Hydrology and Earth System Sciences, 9(6), *721–722* (2005) © EGU

Hydrology & Earth System Sciences

Book Reviews

Tyne and Tide: A celebration of the River Tyne. 2003. Edited by David Archer. Daryan Press, Ovingham, Northumberland UK. ISBN: 0-9544944-1-5. 270pp. £18.95 (Hardback)

Heraclitus (540–480 BC) famously said that you can never step into the same river twice; in his view the paradox between the deceptive stable appearance of the river and its perpetually changing waters illustrates much of life. Fascination with the dynamism of a river together with its symbolic role as a connector of people justifies this attempt to draw together many authors who express their love of the Tyne and its valley, mostly in scientific and technical studies.

At the hand of humanity, the Tyne has long been subjected to radical changes which far exceeded the flux of its natural dynamism. The upper Tyne has been dammed whilst the lower Tyne has been severely polluted**;** in the words of David Archer "abuse and misuse have taken their toll".

Floods and droughts have proved a damaging aspect of the behaviour of the Tyne and the introductory chapter on the hydrology brings together valuable data needed to understand the river's behaviour. The author, David Archer, formerly in charge of the Northumbria network of gauges, discusses with feeling his constant battle with cost cutters who saw little immediate return on investment in gauging and recording of precipitation. He defends the two major dams, Kielder and Derwent, from what he calls "sniping" attacks but, even in his assessment as a civil engineer, he regrets the effect of water abstraction from the Derwent reservoir which makes "a sorry tale for the river" downstream with its flow reduced by 61%. The underused Kielder reservoir makes little difference to the annual river flow though summer droughts are lessened.

David Archer has also used his experience in monitoring floods for Northumbrian Water by providing vivid anecdotes about flood hazards in the recent past. The Kielder reservoir functions to reduce flood flows on 25% of the North Tyne but "90% of the main Tyne is uninfluenced by Kielder". Flood warnings, embankments and prevention of development on flood plains are seen as the appropriate response.

Malcolm Newson takes a longer time perspective in discussing the evolution of the river system. Unravelling the characteristics of the "natural" river leads to a better understanding of the hybrid, radically-altered river of today. Deforestation, lead mining, gravel extraction, regulation, afforestation and riparian development have all produced significant changes. The impacts of modern gravel extraction from the river bed on undermining of bridges, bank erosion and ecology are picked out for disapproval in the next chapter by David Archer.

The ecology of the river is discussed by Anne Lewis and Tony Champion, while Aidan Pollard discusses fishing. A newspaper in 1755 reported over 2400 salmon caught in the Tyne in one day. Fishing records before the "catastrophic effects of domestic and industrial pollution" also boast of fish up to 5.5 feet in length. Some recovery of the salmon fishing has followed the industrial decline since the 1970s and the construction of the Tyneside Sewage treatment works in the 1980s. Artificial stocking of salmon has also increased numbers despite doubts about whether such introductions may cause deleterious genetic damage to fish stocks in the long-term.

David Archer, Roger Inverarity and Sam James give a historical account of the pollution of the river concluding with dire warnings about present dangers and the need for vigilance. Tony Foster recounts progress made in regenerating the Tyne estuary based on the efficacy of the Tyneside Sewerage scheme.

In an interesting chapter on the Kielder reservoir, David Archer tries manfully but unconvincingly to repudiate its renown as a white elephant**;**, its construction costing a vast amount of taxpayers' money to supply industries which had already declined before the completion of the reservoir and the inter-river water transfer scheme. The privatised water company, NSL, now owning the reservoir is still subsidised to the tune of £11.5m annually from the Environment Agency to operate Kielder (NSL Group Annual Report 2003). Watersports feature in the following chapter by Archer before three historical chapters on the Port, Tyne industries and river crossings by Stafford Lindsay supplemented by another chapter by Archer on the art of crossing the Tyne.

The book is rounded off by Paul Younger, a hydrogeologist demonstrating his versatility and love of his homeland in a fascinating chapter on the Tyne in music, song and verse.

Hydrologists will find interest both in the scientific chapters and in the attempts to produce a holistic account of the river. Such attempts are rare and not only local people

will find this book both stimulating and a valuable reference. A disappointing omission is a lack of political analysis of the struggles between the many people who have tried to use the river for their own ends. Yet Heraclitus would not be disappointed**;** behind the long-lasting continuity of the ancient British river name 'Tyne' belies a constant flux and many changes to the river as amply revealed in this book.

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The Soil Hydrology of the Plynlimon Catchments, 2005. John P. Bell, Institute of Hydrology Report No. 8. Centre for Ecology and Hydrology, ISBN 1 903741 13 0. 52 pp. Available at: http://www.ceh.ac.uk/products/publications/hydrology.html

The Plynlimon experimental catchments located in mid-Wales, the largest field laboratory in UK hydrology, were set up by the Institute of Hydrology (Wallingford, UK) in the late 1960s; they continue to provide data although the monitoring is now much reduced. This contribution is the formal publication of an Institute of Hydrology Report prepared in 1968/69, distributed internally then but not published due to the cost of reproducing the many colour photographs that are a key component. The report has recently been revised by the author and his photography has been retrieved for electronic publication.

The substance of the report is an account of the soils, their topographic distribution and the water flow pathways they offer to rainfall, as observed in the field, and a conceptualisation of relations between these.

Excellent photographs illustrate the soliflucted and colluvial soil parent materials and soils; solifluction deposits are more prevalent on northerly-aspect slopes than on those with a southerly aspect, where colluvium is common. Three principal soil types are identified: podzols, creep brown earths and peaty gley/peaty gley podzols, and described. Their relationships with slope characteristics and parent material are explained and then systematised by tabulation. Five principal soil water pathways are identified: overland flow, subsurface lateral flow on impeding interfaces within the soil profile (e.g. iron and clay pans), subsurface pipe flow on impeding surfaces, lateral flow through the base of the weathered rock zone and, potentially, fissure flow through unweathered rock; photographs illustrate the first three of these. Cross-sectional diagrams of the postulated soil water pathways on northerly and southerly aspect slopes place them in the catchment context

A brief section considers the role of groundwater in the catchments and re-states the reasons for assuming them to be water-tight. However, the possibility of water storages within the frost-shattered rock of the hilltops feeding significant downslope flow through shallow fissures to the valley bottom streams is not precluded. The final section proposes how it might be possible to model the soil information to provide a soil map for the catchments as a precursor to defining "hydrological domains".

A modeller might be disappointed not to find a soil map and values of soil depth and hydraulic conductivity but this work preceded much soil and catchment modelling. The Glossary is important as the terminology used is not always current but the clear definitions enable the reader to reconcile the terms with more familiar lexicon.

The Introduction describes the raison d'être of this study of soil hydrology: *to provide a framework of information on the soils and their influence on the hydrological study*. Would that more catchment research could invest in such studies. However, the photographs will remind the reader of the complications inherent in the details of field hydrology. The conceptualisation is a coherent rationalisation of what the soils have to tell. While this report is an important component of the Plynlimon literature, it is also well worth browsing (access is free) for an appreciation of UK upland soil hydrology.

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