Surveying The British Canal System

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From The Canal age to DGPS

A Brief History of English Canals

The development of a large inland water-transport network was, perhaps, the most important factor behind the industrial revolution in England during the eighteenth century. At first glance, the use of inland water transport in England, where rivers are not large, compared to elsewhere in Europe, seems unusual. In a country with nowhere further than about 100 kilometres from the sea, road transport would seem to be more viable. However, the small size of rivers and their water gathering grounds could have been an advantage. In the 18th century, hydraulic technology was still in its infancy, and the smaller scale of works necessary for canals and river navigations in England would certainly have made it easier for the engineers of the time to organise and construct them. Today, inland water transport is no longer widely used in England, with most goods being carried by road transport which is, perhaps, better adapted for short journeys. The small size of the country, once a reason for the success of canals, is now a reason for their decline.

Perhaps the main feature of England's geography is its diversity. Flat coastal plains, rugged mountains and gentle hills can all be found within one hundred kilometres of each other. The south-eastern part of the country is generally chalk or clay, with low rolling hills and wide valleys. The main river is the Thames, flowing eastwards to the sea at London. Further north, England's midlands are situated on a 300 metres high sandstone plateau which has outcrops of coal measures. The area is surrounded by the rivers Severn and Avon which flow to the south west, and by the Trent flowing north east to the Humber. The north of England is dominated by a central mountain range, up to 600 metres in height, called the Pennines which comprises sandstone and limestone areas, with coal measures underneath. This range of hills is drained by several rivers. The most important are the Aire, Calder, Don and Ouse which flow east into the Humber, and the Mersey and Ribble which flow west into the Irish Sea.

The supply of heat and raw materials has always been a major factor in the location of industry. Before the eighteenth century, most English industry was located in the south-east, where forests provided plenty of firewood. The rivers in the area, which are usually slow moving, were sufficient to power the waterwheels which drove the small factories of that time. As industrialisation developed during the eighteenth century, the increasing demand for cheap and reliable energy led to new factories being built further north. Engineering industries were established in the high central plateau around Birmingham, where their power came from coal, excavated from the local coalfield. Further north, in the steep, narrow valleys of the Pennines, textiles became the main industry. Powered initially by the fast flowing streams and rivers, textile mills were subsequently driven by steam generated with coal brought from the Lancashire and Yorkshire coalfields.

Transport was the key to the development of these midland and northern industries. Roads of the period were inadequate, particularly in the steep valleys of the

Pennines. They were incapable of carrying the vast quantities of heavy materials needed to supply the growing demands of the new factories. In the south, the wide slow-flowing rivers had been used by boats for centuries, though mills on these rivers often made navigation hazardous. Further north, the rivers were faster flowing, making it more difficult for boats to use them. Instead canals were built which overcame the difficulties of road and river transport. Thus, it was the construction of canals during the eighteenth century which allowed the industries in northern and central England to develop.

Since Karl the Great had built the *Fossa Carolina* in 793, in an attempt to link the rivers Main and Danube, canal technology had been developing progressively throughout Europe. Locks were introduced in the Low Countries in the twelfth century, and later the *Stecknitz Canal*, opened between Luebeck and the Elbe in 1398, became Europe's first summit level canal. One hundred years later, the mitre gate had been introduced on Italian waterways, while, with the opening of the French *Canal du Midi* and its water supply system in 1681, virtually all the technical problems in the construction of canals had been solved.

Why, then, were England's canals so important? Until the eighteenth century England had been slow to adopt developments in canal technology. It was the growth of industry in central and northern England which was to change this attitude. Merchants, who owned factories or who sold the goods produced, needed cheap transport for raw materials and for finished products. It was they who paid for the construction of these highly successful English canals. Until the eighteenth century, many European canals had been financed by the aristocracy who obtained little financial benefit from them, and they were sometimes built to increase social or political standing. The English canals and river navigations of the eighteenth century were different. The merchants who built them realised that to maximise their profits they had to invest not just in factories but also in transport, and that meant canals. They realised that making a profit from transport was of less importance than the profit they could obtain from the larger market for their goods which they could supply by canal. The financial success of these early eighteenth century canals and navigations came as an added bonus to the growing profits made from industry and commerce.

In the eighteenth and nineteenth century, England was the pioneer in the development of industry and transport. Although it enabled the country to become extremely wealthy in the short term, it was to create several problems which have affected Britain's long term prosperity. There were two specific factors associated with the development of canals which were to cause continual problems and were to lead, together with lack of support by government, to the eventual abandonment of inland water transport in England:
To keep down costs, canals were usually constructed to small dimensions. That there would be a rapid growth in the demand for transport during the eighteenth century was not appreciated by the early canal builders.
Most canals were built to carry goods between points on the canal or between a port and an industrial area. Apart from the narrow canals in the English midlands, they were not envisaged as an interlinked transport system. There was no national standard size for canal locks.
The effect of these factors was a transport system which was fragmented and inefficient.

As a result, England's canal system can be divided into two, with the size of locks being the decisive factor. River navigations were normally built to accommodate the

local coastal vessels of the period. Their locks were usually at least 4,3 metres wide and between 18,5 and 25 metres long. Some canals, particularly those designed as coast to coast links, were also built, approximately, to these dimensions. But when the first canals were built to link the midlands with seaports, it was decided to reduce the size of locks to make construction cheaper. They were built just 2,15 metres wide and 21,5 metres long, with the canal boats capable of carrying about 20 tonnes.

Most English canal and navigation construction took place during the 135 years between 1700 and 1835. It can be divided into four distinct phases:

The period up to 1760.
In the south of England, the navigation of many rivers had been improved in the sixteenth and seventeenth centuries. The main examples are the *Thames, Kennet* and *Lea*, all of which helped to supply London with goods and food. Few true canals were built in England during this time, the most important, technically, being the *Exeter Canal* of 1564. It was the early eighteenth century river navigations in the north of England, built by local merchants, which were to show the true benefit of cheap water transport. They brought dramatic improvements to trade, by reducing the cost and increasing the reliability of transport, and were to lead to England's rapid industrialisation in the late eighteenth and nineteenth centuries. The most important of these new waterways were the *Aire & Calder Navigation*, linking Leeds and Wakefield with the ports on the Humber, and the river navigations associated with the new port of Liverpool. It was only in the late seventeenth century that Liverpool had first been used by vessels trading to Africa and America. The rapid rise in the prosperity of the port can be linked directly to the opening of local river navigations and canals which linked it with, and helped with the development of, its industrial hinterland. All were built with locks around 4.5 metres wide and capable of being used by coastal sailing vessels.

1760-1770.
The increase in trade resulting from the opening of canals and navigations in the north of England made merchants and landowners throughout England realise the importance of cheap and reliable communication, particularly with ports. As a result, they began to promote canals linking the growing industrial areas in the north and midlands of England with the sea. Many of the most successful of England's canals commenced construction at this time. The first were authorised to be built as wide canals, similar in size to the river navigations already in use. Some, in the north of England, were certainly built as such. However, after construction had started on the *Grand Trunk Canal*, linking the pottery-making district around Stoke-on-Trent with the estuaries of the rivers Trent and Mersey, it was found that the cost was far greater than anticipated. To allow construction to continue, it was decided to reduce the size of the canal locks, resulting in the first narrow canal, with locks only 2.15 metres in width. After this, all of the canals built to serve the midlands of England were of this type. There were definite advantages, it reduced the cost and the volume of water needed. But as trade increased, these narrow canals became insufficient to meet the demand. Although they made large profits at first, they were not re-invested, and most of these canals were never improved. Some were purchased by railway companies in the mid-nineteenth century to control competition. Most of the canals built in this period, particularly the wide ones, continued to carry large quantities of goods into the twentieth century.

The 1790s.

Investment in canal construction had virtually ceased during the economic depression of the early 1780s. However, trade recovered rapidly, and by the start of the 1790s, people began to look for places to invest their money. Canals seemed to be an obvious choice; those already open were providing large profits. As a result there was a 'Canal Mania', when several long and numerous short, local canals were promoted and built. Many of the new canals planned at this time were looked upon just as a means of making money by the people involved with their promotion. The promoters were not involved with local industries, but were speculators who had seen the profits which early canals had made, and expected that canals would make large profits irrespective of where they were built. They did not realise the vital link between industry and transport, and many canals of this period were suggested and built in agricultural areas with little industrial potential. People from all over the country invested their savings in these new canals, often with disastrous results. Of the ones that were built, and many were, few made much in profit. Those that did were usually wide canals in the north of England. Some of the others were barely able to repay their construction costs and, by the middle of the nineteenth century, most were unable to compete with the new railways. To reduce competition and to gain traffic, the railway companies purchased many of the canals built during this period. They did not maintain them properly, with several being closed or abandoned. Those constructed during the 'Canal Mania' that survived under railway ownership were usually kept in poor condition and little used.

1800-1835.
By the start of the nineteenth century most of England's canal system had been completed. The two major canals built in England at this period were the *Knottingley & Goole Canal* which improved the *Aire & Calder Navigation* and allowed access to a new port at Goole, and the *Gloucester and Berkeley Canal* which by-passed the worst parts of the tidal River Severn and improved the port at Gloucester. Because the English canal system had been built piece-meal, with no overall government control, there were several useful links which had not been built. These included the *Birmingham & Liverpool Junction Canal* and the *Macclesfield Canal* which were added to the system at this time. Civil engineering had improved, and a few early canals which had long, winding routes, following the contour lines, were made more direct by building short diversions which replaced some of the worst of these sections, reducing the overall length of the canal. Surprisingly, nearly all the canals built or improved in this period continued to use the small, narrow locks, typical of the canals of the English midlands. Only a few of the canals and navigations increased the size of their locks, making them efficient enough to compete with railway transport. These were usually already built to accommodate boats over 4.5 metres in width.

Despite the fact that England's canals have long been considered of vital importance to the development of an industrial society, few technical innovations were introduced on them. There could be two reasons for this. Firstly, the small size of the canals made such innovation unnecessary as the benefits improvements would bring would be related to the size of navigation: small canals only needed small improvements. Secondly, by the time traffic had increased to the extent that technical developments were necessary, England was building railways. Consequently, transport technology concentrated on railways.

Innovations
However, there were three areas where innovations were introduced. New materials was one of these. At the start of the nineteenth century, cast iron began to be used for canal structures. Perhaps the best example of its use at this time is the Pontcysyllte Aqueduct on the *Llangollen Canal*. Opened in 1805, it uses a cast iron trough on stone piers to cross the valley of the River Dee. It is 310 metres long and 39 metres high.
Another interesting use of cast iron was the new lock at Beeston, built in 1827 on the *Ellesmere Canal* in Cheshire. It was constructed of cast iron, both lock structure and gates, and replaced an old stone lock which had failed because of unstable foundations.

The second area of innovation was in containerisation. Several late eighteenth and early nineteenth century English canals used 'tub' boats, capable of carrying from 5 to 10 tons, often used with primitive boat lifts or inclines. The *Aire & Calder Navigation*'s engineer developed this idea into the 'Tom Puddings', a compartment boat system for carrying coal. Moved in trains of up to 30 compartment boats by steam tugs, they were lifted out of the water and then tipped by hydraulic machinery to empty their cargo into sea-going ships.

The final area of innovation was in the development of boatlifts and incline planes. The first modern boat lift was opened at Anderton, Cheshire, in 1875, and is currently being restored as a technical monument. It formed the basis for subsequent boatlift development elsewhere in the world. Incline planes were also developed

successfully in England, the Foxton incline in Leicestershire setting a new standard in design.

Despite these innovations, there were several major faults with the English canal system. They were financed by private companies with little or no government control, and were built to a variety of different sizes. The most successful canals served areas with a diversity of industry, but on others their route was designed to serve just one major industry. Their success thus depended upon this industry, and when it declined, the canal ceased to make a profit. Also, because canals were owned by different companies and built to different sizes, it was extremely difficult to develop trade between towns on different canals. Cargoes had to be transhipped or carried in boats small enough to fit every lock. A single charge for the whole trip was impossible, each company having its own accounting system and charging separately for the use of its own section of canal. Although the disadvantages of this system must have been apparent, the first railways in England were also built under the same rules. It was only after twenty years of railway construction that government insisted on a standard gauge for the track. The problems in quoting through rates for goods were only really solved when transport in Britain was nationalised in 1948.

Railway competition in the second half of the nineteenth century was to reduce profits. The owners of some canals proposed converting them, filling in the canal and building a railway on top. Others, unable to compete with the new form of transport, were purchased by the local railway company to reduce competition and thus enable railway rates to be increased. Consequently, some canals were owned by railway companies, who in many cases were not interested in canal traffic, while others continued to be independent. This resulted in further problems in quoting rates for traffic passing over several canals, with railway companies often raising rates on their canals to discourage canal traffic. A few railway companies did operate their canals efficiently, but this was usually because their canals served areas where they did not have railway lines or which were served by competing railway companies.

Although some canals serving agricultural communities fell into disuse during the nineteenth century, those in industrial areas continued to provide a useful service. They continued to carry their established traffic, but rarely expanded into new markets which were usually served by railways. Consequently, money for improvement and renewal of facilities was unavailable for all but the most successful of canals and river navigations. Once again, it was the geography of the country which influenced development.

Geography

Canals in England have large numbers of locks, with a national average of one lock every 2 kilometres. Some canals had far more than this, for example the *Rochdale Canal* has a lock every 570 metres. There were also some 5000 bridges, 60 tunnels and 400 aqueducts on the system. With such a large number of structures to alter, often surrounded by large concentrations of industry and housing, it is small wonder that the English canal system was never extensively improved. The cost would have been prohibitive. It was only river navigations, with their comparatively small number of locks, regular water supply and simplicity in increasing navigable depth and width which were improved to any great extent. The most important improvements at this time were on the *Aire & Calder Navigation*, the *Weaver Navigation* and the *Severn Navigation*.

Despite their disadvantages, canals continued to provide a useful service throughout the nineteenth century. There was even increased interest in water transport, following the opening of the *Manchester Ship Canal* in 1894. Several further ship canals were proposed, with both the *Aire & Calder Navigation* and the *Sheffield & South Yorkshire Navigation* having plans. However, the First World War was to reduce optimism dramatically. The increasing use of road transport, resulting from the purchase by businesses of surplus military lorries after the war, and government's failure to provide adequate compensation for maintenance arrears suffered during the war, led to a rapid decline in canal transport on smaller canals. Even fairly successful companies, such as the *Leeds & Liverpool Canal*, had to sell their fleets of boats in order to reduce overheads. Small, private carrying businesses took over these fleets, but they operated with small profit margins and always had problems in replacing old boats and improving cargo handling facilities. The depression of the 1930s only added to these problems, even though the Government did provide money for some improvements. The *Grand Union Canal*, linking London to Birmingham was widened at this time, though its locks were only doubled in width to 4.3 metres so that two narrow boats could pass through at the same time.

After the Second World War, there was a change in government which led to the nationalisation of transport, including most of the canals which were still in use. These included many of the narrow canals which, despite still using boats only able to carry 25 tons, were still providing a useful service. Old traditions died hard, and England continued to use 18th and 19th century canal technology right up to the 1960s. Diesel engines had been fitted to many cargo carrying boats, but horses continued to be used for towing others for many years, particularly on narrow canals. The last one finally retired in the 1970s. Even today, many people in England still think in terms of horse drawn narrow boats when they read about canal transport. This has been re-inforced by the wide publicity given to the use of narrow canals for tourism and as a heritage resource.

Water transport was adversely affected by the post-war decline in England's traditional industries and the construction of motorways. The widespread replacement of steam power by electricity also reduced dependence on water transport, and the 1950s and 1960s saw barge traffic disappear from most English canals. Only the larger waterways, such as the *Aire & Calder Navigation* and the *River Weaver*, remained as large scale carriers of goods, and even here the closure of coal mines during the 1980s and decline in manufacturing industry has reduced the volume of cargo carried, especially on the *River Weaver* where only one tanker uses the navigation each week.

From this brief history, it can be seen that England's canal system retained much of its original infrastructure into the 1960s. On narrow canals, boats carrying just 25 tons continued in operation, with their boatmen and their families maintaining many old traditions. During the years just prior to the Second World War, several people had begun to question and criticise the social changes which had occurred as a result of industrialisation over the previous 150 years. One, an engineer and industrial historian called L.T.C. Rolt, was particularly interested in canals and the families still living on and working canal boats. He purchased a converted narrow boat on which he and his wife lived in the late 1930s and 1940s. He wrote a book, "Narrow Boat", telling of his travels around the canal system and comparing the values and quality of life he found there with those to be found elsewhere. Published immediately after the war, the way of life which the book described was widely acclaimed. It seemed to provide a respite from the austerity which people had suffered during the war and, due to post-war shortages, were continuing to suffer.

Canals came to be seen as a haven of peace, ideal for leisure and recreation, an image which they retain today. This causes problems when people try to promote modern water transport in England.

Restoration

Although interest in canals increased dramatically following the publication of "Narrow Boat", it was to be many years before the English canal system was safe from closure and seen as a suitable subject for development. Before then there were to be many battles with bureaucracy. A major step forward was taken with the formation of the Inland Waterway Association (IWA) in 1946. Set up by enthusiasts, including Rolt, Charles Hadfield, who was to write a series of books detailing the regional and national history of English waterways, and Robert Aickman, ultimately the IWA's driving force, it was to prove a thorn in the flesh of national and local government wherever canals were in danger of closure. Despite initial problems in deciding the exact aims of the Association, it is indubitably due to its efforts, by unpaid or underpaid enthusiasts, that almost all of the English canal system is still in use today.

During the 1950s and 1960s, the IWA campaigned to increase national recognition of canals and the role they could play in commerce and recreation. It was an uphill battle, as many influential people thought most canals were virtually derelict. Often people tried to have them abandoned and drained because they considered that they were a danger to children. Drownings were widely publicised. It was against this background that the enthusiasts who formed the IWA struggled to keep the canal system alive. Parliament was lobbied every time that canals were mentioned in proposed legislation, and their historic and recreational aspects were widely promoted. Rallies, where both commercial and pleasure boats gathered, were organised to increase interest amongst the general public and to highlight sites where there was a specific problem. Such rallies, together with associated arts based shows and displays, have now become an established part of the English canal scene and are still used to publicise all aspects of waterways. They now include trade fairs and other land-based attractions to encourage the local population to attend, and thus see their local canal in a positive light.

It was considered most important to obtain the support of canalside communities and the public in general. Government was concerned about the increasing cost of maintaining a canal system which was neglected and carrying a decreasing amount of goods. They produced reports at regular intervals which highlighted the problem and looked at the cost of de-watering those canals which had become uneconomic - these were the majority of the smaller canals. This policy would have resulted in elimination of the majority of England's canal system. In 1968, the Government proposed introducing a new Transport Act which would have enabled them to close canals easily. The IWA was at the forefront of opposition and, together with other interested bodies, forced Government to take out the most contentious aspects. Although some rights, previously held by those using the canal system, were removed, the Act marked a turning point in the recent history of England's navigable waterways. From the opposition to this Act, Government realised that there was widespread support for the retention of England's smaller canals, particularly for recreation.

Industrial development during the post-war years resulted in increased leisure time, while better education had made people more interested in their history. Canals were seen as an outlet for both. The small English canals were of an ideal size for pleasure boats, with locks which were small enough to be operated by anyone. They

had remained virtually unaltered for 200 years and so were seen as historically interesting, besides passing through some of the country's most beautiful scenery. Even in towns and cities, with their undisturbed towpaths, they formed isolated stretches of peaceful country within the urban environment. More and more, planners began to see canals as an asset to their town improvement schemes rather than, as previously, an eyesore.

Although most of England's canals were still in use at this time, there were a number which had already been abandoned, either officially or through lack of maintenance and disuse. One in particular was the *Stratford Canal*, linking Shakespeare's birth-place with the rest of England's canal system. The local authority had tried to have the canal closed in 1959, but were successfully opposed by enthusiasts. However, there was no money available for restoration of the canal. To overcome this problem, the canal was leased to the National Trust, a non-governmental body which maintains historic properties, supported by contributions from the public. The restoration of the canal was then undertaken by enthusiasts, with some help from the armed services and prisoners. The work was completed in 1964, the Queen Mother officially reopening the canal during the celebrations for the 400th anniversary of Shakespeare's birthday.

The successful reopening of the *Stratford Canal* encouraged enthusiasts to start work on other closed canals, all over the country. Many individual canal societies were formed to promote the restoration of their local canal. Some members of the IWA formed the Waterway Recovery Group. It organised, and still organises, the restoration of derelict canals by volunteers, both in this country and more recently in Ireland. Sometimes they undertake large scale operations, with two events around 1970, part of the restoration of the *Ashton Canal*, near Manchester, attracting hundreds of volunteers. They spent their weekend clearing mud and rubbish from the canal and restoring locks and bridges. The working parties are usually smaller, with many groups working on their own local projects.

At first the local and national authorities were very dubious about the activities of canal enthusiasts. However, the increasing publicity which was being given to canals brought them to the attention of a wider and wider audience. Some were interested in the historic aspects of canals. Because there had been so little investment in them, many canals remained virtually unchanged from the days, 200 years previously, when they were built. In towns, they remained a quiet haven of tranquillity in an increasingly noisy world, whilst elsewhere they passed through beautiful countryside. With such advantages, people came to regard them as ideal for leisure pursuits. For many years there had been some fishing and pleasure boating on canals, but now they were increasingly used, not just for these activities, but also for other leisure activities. More and more now use canals, walking or cycling along the environmentally friendly towpath, whilst others have become interested in canal history and that of the industries along their banks.

With the rapid growth in leisure time over the last twenty years and the recognition that this is now a major industry in itself, business and government have begun see major advantages in canals. Also, the rapid changes in society and technology since the 1950s have made people more interested in the 'security' of the past, besides being desirous of improvements to their environment. With their combination of heritage and ecology, canals and waterways are now being seen not just as a place for recreation, but also for residential and commercial development. The conversion of old buildings to new uses and reuse of derelict town-centre canalside sites for industry, commerce and housing is now considered normal practice.

At first the Government's waterway authority, British Waterways, was extremely sceptical about the activities of the IWA in promoting the wider use of canals and the restoration of ones which had been abandoned. Restraints on spending and lack of direction by the Government made British Waterway's task difficult and they found it a struggle to come to terms with the radical approach promoted by enthusiasts. At first they tried to insist that all work should be undertaken by professionals, and they certainly began improvements to some canals in the 1960s. They also started work on town-centre sites, notably at Farmer's Bridge locks in Birmingham. However, lack of sufficient government funding and the quality of work by volunteers from the Waterways Recovery Group has made them reassess their attitude to the role of the unpaid enthusiast. Co-operation between British Waterways and enthusiasts involved in the promotion and restoration of canals is now well established.

Over the last 25 years, a number of canal restoration projects have been completed. More are underway and canals which have partly been destroyed and their land used for agriculture or building are now being restored. Their are even plans for new canals which will improve access to isolated parts of the canal system. The money to finance these projects comes from a number of sources. British Waterways pays for some of the work, but is limited in the amount of money it can use by the Government, particularly on derelict or semi-derelict canals. Government grant aid for the reclamation of derelict land is sometimes available, as is European Union money, but this source is limited to specific areas. Local government also provides finance in many places and business sponsorship has been obtained for certain projects. The IWA and local canal societies are another source, not just for finance, but also for practical assistance.

Possibly the first individual canal society to be formed was the Kennet & Avon Canal Association. In 1950 there was a temporary closure of this 140 kilometre long canal. There was no money available for repair work and the condition of the canal deteriorated. Finally, in 1955, its legal closure was proposed. The Kennet & Avon Canal Association was formed to fight this proposal and to save the best inland waterway link between the North Sea and the Irish Sea in the south of England. Work on restoration was agreed in 1961, though sufficient finance was never provided. The 1968 Transport Act then designated 30% of the canal as a 'cruiseway', for which money was available, but the rest was designated as 'remainder' waterway, with low financial priority. The Association, together with local authorities and British Waterways, set about restoring the 'remainder' section. Over twenty years, a total of £9.5 million were raised. This paid for a variety of work undertaken partly by government job-creation schemes, partly by British Waterways and partly by volunteers. The canal reopened in 1990. However, because restoration was undertaken with a very limited budget, the standard of work was poor in certain places, and the canal's water supply, which had always been extremely poor, still causes problems. To complete the restoration of the canal to the highest standard a programme of work costing £28 million has been proposed; three-quarters of this it is hoped will come from Lottery funding, the rest from local authorities, British Waterways, the K&A Trust (formerly the K&A Association) and from income already being earned by the canal.

The *Peak Forest* and *Ashton Canals* were also saved from closure by enthusiasts. These two canals were important as, when open, they would create a circular route to the south of Manchester, ideal for leisure activities. British Waterways had proposed to close these two canals in the 1960s, but were successfully opposed by the Peak Forest Canal Society and the IWA. Again volunteers provided vital help in

raising money and in the actual restoration. Their effective publicity also changed the attitude of local authorities who had originally been in favour of the canals' closure. Today these authorities have realised the recreational benefits of canals and are supportive of further improvements. The restoration of these canals also saw a change in attitude of British Waterways. Originally they had been extremely obstructive. However, because of the useful practical work of the volunteers and their success in changing local attitudes and in raising finance, British Waterways eventually agreed that the restoration could be accomplished. Sufficient finance was then raised from local and national government sources to complete the work, the two canals re-opening in 1974.

Among on-going projects is the restoration of the 53 kilometre long *Grantham Canal*. Originally serving the countryside to the east of Nottingham, this canal had been abandoned in 1936, and parts have been filled-in. Restoration will require 3 kilometres of new canal to be built, to link the old canal with the rest of England's waterway system. A similar distance has been drained because of mining subsidence and will also need extensive reconstruction. On several earlier projects, work was done as cheaply as possible because of financial restrictions, causing subsequent problems and, in the long term, negating any cost benefits. As a result of these experiences, British Waterways are concerned to ensure that current restoration programmes are undertaken to the highest standards right from the start. This requires a high level of funding, with around £30 million needed for complete restoration of the *Grantham Canal*. To raise the finance necessary, the local authorities, British Waterways and enthusiasts from the Grantham Canal Trust have joined together to promote restoration. A full study has been undertaken, looking at the cost of restoration, environmental problems and the economic benefits to the local community. It is expected that most of the finance will come from European Union sources, with the remainder provided by British Waterways and the local authorities. The Grantham Canal Trust will also help with fund-raising as well as providing volunteer labour which will help keep costs down.

The increased publicity for canals and the extensive political pressure for conservation and restoration which has been achieved by an enthusiastic canal lobby over the last 25 years has led to great interest in canalside development from business and industry. Canals, with their English reputation for slowness and lack of investment, had previously been seen as detrimental to commercial development. However, with the public's increasing awareness of the positive environmental benefits of canals and their historical associations, canalside sites, particularly those with suitable old buildings, are now regarded as prime sites for commercial development.

One of the first cities to look with renewed interest at canalside redevelopment was Birmingham. By the late 1960s, an area of warehousing and associated buildings at the top of Farmer's Bridge locks, close to the city centre, had fallen into dereliction. A scheme for new housing and recreational facilities was drawn up, together with plans for the conservation of some of the canal's older buildings and other features around the canal locks. Some old houses were restored, while others were converted into office accommodation. The resulting improvements were widely acclaimed. Although it took some time before further work was undertaken, the scheme had shown the positive advantages of re-using older buildings and canals in the redevelopment of city centre sites. The success of the scheme led to similar developments all over the country. In Birmingham, further work has taken place recently, and a partnership of City Council, British Waterways and private developers have just won the international 'Excellence on the Waterfronts' Award for the development of the

canalside at Worcester Bar. This scheme is just around the corner from Farmer's Bridge and is, to some extent, a continuation of the earlier scheme.

European Union money has been vital to the success of many projects. One in particular, which used European Regional Development Funding, is the Leeds and Liverpool Canal Corridor project to regenerate the economy of an 80 mile corridor of land on either side of the canal in Lancashire and Wigan. The area around the canal contains many old industrial buildings and the decline in traditional industries had led to some dereliction. The idea of using the canal as a linking theme for regeneration was first promoted by British Waterways in the early 1980s. Together with the local authorities and private investors, they have been able to attract over £200 million for development projects since then, finance coming from both the public and private sectors. Not only have new buildings been erected, but several historic canalside buildings have been restored and converted for new uses. For example, in Wigan, an industrial museum has been established in old canal warehouses, reflecting the important position of the tourism industry in generating new business. In Blackburn a similar warehouse has been converted to a Business Development Centre, offering advice and facilities for small firms, with a former flour mill nearby now used as offices and a television studio, while in Burnley a former textile mill is currently being converted into a hotel. These are just a few examples of old buildings along the canal corridor which have been altered for new leisure and commercial purposes.

Another example of the re-use of industrial monuments is the conversion of the warehouses around Sheffield canal basin. Close to the city centre, they had fallen into disuse and were virtually derelict, but the site was seen as important to the revitalisation of the former steel making area in the River Don valley. It was hoped to start work in the mid-1980s, but a deterioration in the property market resulted in the withdrawal of the private developer. In 1988 the Government set up the Sheffield Development Corporation, giving it extensive powers and finances to regenerate the former steel-making district. British Waterways leased the canal basin site to the Development Corporation, and agreed to restore the warehouses and to clean and landscape the basin. Private developers are erecting modern buildings on part of the site, and they will complement the facilities provided by the older buildings. Restoration work by British Waterways on the warehouse cost £2.4 million, £1.5 million of this coming from the Development Corporation, together with a further £1 million towards work on the basin. They also provided new access roads and car parking. The complex re-opened in 1995 and has provided improved public access to the canal and a boatyard, besides office space in prestigious buildings close to the city centre.

Although most of our English canals are now safe from closure, few are used for transporting goods. Over the last twenty years, all canal developments have used the long-established historical and traditional aspects of canals as part of their marketing strategy. As a result, most people in England now perceive canals as small and antiquated, despite the fact that around 4 million tons are carried annually on the larger commercial waterways. Wide publicity for the history of English canals has had a detrimental effect upon attitudes to investment in modern commercial carrying by inland waterways. The small size of England is also a disadvantage, short journeys being more suited to road transport. Also, as an island race, we have not seen ourselves as an integrated part of Europe. However, as our dependency upon trade with Europe develops and pressure for environmentally sustainable transport increases, it is to be hoped that there will be more interest in improving navigation, particularly on our rivers, to European standards.

Why has the restoration of English canals been so successful? One of the most important reasons must be the pressure exerted by enthusiasts and the IWA over the last fifty years. Firstly, they changed the public's view of canals from that of a derelict eyesore to one where the historical, environmental and leisure benefits were appreciated. Secondly, by positive publicity in the media, they forced national and local government to re-evaluate the position of canals in their planning policies. This, in turn, allowed finance to become available from public sources for conservation and restoration. The large-scale private investment which followed would certainly not have been forthcoming, had not the public authorities already started to conserve and develop canals.

Much has been achieved by English canal restoration in the conservation of industrial monuments and the creation of new businesses, though the process has taken many years and there are still many problems to overcome. Society has developed rapidly over the last twenty-five years, and it is now less easy to define precisely the objectives for conservation and restoration. When restoration was first suggested, canals were mainly used by enthusiasts with simple needs. Today they are visited by more and more people who demand easy access and good facilities. This is expensive, and the cost of using canal facilities has risen dramatically in order to provide a return on this financial investment. It has led to some criticism, particularly from older enthusiasts who have seen the cost of their hobby or business increase at a faster rate than inflation. They see new business orientated developments, with their high cost and extensive alterations to old structures, as destroying the very fabric of the canal environment for which they had worked over the years. Increased access to canals has, to some extent, threatened their peace and tranquillity, one of their prime assets in the modern world. However, is it possible to justify the cost of maintaining old canal structures without increasing usage and income, and would canals have survived without an increase in funding? In a market-led economy, this is the problem for any conservation project. The very success of canal restoration has, inevitably, led to increased commercial development. The difficulty for planners and historians is to maintain a balance between preserving the integrity of the past and creating a sustainable future.

PRESENT DAY

BRITISH WATERWAYS are NOW the custodians of 2,000 miles of the nation’s historic network of canals and inland waterways, much of which is over 200 years old. Built to service the transport needs of the world’s first industrial revolution, waterways transformed the social and economic life of communities all over Britain. In the new millennium, they can bring about a new renaissance. Today, the waterways are valued as a leisure and recreation resource for millions, are a part of our land drainage and water distribution systems whilst still providing an environmentally friendly means of transport for coal, aggregates and other materials.

The waterway network includes 3,200 km of canals, 4,763 bridges, 397 aqueducts, 60 tunnels, 1,549 locks, 89 reservoirs, nearly 3,000 listed structures and ancient monuments and 66 Sites of Special Scientific Interest. Much of the network is over 200 years old