

*Fish versus Power: An Environmental History of the Fraser River.* By Matthew D. Evenden. (Cambridge: Cambridge University Press, 2004, xvii, 309 pp., diag., ill., tables, maps, bibl. ISBN 0-521-83099-0 £40.00)

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delicate connections between Cantor's faith in God, his mental illness, and his mathematical work, which would prove revolutionary in the twentieth century. The famous lecture of David Hilbert at the Paris meeting of the International Congress of Mathematicians (ICM) in 1900 likewise boasts extensive impact. In "Hilbert and his 24 Problems," Rudiger Thiele – twice the May Lecturer – explores Hilbert's mathematical interests and research questions that would drive significant work in twentieth-century mathematics. Thiele presents here the first publication of Hilbert's previously unknown 24th problem about finding a criteria for simplicity of proof. In "Turing and the origins of AI," Stuart Shanker aims to assess the influence of Turing on pursuant work in artificial intelligence. Shanker argues that Turing's work, at the interface of analytic philosophy and psychology, transformed the concept of a machine, created new models of thinking, and provided insightful analysis of cognition.

The final chapter, "Mathematics and Gender: Some Cross-Cultural Observations" from Ann Hibner Koblitz, challenges the perpetuated understanding that few women are, ever have been, or are even capable of being involved in serious mathematical activity. Through cross-cultural investigations, Koblitz illustrates the currently (and historically) complicated and contradictory picture of women in mathematics. With these high-caliber samples of various approaches, like biographical research, textual study, institutional history, technical investigation, sociological inquiry, archival work, to the history of mathematics, *Mathematics and the Historian's Craft* offers a good introduction to the CSHPM and its activities. This effort to make CSHPM scholarship more accessible to a broader scholarly audience succeeds in providing a good survey of recent projects and questions of interest in the history and philosophy of mathematics.

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## Technology / Technologie

***Fish versus Power: An Environmental History of the Fraser River.* By Matthew D. Evenden.** (Cambridge: Cambridge University Press, 2004, xvii, 309 pp., diag., ill., tables, maps, bibl. ISBN 0-521-83099-0 £40.00)

*Fish Versus Power* is a welcome addition to the growing literature on the environmental history of British Columbia. Covering the period from

approximately 1900 to 1960, Matthew Evenden presents a clear and informative history of the ongoing struggle between the growing demand for hydroelectricity, especially in the increasingly urbanized Fraser River delta area of the province, and the needs of the commercial fishing industry. The incompatibility of exploiting these two resources – fish and power – had become one of the main obstacles in the development of large-scale water resources on the North Pacific Slope, and as such, Evenden's excellent study explores the politics of large rivers such as the Fraser and offers a unique regional study in which power development and large-scale damming projects were constrained (unlike similar massive hydroelectric projects constructed on the Columbia River in adjacent Washington State). The third-largest river in terms of annual flow on the Pacific Coast of North America, the Fraser (located in British Columbia, Canada) is today the most productive salmon-spawning ground in the world. As a highly productive river system, the Fraser not only continues to support a large First Nations population, but also a large commercial fisheries industry.

Evenden begins his discussion with the salmon run of 1913 that had been blocked by land slides, primarily at Hell's Gate. These slides, resulting from the construction of the Canadian Northern Railway in 1911, led to an immense blockage in 1913. Although attempts were made to clear the obstruction and allow spawning salmon to proceed upstream, an imperfect understanding of the salmon life cycle led to a substantial loss of the fish population and a consequent reduction in returning fish stocks over the next many years.

As a result, greater research into salmon populations was conducted over the next several decades, and by the 1930s a joint United States–Canada research group was established to tackle the ongoing problem (partly in response to the decimation of fish stocks due to the damming of the Columbia River and other New Deal projects). Evenden covers this period well, keeping the international and scientific politics to the forefront of his analysis, while also delving into the growing demand, both public and private, for increased electrical energy consumption.

The political conflict over the fish versus power debate present in the scientific community is aptly illustrated by Evenden and is exemplified by his analysis of the institution of a fish-tagging program. Beginning in the late 1930s, tagging was commenced to determine the population size of returning salmon. "The assumption was," states Evenden, "that the tagged fish mirrored the experience of the larger population, at least in probability terms" (p.92). In order to encourage the return of the tags and retrieve information on where the fish was taken, each tag was redeemable for fifty cents. Immediately, the Native population living

along the river incorporated this bounty into a major source of income. As Evenden notes for the 1941 season alone, “over \$1,000 would be paid to natives searching the spawning grounds... More than 10% of the total number of tags used in that year” (p.94).

Yet, rather than submit the tags immediately, many of the Native fishers collected and “banked” them as a new source of indigenous currency. Further to this, tags as a means of identifying fish populations became increasingly problematic when fisheries scientists discovered that commercial stores accepted these identifiers as payment for goods and only irregularly redeemed them once significant numbers had been collected. “Given the haphazard recording system for tags, at least in the first few years of tag collection,” stated Evenden, “it is entirely possible that such tags were mixed up . . . giving commission scientists erroneous data from which to measure the passage of fish” (p.96). This is but one example that critics subsequently pointed to when questioning the underlying assumptions held by certain members of the scientific community.

Nevertheless, even with this imperfect “haphazard collection” of tags having skewed the data, most scientists concluded that decreases in the salmon runs were related to deteriorating environmental conditions. The result of the International Pacific Salmon Fisheries Commission (IPSFC) conclusions with respect to salmon stocks recommended the construction of fishways to allow the salmon to pass the obstructions in the river and continue upstream. The construction of fishways was questioned by Bill Ricker (a fisheries biologist formerly with the IPSFC), who subsequently became the most outspoken critic of the commission’s conclusions. Ricker raised the possibility of an ulterior motive for the implementation of a fishways system. As Evenden states:

In a parting salvo in his critique of the commission’s science, Bill Ricker had raised an intriguing idea about the possible rationale for the fishways. Maybe, he mused, the IPSFC wanted a fishway to ensure that the Hell’s Gate site, and the canyon around it, would be safe from hydroelectric-power developers... There seems little basis for this suspicion, but Ricker was not alone in the direction of his thinking. Water Branch officials fretted that the fishways would destroy their plans for major postwar water developments in the canyon. The fishways not only saved fish, they also claimed territory (p.116-17).

Power demands began to increase dramatically following the Second World War, with the growing economic interdependence between Canada and the United States. Hydroelectric dams represented, within the twentieth-century public consciousness, wonders of the new world,

whereby Man's manipulation of nature was symbolic of human ingenuity and progress. Yet, the story of the Fraser is one that essentially bucked this pervasive trend in North American development strategies. Further projects had been proposed for damming the Fraser in many locations, but as Evenden concludes, the fish-versus-power debate had continued, but with fish ultimately winning out. The result was that power-development projects were shifted to the Nechako (for a large Alcan aluminum production facility) and Peace rivers, leaving the main stem of the Fraser unimpeded.

Evenden has succeeded in writing an informative and readable history of the struggle between fisheries and power development along the Fraser River, a remarkable story in that there are no dams on the Fraser River to this day. He has presented the conflict within the context of the political arena (international, national, and provincial), the scientific community, and the growing influence of private industry. His conclusions ably focus the information presented.

If *Fish Versus Power* lacks anything, it is the impact that these human-made obstacles had on the First Nations peoples of the province. Although Evenden does discuss First Nations at the beginning of his narrative, they quickly move to the periphery as marginal stakeholders. Dams on smaller rivers in southern British Columbia, and landslides at places such as Hell's Gate, had not only a significant impact on salmon stocks, but also devastating consequences for indigenous, fish-based peoples, most especially on the Upper Fraser, the effects of which are still being felt to the present day.

With this caveat in mind, Evenden's account of the environmental impact of development could be seen as holding a Eurocentric perspective, but this in no way detracts from what will be an indispensable reference work that is based on voluminous research and which tells a unique story whereby the fish of the Fraser won out over the substantial interests of industrial capitalism. One need only travel along both the Fraser and Columbia rivers today to see the effects of two different policies in two separate countries. In Canada, the Fraser has not been dammed, while in the United States, the Columbia has been refashioned into a chain of artificial lakes and massive obstructions, the environmental consequences of which have been enormous.

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