



THE INSTITUTION OF  
CIVIL ENGINEERS

# PHEW NEWSLETTER

Panel for Historical Engineering Works

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## SIR ALEC W SKEMPTON, 1914-2001

by Mike Chrimes

Professor Sir Alec Skempton, 'Skem' to his close acquaintances, died on 9 August 2001. The leading civil engineering historian of the twentieth century, he acted as Chairman of PHEW from 1982 until 1990, bringing his immense knowledge and intellectual rigour to the Panel's activities.

Born in Northampton, he studied civil engineering at Imperial College where he was encouraged by Professor Pippard to undertake research, initially into reinforced concrete. In 1936 he joined the staff of the Building Research Station and in January 1937 joined the Soil Mechanics Section led by Dr Leonard Cooling. This proved a fateful move. Soil mechanics was then in its infancy in the UK, but within a few months the Chingford dam embankment failed under construction and the subsequent investigations by BRS brought geotechnical engineering to the fore. Skempton's analysis of its causes established his early reputation. In 1945 he began lecturing at Imperial College where he became Head of Department in 1957. Under his leadership it became one of the leading civil engineering departments in the world, attracting able staff and students in part through his teaching and international reputation in soil mechanics. Many students will also remember his lectures on the history of civil engineering, which proved an inspiring introduction to the subject.

In the field of the history of engineering, Skempton's corpus of work has, almost single-handedly



'Skem'

Photograph supplied by John Burland

transformed the subject from that of the enthusiastic amateur historian, largely focused on steam engine technology, to a rigorous academic discipline, challenging orthodox assumptions.

A selection of his vast range of historical papers were reprinted recently in *Civil Engineers and Engineering in Britain, 1600-1830* in Variorum's collected studies series. He also acquired a significant library of civil engineering papers and produced definitive bibliographies of early civil engineering literature.

He was the obvious choice as the first Chairman of the Institution of Civil Engineers Archives Panel. The Panel was set up in 1975 to supervise the management of the Institution's own records and the rich collection of civil engineering literature it owned. Skempton remained Chairman for twenty-one years, a period in which the collections were thoroughly reorganised. This work culminated in the forthcoming *Biographical Dictionary of Civil Engineers*.

Skempton's contribution to civil engineering was rewarded in a succession of national and international awards and honours. He was knighted in the millennium New Year's Honours list to the delight of his many friends and former students.

## THE CHAIRMAN'S COLUMN

by Professor Roland Paxton

On a recent visit to Troy, New York State, I was surprised to find myself and the Institution of Civil Engineers mentioned in the morning's *Troy Record*. This was under a 'Heritage on the Hudson' leader written by former City Archaeologist Don Rittner in support of preservation of the Albany end of the track-bed of the Mohawk and Hudson Railroad and the city's historic waterworks. This railway, reputedly America's first passenger line, was opened in 1831. Unfortunately commercial pressures have prevailed so far and the site is now being redeveloped without regard to its historical significance. It would be greatly to the credit of the City of Albany, if this remarkable achievement of their forebears could be commemorated for posterity. As parts of the track bed survive perhaps at least an interpretive site with information boards could be considered.

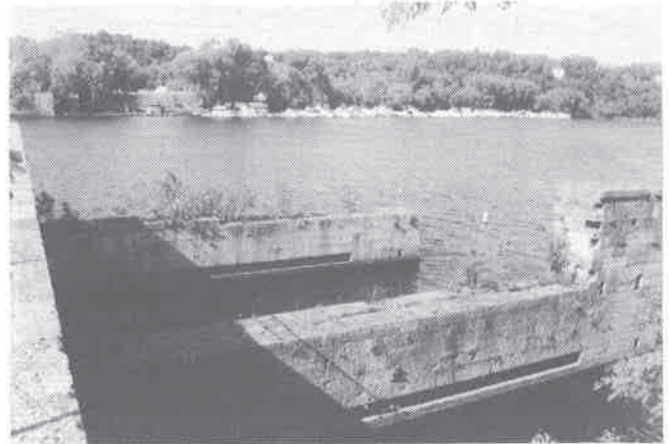


Dr Carroll and the Erie Canal from rebuilt Whipple Bridge, Clifton Park  
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Whilst in this area I visited Erie Canal sites under the expert guidance of Dr Tom Carroll, the energetic Director of the Hudson-Mohawk Gateway. Dr Carroll, as well as actively developing the Burden Ironworks Museum, is to be congratulated for the innovation of promoting local historical engineering works to the public. From last October he has organised and acted as guide for coach visits to Erie Canal structures and Whipple bridges, emphasising their engineering and social attributes. Participants pay about \$60 per head and the response has been excellent.

The 363-mile long, 84-lock, Erie Canal (543 miles with branches) connected Buffalo at the east end of Lake Erie with Albany on the upper Hudson River, and thus, the Atlantic Ocean via New York with the Great Lakes and River St Lawrence and, via the Ohio

Canal, with the river Mississippi. Construction began in 1817 and when the canal opened in 1825 its effect on the nation's well being was immediate and dramatic. Settlers poured west. Freight rates between Buffalo and New York dropped from \$100 to \$10 per ton. Within nine years construction costs had been more than recouped by tolls and work began on enlarging the canal by bank heightening to 60ft wide and 7ft deep. Today the canals use or run parallel to the original waterways.

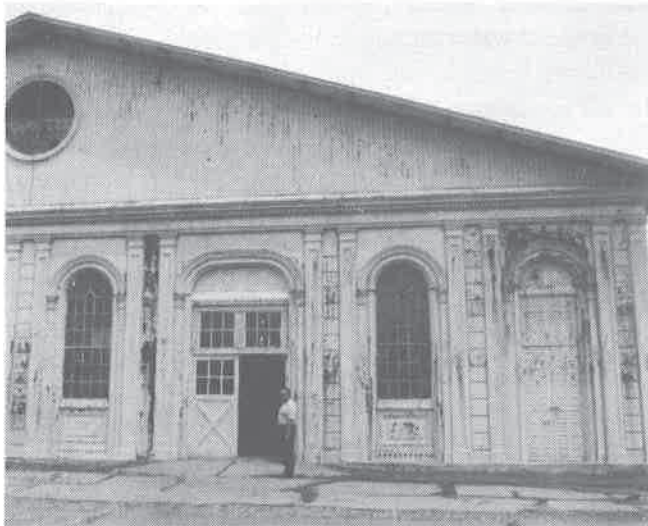


Rexford Aqueduct, 1842 – limestone ashlar supports to waterway with slots for timber  
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Of several sites visited, Rexford Aqueduct 1842<sup>1</sup> (the canal's second longest) crossing the river Mohawk was the most thought provoking in design terms. Its 10ft wide towpath, but not its waterway, was carried on 13 segmental masonry arches of about 45ft span and 22ft rise, too high to accommodate the canal's water level at about 21ft above river surface. The timber trough waterway alongside was carried on extensions of the arch piers and its underside was about 12ft above river water level. Of the towpath only two arches at each side survive. Navigation is now via the canalised river. At Cohoes we walked through several bypassed locks, including Lock 5, 90ft long by 15ft wide, which had been infilled and grassed to 5ft below its top to form an attractive landscape feature, with the nipper indentations for lifting the large stone blocks clearly visible.

At Watervliet, we visited the cast iron 'Arsenal' storehouse erected in 1859 and its outstanding 'museum of big guns' under the authoritative guidance of director/curator John Swantek, co-author of *1813-1997 The Watervliet Arsenal ... the Nation's Oldest*. This 'Crystal Palace' type structure in iron, comprises a rectangular warehouse 100 x 196ft detailed in Renaissance style, proportioned for stone, but prefabricated in cast and wrought iron components by

the 'Architectural Iron Works' (Founder: Daniel D Badger), City of New York. The roof trusses are of wrought iron Fink and modified Fink type. The side galleries webbed 'Siamese' cast iron columns support state-of-the-art cast iron connecting beams 27in deep at mid-span. A 2½in wrought iron rod integral with the bottom flange provides additional tensile strength.<sup>1</sup>



Mr Swantek and Watervliet Arsenal façade, 1859  
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Through the good offices Nick Gianopulos, who much enhanced my visit to Philadelphia last year, I visited Lowell, Massachusetts – the New Lanark of the USA. Here, c.1823 the river Merrimack was dammed above the Pawtucket Falls to utilise a 32ft head and an immense amount of water to create, and power by means of breast waterwheels, America's first planned industrial city. By 1850, a mile-long stretch of mills was operating about 10,000 looms and the population had leapt to 33,000. Technology transfer from Britain played no small part in this development. The more efficient turbine then began to eclipse the waterwheel, e.g., in 1854 two 750hp turbines were provided at a new mill.<sup>2</sup> Eventually demand for Lowell textiles declined. The city is now a dynamic heritage centre through its outstanding museums, trails, events and conservation of examples of its historic mill infrastructure, including canal flow regulation sluice gates! Well worth a visit.

Lastly, but by no means least, developments for the History and Heritage Committee of ASCE. The Panel is pleased to note that Professor Henry Petroski, Duke University, Department of Civil Engineering, Durham, NC 27706 USA is now Chair of the History and Heritage Committee. Congratulations to his predecessor Dr Jerry Rogers on being elected an ASCE National Vice President. ASCE is holding an Annual History and Heritage Conference from October 10-13, 2001 at Houston, Texas, at which Mike Chrimes, Amar Bhogal and myself are to present

papers. The *Proceedings* for this and for the 1996 and 1998 conferences can be ordered from ASCE/ICE Publications.



Pawtucket Falls dam and 1848 brick gatehouse at end containing ten 6½ ton sluice gates  
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<sup>1</sup> *A Report of the Mowhawk-Hudson Area Survey conducted by the Historic American Engineering Record.* Ed. R M Vogel, Smithsonian Institution, Washington, 1973.

<sup>2</sup> *The World of the Industrial Revolution.* Ed. R Weible, Museum of American Textile History, Lowell, 1986.

## MANCHESTER'S LONGENDALE DAMS AND RESERVOIRS

by H Gunston

On 6 and 7 July the British Dam Society organised a Study Tour of the dams and reservoirs in Longendale which were originally constructed for Manchester Corporation between 1848 and 1877. Five major dams were built across the valley of the River Etherow, the upper three (in descending order Woodhead, Torside and Rhodeswood) being for gravity water supply to Manchester, whilst the lower pair (Vale House and Bottoms) provided compensation water. John Frederic Bateman, aided in the later years by George Henry Hill, directed the whole scheme, which also included two smaller reservoirs on side streams (Arnfield and Hollingworth), together with the Mottram Tunnel and service reservoirs.

The technical focus of the BDS visit was the engineering work carried out in recent years by North West Water (now under the United Utilities umbrella) to bring the dams up to modern flood routing standards. However, there was much engineering history to be seen, starting with spectacular masonry