills. Kilburn was a master at 'banging heads together' when the going got tough. He was a meticulous minute taker and never let any one of his contractors off the hook. He could compromise when necessary and formed a very good working relationship with this Yorkshireman who led the production side of the project team.

In many ways the Burton development turned out to be a model project. The first piles were driven into the ground on 6 December 1982 and the first production run was made on 5 December 1983. The project was completed on time and within budget (£5.5m) and so the D.C.F. rate of return on the investment was achieved.

We had learned from mistakes made at Mistley and coupled with some new ideas and new technology we improved the robustness of the plant.

One factor that had hit the malting industry since the time of the Mistley development was the discovery of potentially carcinogenic nitrosamines in beer and the finding that the main source of nitrosamines was malt.⁶⁶ Nitrosamines (NDMA) arise from the reaction between nitrogen oxides (NO_x) in the products of combustion from the kiln fuel and amines in the green malt. There

are various palliative treatments that can lower the level of NDMA in malt (such as lowering green malt pH value) but the only sure way is to use indirect firing so that products of kiln fuel combustion are not passed through the malt bed. This was achieved in the Burton maltings by using steam from the brewery boiler house to heat coils over which the air onto the kiln passed. The capital employed in this system was thus on the brewery books not the maltings!

There was also much concern in the industry about energy efficiency. Around 60% of total electrical energy in malting is used to drive the kiln fan motors. Over 90% of the process fuel is used in kilning.⁶⁷ Kilning costs are therefore the most sensitive indication of efficient energy management in malting. For the Burton development to be a success the highest level of energy efficiency was required. The physics of the malt kilning process have been discussed in detail by Briggs.⁶⁸ It is important to control the air volume and to be able to recirculate air to lower energy use. Air leaving a malt bed in kilning is at 100% relative humidity (R.H.) until after the break-point.⁶⁹ After this point R.H. falls and air is recirculated to the malt bed. By introducing a heat exchanger through which all air passes leaving the kiln heat can be recovered from the moist air in the early stages of kilning. This yields considerable savings.⁷⁰ To maintain the R.H. of the air off the kiln as high as possible for as long as possible as the malt bed dries requires air volume to be reduced as the kilning progresses. This is tricky. Radial vanes on the air inlet to the fan can be used (Mistley) with the fan motor at constant speed. But for the most precise control of air volume the speed of the fan motor must be lowered. This can be done by using thyristors to control a D.C. motor. Both these innovations were used at Burton. As a result very low energy consumption (for the time) was achieved:

Electrical energy 0.30 GJ/tonne; Process Fuel 2.20 GJ/tonne

For a time the Burton Tower malting was probably the most energy efficient in Europe.

Brewers had always made considerable use of stainless steel. Maltsters were reluctant users because of cost. But the effective cleaning of large scale malting plant was becoming a real issue. At Mistley the germinating barley was in contact with concrete painted with an epoxy

resin paint. This surface was resistant to conditions of 100% humidity but had to be replaced every two years. The quite radical decision (for the time) at Burton was taken to use stainless steel to line the germination vessels in contact with the green malt. This made cleaning much easier and allowed a more complete discharge of the green malt to the kiln.⁷¹ Full microprocessor control of all the malting operations in the Tower was installed; again unique at that time. The Burton development was a success.

After Burton

What to do next? It was early 1984 and the Burton Saladin plant along with Shobnall, Barnby Dun and Worksop were closed. Shropshire floor maltings and the drums at Chadwick Street were still in production. Despite what sales people were telling us it was clear to us in the maltings that beer volumes in the Group were falling. To remain efficient we needed to replace the old plant in Leeds and Shrewsbury. For a time we envisaged a third new plant to be built in Shropshire. The Telford Development Corporation was in full swing and money was around. Many talks were held. To build a plant of 30,000 tonnes output we were looking for around 150,000m³ water and 800,000 therms of gas. In the end the development could not be put together: money was becoming tight in Allied, Telford were unsure about the utilities and effluent treatment and future beer volume was uncertain. I realised that a third box at Mistley could replace the Shropshire output (13,500 tonnes) and by squeezing production harder and buying additional malt Chadwick Street output (9,000 tonnes) could be 'lost'. Reductions in manpower and capital employed resulted in a sound business plan.

Brian Kilburn was retained as project manager and the approval for cash for investment was sought from the Allied Breweries Board.

Mistley further developed

Approval for the extension of Mistley maltings was achieved after a tough presentation to the Allied Breweries Finance Director, J.A.F. (Tony) Trigg who combined duties as a ruthless financial manager with those of international rugby referee. Ruthless Trigg was

but he could see the value of a sound investment and I persuaded him that this could not go wrong. As with all these projects time was of the essence and there was not enough. Redler were approached and came up with a keen price very quickly. The contract was in the overall charge of Ken Bucknall just having returned from Redler's failing South African business. Bucknall was a sound administrator and spoke with a curious mixture of a Gloucestershire and Afrikaans brogue. He was fortunate to still have the germ of the original Mistley team and Dick Dangerfield remained the key player. Competitors in the malting business could not match the price. Redler got the job.

Essentially a third box was to be added with a second steep vessel. And the opportunity was taken to make some changes to the fabric and mechanisation of the Mistley plant. The kiln firing system was changed to indirect firing with the incorporation of medium pressure (125psi) hot water boilers. And thermal efficiency was improved with a glass tube air to air heat exchanger through which all the air off the kiln would pass. The NDMA problem was thus solved. A combined heat and power unit (C.H.P.) rated at 750kW was also installed and this was a 'first' for the Allied Group. The unit could produce heat and electrical power simultaneously from natural gas fuel. It was a success and subsequently a bigger unit was installed in Tetleys Leeds brewery.

In the original development Walter Hyde had specified that on stripping the malt after kilning 'all malt was to be removed'. To attempt this Redler had designed a stripping blade attached to the grain turners that could be activated to reverse into the malt bed and take 'bites' of malt which would be dumped into a cross conveyor at the end of the plenum chamber. This design had worked for ten years with mixed success. The machine worked at high speed (109 tonnes/h) and could strip a box in about one hour and ten minutes. There were penalties to this. The machine was heavy and was taking its toll on the structure of the box walls. It was also clear that 'all' malt could not be stripped from the box. An alternative design was needed. In the new box the tested Redler system of stripping the kilned malt by means of a cross-screw and small elevator into the overhead conveyor commanding the box length was used. There was much less attrition on the box walls. Boxes 1 and 2 were converted to the same system. Some resid-

ual malt remained which had to be swept up but Walter Hyde was not there to see this.

The steep house was extended to incorporate a second 160 tonne capacity flat bottom steep vessel. Some of the draw backs of flat bottom steep vessels were now coming to be realised. The plenum chamber beneath the perforated floor results in the use of more water (1.23m³/tonne/wetting) and it is difficult to clean. There are no such problems with a conical steep. But we still needed to process barley in six days total time to achieve our financial return. And so the barley had to be well-chitted at the conclusion of steeping. I considered that the flat bottom steep was essential for this. A reduced volume plenum chamber was designed and a system of steep cleaning using a caustic soda based compound was introduced with some success.⁷²

The decision was taken to make 158 tonnes the standard barley steeping quantity. This resulted in a production output and plant utilisation as follows:

Production year 350 days

Batch size 158 tonnes of barley

Residence time in box, 4 days

Number of batches /box = 87.5

Total number of batches = 262.5

Assume outturn of malt at 3% moisture from barley at 12% moisture is 84.5%

Therefore Annual production = 35,046 tonnes.

The plant was successfully commissioned in 1986. This resulted in the closure of the remaining floor maltings in Shrewsbury and the Chadwick Street drums in Leeds. There was the potential to add a fourth box or more likely a circular vessel at Mistley to result in 100% plant utilisation. But this was beginning to look unlikely as beer volumes in the late 1980s were in decline and the bombshell of the Monopolies and Merger Commission report into the brewing industry was about to explode.

The final throes

Norman Crow and Douglas King were approaching retirement. In the late 1980s Crow assumed responsibility for the Allied Hop farms and for the purchase of hops and sugar and malt replacement syrup for the breweries. These new challenges occupied his mind and allowed

me to run the maltings. It was a satisfying time. Douglas King retired in 1989 aged 60. He had battled from the frustration of briefly being Head Maltster at Tetleys to a life of subordination to others: Hyde, Crow and finally me. He made a vitriolic retirement speech praising the maltings of Bass (where he started) and departed with £200 worth of gramophone speakers. He was not heard of again.

Prior to King's retirement Norman Crow and I knew we had to make the right appointment as successor. Crow left it to me. I believed that the best malting manager for a brewer-maltster was a competent technical brewer. I found the right person in Allied in Colin John West. Colin West had read biochemistry at St. John's College Cambridge and had joined Allied as a graduate recruit. He had worked at Burton and Romford and had achieved the Diploma of the Institute of Brewing. West had taken technical and management roles (in the Burton keg plant, no less) and was ripe for a more senior management appointment. He made an excellent job of managing the Mistley plant. He had few men to deal with but could exercise his technical skills and was well-respected in the breweries.

Norman Crow also retired in late 1989. It was not always clear that I would take over. 'Nothing is certain at these times', Norman told me. But I did take over and reported to the joint managing director of Allied Breweries, W.G.A. (Tony) Warde-Norbury, patrician, and land owner of a substantial estate at Hooton Pagnell in South Yorkshire. Warde-Norbury was a charming man who enjoyed detail but avoided decision making. He largely left me alone. Crow did stay, in classic Allied style, for a year to look after the hop farms for which I assumed responsibility in 1990 on Crow's final departure. He had spent 34 years with Allied.

I had a strong team with George Philliskirk in Burton and Colin West in Mistley. They were supported by David John Banfield whom I appointed as Operations Manager. Banfield had worked for me on and off from R&D days. He had a science background and was a sound administrator. He had run the malting laboratory and had developed a profound knowledge of the hop trade whilst working for Norman Crow.

We ran as a profit centre. We transferred malt to the breweries at market price and took a profit which was straight into Allied's central 'pot'. There was no possi-

bility that the breweries could lose this profit as there would be if malt was transferred at cost. This system was much favoured by brewing division Chief Accountant, G.W.G. (Gordon) Whitehead. The breweries did not like it but Whitehead did not trust them. I established the market price by buying malt from U.K. sales maltsters.

Our production from the two plants was around 65,500 tonnes. Production in 1969 was around 80,500 tonnes. It is indicative of the decline in the market and the decline in Allied's share that both these amounts represented about 80% of the malt requirement of the Group. It is likely that Allied Breweries total output by 1990 was only in the region of five million barrels. This reflects the inability to find a volume replacement for draught Double Diamond (now out of fashion) and senior management's profound failure to promote the potentially global brand, Skol.

A quiet period of consolidation and profit taking was in prospect with two very efficient plants.⁷³ Fuel consumption was amongst the lowest in the U.K. at 2.50 GJ/tonne and output was at a competitive 3,275 tonnes/man. I gave a paper to the European Brewery Convention in Oslo on 'The economics and utilisation of brewing materials in the 1990s'.⁷⁴ This was a demonstration of Allied at the forefront of technical brewing development in Europe. This was destined to be the last such demonstration.

Everything changed as Lord Young was 'minded' to accept the recommendations of the report of the Monopolies and Merger Commission into the brewing industry. Lord Young was Business Secretary in Margaret Thatcher's Conservative government. The Brewing Industry was shattered by this decision. The details are well known.⁷⁵ Essentially the big brewers had to choose to be brewers or retailers. Allied did not really know what to do. The overall business was now Allied Domecq and ran pubs, brewed beer and had substantial wine and spirits and cider interests as well as the food division developed from the acquisition of J. Lyons and Co. To start with the business was 'hived down' and Allied Domecq retail was formed. An uneasy relationship with production started to develop.

In Albrew Maltsters I knew little of the machinations that were afoot. Eventually a 50/50 joint venture with

Carlsberg was announced in which Allied's six breweries were pooled with Carlsberg's Northampton brewery. The company was called Carlsberg-Tetley so at last Tetley was accepted as the strongest brand name in Allied. The writing was clearly to be on the wall for Ind Coope and Ansell's. The business was launched amid great fanfare at the National Motorcycle Museum hosted by the then hugely famous media figure, Steve Rider. A supply agreement with Allied Domecq retail was included in the deal. So Allied were to be retailers. The breweries were ditched as were we in the maltings. It is difficult to imagine cultures as different as those of Allied and Carlsberg. In Allied businesses were devolved as profit centres with individual managing directors taking their own decisions to deliver an agreed business plan. I was one of these managers. In Carlsberg everything was decided from the centre. Plans were driven down to the breweries who became mere implementers. Of course it was a joint venture and the Chief Executive was Don Marshall from Allied with Ebbe Dinesen from Carlsberg as his Deputy. Marshall had been schooled in the ways of Ansell's and was a man of detail and integrity. He had a very difficult time with little direct support from Dinesen whose direction was clearly from Copenhagen. He perhaps lacked the ruthlessness to deal with Carlsberg. He had a kindly persona and was good to me. I had to report to J.J. (John) Smith, Operations Director. He was quite the most difficult boss of my time with Allied. Smith had risen through the personnel department and had caught the eye of Roy Moss. Moss had been a chief engineer at Tetleys and had eventually become Brewery Director at Romford. From there he had proceeded to joint Managing Director of the Allied beer division with Tony Warde-Norbury before assuming the sole role on Warde-Norbury's retirement. Moss could be irascible but he could see profound change coming in U.K. brewing following the Beer Orders. But nevertheless Moss set up Don Marshall with an astute 'hospital' pass. John Smith came as part of the deal. Meetings with Smith took hours and outcomes were often scant. I was not one of his boys.

It soon became clear to me that a time of frustration was in store for Albrew. Carlsberg were not in sympathy with the profit centre approach. They perceived that our malt was expensive. In fact it was the lowest cost in the UK. They could not understand that we transferred to the breweries at profit. Furthermore it was evident that my role in buying barley, malt, hops and sugar was

under threat. These activities were going to be transferred to a central purchasing department. I spent some time trying to convince John Smith of the folly of upsetting a well proven system. He did not give me support.

I managed the Albrew business for four frustrating years. I was in a chauffeur's car in July 1993 being driven to Norfolk to inspect the barley crop in the field when I had a 'phone call from Don Marshall. Changes were afoot and he offered me the job as Brewery Director at Tetleys in Leeds. What to do? I was steeped in malting from PhD research to management and direction over 23 years. I loved the business. But I was not happy with its direction. After considerable thought I accepted Don Marshall's offer and thus was to enjoy a further seven years in Leeds as Brewery Director and managed a considerable change programme at the Tetley brewery which is another story.

I was asked to name my successor to run Albrew Maltsters. It was a difficult decision. I had worked with George Philliskirk for over ten years. He was my friend and this had never inhibited our working relationship, but I thought the business would be best run by Colin West and I named him as my successor.

In the event George Philliskirk left the maltings to take a role in Tom Martin's technical department. And after a couple of years in charge Colin West left Carlsberg-Tetley all together to join the sales maltsters Munton and Fison. In this way the old order was swept away. In a twist of supreme irony the overall responsibility for the maltings (now called Carlsberg-Tetley Maltsters) was given to the technical department and George Philliskirk became the man in charge and did an excellent job.

Carlsberg had no interest in retaining a malting business in the U.K. And the old Allied malting business was soon broken up. All the old 'big six' brewers had to find ways around the beer orders. For over 150 years Bass had operated alongside Ind Coope and Allsopp's in Burton on Trent. Bass had the largest market share in the U.K. still based on the success of E.P. Taylor's original Carling Black Label. But Bass decided to get out of brewing and concentrate on hotels and retailing. An opportunity was created for the American company, Coors, of Golden, Colorado to buy the Bass brewery in Burton. Carlsberg then sold to Coors the Ind Coope

Burton brewery and with it the Carlsberg-Tetley tower maltings. Coors (to become Molson Coors) had established a major presence in the U.K. and inherited considerable malting capacity with the old 'Allied' tower and the Bass maltings also including a tower and also in Burton. Thus Carlsberg's malting interests were reduced to the Mistley plant only.

It was not long before the Mistley maltings was sold to the sales maltster, Simpsons of Alnwick. The plant still operates and is now part of the Crisp Malting Group. 6 April 2017 saw the 40th anniversary since the first piece produced in the Mistley box maltings. John Crisp was the eighth generation of a famous malting family. His malting businesses had had a chequered history. The company had been part of A.B.M. but in 1962 this John Crisp had formed a new company with F.&G. Smith of Great Ryburgh called the Crisp Malting Group and a new Saladin maltings was built.⁷⁶ Acquisitions followed including the Courage maltings at Ditchingham and the old Beccles floor maltings were bought back from A.B.M. together with supply contracts! Crisp was a great entrepreneur and quick to see any profitable business opportunity. He bought the 'Edme' malt extract business in Mistley and was an early producer of home brewing kits in the 1970s. The Allied Mistley plant was thus to finally find a good home. However Walter Hyde would not have enjoyed this outcome. John Crisp and Hyde were great antagonists and for many years in the 1970s Hyde would not buy malt from Crisps! But there you are, things change.

The Albrew Burton tower malting has not been so fortunate. It was built in the middle of the Ind Coope brewery site. Coors other inherited maltings were on a dedicated site about a mile away. Coors had too much malting capacity and had plans to develop a state of the art energy centre on the Ind Coope site. The tower was demolished in 2012 and so followed the same fate 30 years later as the Shobnall floor maltings. Having suffered the pain of the Shobnall demolition I was glad not to see the tower go down.

Conclusion

What can we conclude from this history? I believe I have illustrated a tale of technical excellence, ambition and lost opportunity. The companies which came to

make up Allied Breweries had people who were innovative maltsters. We have seen this in the pioneering work of William Jones, Joshua Tetley and Robert Free. We have seen astute commercial developments in the hands of D.R. Tamplin, Gerald Otho-Briggs, Ken Fergusson and Walter Hyde. All these men had ambition; they wanted the company to succeed but were also driven by personal pride and a desire to be on top of their particular part of the business. In some cases this was to the certain detriment of their colleagues. In many ways this is a necessary prerequisite of commercial success. But this success is all the more lasting if it can be backed by technical excellence. The formation of Allied Breweries in 1969 uniquely provided a framework for this to happen. A pioneering central research department was set up under Ron Hall which was ultimately given focus and direction as a process research department by George Howard and Tom Martin. This was the early 1970s and there was money and encouragement freely available. Under the astute guidance of Tom Martin I prospered and the scientific basis of Walter Hyde's development ideas was established. It was technical excellence that underpinned the lasting business success. This was manifest in the developments of the maltings in Mistley and Burton. This progress was continued under the business leadership of Norman Crow and then myself. For a period of over 15 years Allied Breweries was clearly seen as a company with a firm technical basis. This reputation was promulgated by the publishing of papers and the delivery of lectures at international meetings such as those organised by the Institute of Brewing, The European Brewery Convention and the Master Brewers' Association of the Americas. Allied was an important member of the 'Beerage' and had considerable influence in the international drinks business to the benefit of customers, employees and shareholders.

By the end of the 1980s Allied could boast of two of the most efficient malting plants in Europe.⁷⁷ But by world standards output of the plants was small. Output was geared to the demand of Allied's breweries. But this output was falling. Development in the 1970s was fuelled by the huge demand for Draught Double Diamond (DDD), the premier keg ale brand of the day. Volume of DDD was in excess of two million barrels annually. And it commanded a price in the pub of 2/6 a pint when competitor brands such as Worthington E and Watney's Red sold for 2/-. Inevitably as in any product life-cycle sales of DDD declined. But there was a ready replacement

with Skol lager. Skol was an international brand with huge demand growing in Europe for brewing in Spain at the breweries of Union Cervecera. This business was actively developed by Ron Hall and John Wain. Developments were also underway in East Africa as a result of technical consultancy by Allied experts. At this time Carling was essentially a U.K. brand with little international appeal. Heineken and Carlsberg had not yet achieved true international status. There was a huge opportunity for the purchase of the Spanish breweries and joint ventures in Kenya and Uganda. The technical excellence was there to establish an international malting business with a potential output in excess of 100,000 tonnes. This was not to be so. Bernard Kilkenny and John Dunwell had left the business and the spirit of Neville Thompson was gone. Senior management lacked the vision to become an international brewer. And when the 'Beer Orders' were published in 1989 the Board could take refuge in a more comfortable 'fire-fighting' strategy. The breweries were subsumed into the joint venture with Carlsberg, the pubs, managed and tenanted were dissipated into the miasma of Punch Taverns and Spirit Group and the wines and spirits division was sold to Pernod-Ricard. All that remained was the pension fund. This was ultimately a UK business tragedy and a huge lost opportunity.

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