

National Advisory Council Conference 2008

“What is the value of good water quality to the community?”

Exploring the value of our waters to the ordinary citizen and how it enhances quality of life.

Seeing all the colours: the rainbow of water values in the life of the community

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Back in June I had the pleasure of being at the 13th International Peat Congress, which was held in Ireland this year – in Tullamore appropriately, in the heart of bog country. This is a major event that takes place every four years in different peat-producing countries; this year there was a record 650 delegates and some 300 presentations. It is a very interesting exercise to compare the contents of the published Proceedings of these Congresses over the years. In the early congresses, presentations were divided into half a dozen sections: dealing with peat harvesting, the physics and chemistry of peat, farming and horticultural aspects of peat and peatland forestry: all to do with the *production value* of peat – but over the years you can see a gradual shift of emphasis, and at this year’s 13th Congress there were twelve sections: including peatlands and climate, the ecology of pristine peatlands, bog restoration, and conservation – and the vast majority of the presentations were in these areas.

The shift to which I am referring of course reflects the way in which we have come to understand and appreciate much better than we did 50 or 60 years ago the many *ecosystem functions* other than the productive function (in the narrow economic sense) that different dimensions and facets of natural ecosystems perform in our lives. In the decades following the establishment of Bord na Móna the bogs were of greatest value to us as a source of the raw material from which we could make turf or briquettes, or burn to generate electricity. We had little time or leisure to consider the recreational, aesthetic, ecological, cultural or spiritual functions they served: or that *the other functions* might in certain circumstances outweigh what in conventional economics would be considered the more *valuable* functions.

You can trace the same shift in forestry, reflected most obviously in the efforts made by Coillte in recent years to upgrade its environmental standards in order to merit certification by the Forest Stewardship Council. And you yourselves will be aware of a similar process of evolution – the same process rather – in our attitudes to water in the landscape. It is not long since rivers were seen to be there – to have been created – for three main reasons, all to do with *us*: to supply us with resources such as water and fish, to carry away our waste, and in between times to provide water for recreation. Other value perspectives counted for little. Rivers were convenient sewers. Along the river Dodder the offices and chimneys of a string of dyeworks still stand to remind us of how

in the 18th century the waste products of this most polluting of industries were poured into its waters, turning the Dodder into a dead and deadly river: and it was the same throughout the newly industrialising world of that era, as it is along countless rivers in China and India and throughout the newly industrialising world of our own day. When the natural flooding pattern of rivers impacted negatively upon our agricultural ambitions they were *regulated*, their channels deepened and their bends eliminated, so that they conformed to our will. Taming the flood was high on the agenda of the enterprises that came under God's Garden of Eden instruction to Adam to subdue the earth.

There was a time when clean and clear water was the norm, taken for granted, and we could use and abuse it in these ways with impunity. But we could only get away with that when the ratio of population to resource, the possibility of recovery, did not exceed a certain threshold. That balance has moved into a different realm with the growth in population we have witnessed in our lifetime, and it will shift up into another gear in our children's time, in whose lifetime the number of people on earth is likely to stabilise at something approaching 10 billion. I don't need to remind most of this audience of how water has become the New Gold in this century (for those of you who may be new to all this may I recommend as a must-read primer Fred Pearce's terrific (in the archaic sense of the word) *When the Rivers Run Dry*).¹ Recent UN figures suggest that by 2025 two-thirds of us will experience water shortages, with severe lack of water blighting the lives and livelihoods of 1.8 billion people.² By 2050 7 billion people in 60 countries, out of the world's total of perhaps 10 billion, may have to cope with water scarcity.³

But at the same time as our burgeoning population has begun to drain and pollute rivers and aquifers beyond levels of recovery on human time-scales, we have seen a phenomenal *increase in ecological and hydrological understanding*: in our ability, in other words, to know how water in the landscape works, how our behaviour influences it for better or worse, how we must change our ways in order to manage the resource as we so urgently need to. And the other major development is the way our *awareness, understanding and appreciation of the other functions* served by water in the landscape, the other values of water, has grown.

Changing values: the otter

As a sort of yardstick for the way in which our spectrum of values has changed in relation to the *biodiversity support function* of waterways think of the otter, which in our day has come to embody the soul of the river. It enjoys strict protection; It is listed on the EC Habitats Directive, the Bern Convention and CITES, and is classified by the IUCN as 'Vulnerable' due to the declining or endangered status of many of its populations. It is a priority species in the UK BAP 1994, and is protected by listing under two Schedules of the UK Wildlife and Countryside Act 1981. It has equivalent protection in Northern Ireland (Wildlife (NI) Order 1985) and down here with us.

But in that great classic of English literature, *The Compleat Angler*, published in 1653⁴ – a work nearly as renowned for the piety of its language as John Bunyan's almost

contemporaneous *Pilgrim's Progress* (1678) – Isaac Walton can hardly find words sufficiently vitriolic to express his pious hatred of ‘those villainous vermin’:

I hate them perfectly, because they love fish so well, or rather, because they destroy so much; indeed, so much, that in my judgment all men that keep *Otter-dogs* ought to have pensions from the King, to encourage them to destroy the very breed of those base *Otters*, they do so much mischief.⁵

In an earlier Ireland the otter was hunted extensively, often by men whose profession it was to hunt them, because it preyed on the fish that God had created (so we thought) for our exclusive sustenance first of all; and also because its skin was highly valued.⁶ So there has been a sort of ‘pilgrim’s progress,’ if you like, in the way values and attitudes have changed with regard to the creatures that inhabit the water.

The fascination and wonder of mammals like the otter, as well as of birds and fish, are immediately accessible to us because they are built on our scale of things as it were. We can *encounter* them as we walk along the bank. And an appreciation of the otter or salmon involves us in the world of the otter or salmon, with the whole river so to speak. It is what hooks us on concern for river conservation in the first place, and is the starting point for that deeper appreciation of the *multifunctionality* of the river and the ways those different functions of the river are woven together and influence each other.

But if we look more closely into the water we realise these bigger creatures are only the tip of the iceberg of the enormous fascination of the ecology of stream and lake. Except we need better eyes to see and appreciate this properly, because the creatures that make it up are cut to a smaller pattern than ours, and hidden from our eyes most of the time. We first began to acquire the better eyes it takes as the 17th century advanced, and we began to see into the amazing world of freshwater ecosystems, the wonder of little lives.⁷

The wildlife of streams continues to fulfill those all-important *production functions* in human life: supplying fish and water etc. We have also become more aware of and better understand the *regulatory functions* performed by water in the landscape. Much of our concern for everything else about water is ultimately grounded in the preservation of these functions, and much effort goes into repairing the mistakes of the past in this regard. So there is widespread appreciation among the wider community of these production and regulation functions, and as a result there is general political consent and support. There is also widespread appreciation and support when it comes to some of the other categories: but here we often encounter conflict, especially between competing alternative uses.

Seeing the rainbow: the conflict of legitimate interests

Now when you run down that long list of the different functions that water in the landscape fulfills in our human lives you of course unconsciously *rank them* in importance depending on your own interest, your own experience, and your own particular stage or level of understanding of what rivers are about. I am an angler and I

represent Derryboy District Council: so I want to stock Derryboy lake with trout and I don't see why we shouldn't have powerboats for the tourists. But you are the chairperson of the Derryboy branch of BirdWatch Ireland and you don't want the birds to vanish when the powerboats arrive. This man over here has land on the other side of the lake and his cattle need access to drinking water. She is a teacher and uses the exceptionally diverse ecology of the lake for Leaving Cert geography and biology projects each year. And what about the peace and quiet walkers from the town at present enjoy? And so on. There are potential conflicts that are the result of legitimate interests: different interests *focused* on different functions: the other functions are on the periphery – or maybe out of sight, not recognised even, in each case.

So we *evaluate* – put value on – the functions differently depending on our interest. But if we are charged with the duty of managing or influencing management, we have each of us a responsibility to appreciate, to understand the other functions even if they don't affect us directly or even if we didn't appreciate their importance or even know they existed up to now. And it is essential to appreciate the many ways in which the functions are interdependent. Amenity value depends fundamentally on the ecology. Ecology may benefit from appropriate management by anglers and *vice versa*. And so on. In taking an interest in the other functions of the river, I am as often as not furthering my own particular interest.

So it is a two-stage process. Of *understanding and appreciating* ourselves first of all the range of values and functions of water in our lives *as a community* – and to keep growing in appreciation, because this is a process, not a fixed state of understanding – and understanding that the maintenance and enhancement of these matters to us, to my community, first and foremost. And then secondly *the practical questions as to how to manage* with all those functions and interests in view: and that is where all the argument between competing sectors comes in: but the oath we all have to swear as we come to the table is that the ways we come up with do not compromise the integrity of the resource: *do not compromise the integrity of the resource*.

Biophilia and the experience of nature for itself

Of all recreations, fishing is one of the most leisurely: not in the sense that it doesn't require great skill and concentration. But as much as the fishing it is the contact with the natural world in general that it provides. Every fisherman knows how much more there is to fishing than catching fish. The primacy of the production value in the angler subsumes an appreciation of a whole range of other values. Just *being* in a landscape of river or lake is half the pleasure even if you never catch anything: it is the focal point central to the activity itself. This is a very particular instance of the sense of *being at home* that we experience in places that are still more or less dominated by natural features and processes – places that still have all the elements that were constitutive of the world out of which, speaking now in evolutionary terms, we were born.

Why should we *need* experiences like this? Now this is not something we have time to think about very often. We're not philosophers. But it is important to ask the question because the answer helps us to understand why access to a landscape with clean rivers and streams is important to everybody: not at all merely to the few with obvious stakeholder interest like you or me. So it's worth the mental effort it takes to reflect on this for 5 minutes.

One thing we are becoming increasingly aware of in the last two decades or so is how important it is to take account of human evolution in assessing the function of landscape in our lives. Our origins as a species are in East Africa, and our distinctive human physique is attuned to that particular natural world of our origins – because that is where we evolved: this is what evolution has moulded us to be most comfortable with, it is where we are most at home: it is almost literally an extension of our physical being. Our species evolved over millions of years to survive in a savannah landscape of open grassland, with woods and copses, rivers and lakes “with wide vistas that provided the space to plan distant moves, while the trees and prominences offered places from which to track moving animals, as well as visual surveillance of other human groups.”^{8,9} The flicker of a wild animal against the line of trees at the edge of the forest is an extension of the line of our eyes; the messages in the chorus of birds an extension of our ears, for our eyes and ears have been shaped by a precise evolution to respond to these things, attuning us ever more closely to them. Our feet are made for the touch of grass and the earth, our hands for its feel, our nose to smell this precise world. And just as surely as we are physically shaped for this world of nature, so too are we *psychically* made for it, and this symbiosis of nature and the human psyche is genetically coded as surely as our colour vision and the shape of our hands and face. It is not something we can shake off, this need for natural landscape, a skin we have outgrown: for it has been built into our genes over the millions of years during which our humanity evolved.

A few tens of thousands of years ago – only – we humans moved out of Africa, to slowly conquer the world. But we also took Africa with us, because wherever possible we have shaped the natural landscapes we made our own to resemble those in which our minds as our bodies are most at home. And all through our long prehistory and history, Nature was always on our doorstep – no longer it is true the untamed wilderness, but the experience of trees and flowers, birds and wind and stars, rocks and the sight and sound of rivers and lakes – which satisfied our deep psychological need. The places where Nature still breathes awake in us memories of a deeper childhood. The flowers and trees in every hedgerow awake them, the singing of the birds, every rock outcrop shaped by time and the elements, every stream that follows the form of the land. Our mind and spirit as our body are most at home in the traditional agricultural landscape which is the cultural counterpart of the open natural landscapes of our origins.¹⁰

The particular landscape of the animal is its ecological *niche*, the corner of the world for which it is quite precisely made, physically and psychologically. But it is just the same for us. We may be a little less than the angels, but we have been swept along on precisely the same exhilarating evolutionary journey as all the other species that people this moment of life's time with us. For ourselves as for other creatures *where* they are *is* who

they are, so precisely are they made for a specific place. Put them in different surroundings and *they are no longer themselves* and often cannot survive. Put us in different surroundings and *we are no longer ourselves*.

Wendell Berry wrote: unless you know *where* you are, you don't know *who* you are.

[[Many people live in a prison of deprivation they don't recognise as a prison, because they have been born in it. The experience of woods carpeted with wood anemones and bluebells should be part of the birthright of every child: the opportunity to catch for a moment an echo of the magic and wonder of the woods of that deeper childhood. We don't know enough about our nature as humans to be able to measure or judge the deeper psychological and spiritual effects of its loss].

This concept – the idea that our need to be out there, that we are more at ease with our lives, healthier, happier in a natural world: has its roots as deep as that – is the foundation of the modern *Biophilia Hypothesis*, on which there is a growing literature of analysis, but an awareness of it runs right through the writings of many thoughtful earlier explorers of landscape.¹¹ It gives a new depth to our understanding of the function of landscape in our lives, and has had a profound influence on professional thinking and practice with regard to landscape.

The poetry of water and landscape

All of nature contributes to this sense of being at home outside in the natural world: or rather it is the *experience* of nature that contributes to it: the sky with its clouds and stars and all its weathers; all of wild life, the uncounted kaleidoscope of species that share this moment of earth's time with us, each the product of an evolutionary journey as mind-blowing as our own, parallel with ours but each as unique as ours. But nothing contributes more than the pools and streams of water at the earth's surface upon which all life depends: water is at the very heart of the ideal human landscape understood in this light: the sight of it, the orchestra of its many voices, the feel of it on our skin, the taste of it: and the wonder and gift of the lives it most immediately supports: the aquatic flora and fauna.

Poets have the sense of this, even if they cannot quite put the finger of words on the pulse of it. Some of you I am sure will remember Yeats' marvelous poem *The Stolen Child* – with all its watery references – from school or the Waterboys song:

Where dips the rocky highland
Of Sleuth Wood in the lake,
There lies a leafy island
Where flapping herons wake
The drowsy water rats;
There we've hid our faery vats,
Full of berries

And of reddest stolen cherries.
Come away, O human child!
To the waters and the wild
With a faery, hand in hand,
For the world's more full of weeping than you can understand [verse 1]

Where the wandering water gushes
From the hills above Glen-Car,
In pools among the rushes
That scarce could bathe a star,
We seek for slumbering trout
And whispering in their ears
Give them unquiet dreams;
Leaning softly out
From ferns that drop their tears
Over the young streams.
Come away, O human child!
To the waters and the wild
With a faery, hand in hand,
For the world's more full of weeping than you can understand [verse 3]

Not many of us can follow Yeats into the twilight of that other world he weaves. But whatever about traveling into another world in a physical sense, we do *respond* to the poem: and now perhaps we can better understand our response, because we can appreciate that *the real magic here* has its roots in that deeper time the Biophilia concept explores. When you listen to the words, the sense of magic many feel listening is an echo of that sense of belonging in that world of nature, and of wanting to reach it. And we are more aware of that when the words have nothing to do with our everyday cares and concerns and so distract us less, if you follow me.

The great challenge

Unintended of course and almost un-noticed, we have allowed that treasure of a richer natural waterworld to become tarnished and diminished in our short lifetime, but the challenge of restoration is firmly in hand as a result of the Water Framework Directive which sets out to restore to us the waters of Walton's day by 2015. And of course that is what this conference, and all the work you do to that end, is all about. I want to finish by concentrating on one particular facet of the challenge we face in working to achieve this.

The challenge that faces us is not merely to be aware ourselves of the full spectrum of values for human living embodied in rivers and streams, and water generally: and to work to restore water to what it was and needs to me to maximise the realisation of those values: but the *promulgation of this appreciation* right across the community. The Biodiversity Convention lays just as much emphasis on the need for the community – as distinct from professionals like yourselves – to take ownership of all of the values served

by biodiversity as it does on new research and the of course all-important need to focus on issues of conservation: on the need to get the community as a whole to appreciate how all of the functions of biodiversity can enrich their lives.

The wider community has certainly taken ownership of the recreational values of the rivers and streams, lakes and ponds. In Walton's day angling was a pastime for the privileged who could afford such leisure, and access to fishing waters was limited to the few. Today it is one of the most popular outdoor pastimes (I don't know what the figures are for Ireland, but in the UK it is the largest participant sport, with between 1 and 4 million participants, contributing ST£3.5 billion to the economy).

But *we need to take possession of biodiversity in the same way*. We need as a community to reach the point of being able to say: this enhances my world, enriches my life; makes my everyday world a better place to live in, with the same kind of reason and sincerity as we would say a better health service or transport system makes my world a richer place to live in. It makes my home a richer place to grow up in, to work in, to share life in. Our lives would be not just different without clear streams and lakes, but *poorer*.

Of course this is a challenge we face in relation to the Biodiversity Convention as a whole.

And the *missionary challenge* this faces us with is a much more difficult one today than it was 20 or even 10 years ago – by orders of magnitude – especially the educational challenge of bringing it to younger people, because of the way cyber recreation has engulfed the time and space of their lives. The attention of younger people is so sucked up by the riches of the cyberworld that they might as well be in prison, so cut off are they from contact with the reality of the real place that is home. They may well be well and happy in all the ways you can easily measure, but personal contact with the natural and historical environment is fundamental to a richer emotional and intellectual life on all sorts of levels, and that should be everybody's birthright. Natural heritage features in landscape are moorings to which we unconsciously anchor our sense of belonging, being in place, at home: even if that rootedness is something that only matures as we grow older. And the loss or diminution of this is something that has crept up on us, its psychological effects in this regard almost unnoticed although we are increasingly concerned about its effects on fitness and health more generally. I believe it is something we need to think about urgently, although that is a remit whose challenge extends way beyond the central concerns of this forum.

What it comes down to ultimately is *the anaesthetisation of experience*. Having a poster on your wall with an inspiring caption of a runner in a mountain landscape is not the same as running the hills myself. Watching the emergence of a dragonfly on television is not a substitute for witnessing the real thing.

The challenge is *to restore the experience*, and I believe we could exploit the natural history lore of aquatic life to much greater effect in tackling it. The otter is a good start, and there must be hundreds of information boards beside rivers and lakes the length and

breath of Ireland illustrating and explaining the bird life. But the world of the invertebrates has at least equal capacity to instill awareness of ecological and evolutionary processes: and the simple wonder, that more than anything else fuels the passion to care and conserve all that water stands for. The natural history of freshwater life provides the broadest avenue to an appreciation of life's wonder and diversity: and to an understanding of how that diversity can be diminished by our activities. The natural history lore of life in freshwater is perhaps richer even than that of woodland: for invertebrates certainly I think, but it has been neglected somewhat for more than half a century. This is something we need if we are to meet the great challenge.¹²

And this isn't something just for kids by the way. On the contrary. I have on more than one occasion had the great privilege of sharing my own fascination with the amazing creatures that live under the stones and in the weeds with anglers my own age: and shared in their excitement because it is my own anyway: but I have also been amazed that they have gone through their lives as dedicated anglers for all those decades without having this experience before – even though this teeming life is what the fish they catch even in their dreams depend on.

Restoring the mystique: reverence for groundwater

Wendell Berry once wrote: *"Without a fascination with the wonder of the natural world, the energy needed for its preservation will never be developed". "There must be a mystique of the rain if we are ever to restore the purity of the rainfall".*

There was, in an earlier Ireland, a mystique of the rain, at least in its gathered form as springs and wells.

Sources of water were valued in the self-sufficient economies of the past with a care we have lost, and in every part of Ireland there were wells and springs that were set apart for the ritual celebration of this reverence. What these rituals may have been in pre-Christian antiquity is lost to us; all we know is that on special days these sacred waters were resorted to and rituals performed. The water in these wells had special virtue for the healing of mind and body, and each is unique: in its setting and in its history, in its relationship with a particular community over centuries.

Celtic Christianity took these sacred wells into its view of the world, and made them part of the new way it saw the relationship between man and the divine. But what is the relevance of such outmoded belief in our own day? Science has lifted the veil from the mysterious workings of the natural world, and we can scarcely recover the placebo magic of the past. Is our interest in and concern for the conservation of these places of old ritual and magic belief to be inspired by nothing more than concern for something that may be of value in tourism, or because they are cultural fossils, to be conserved because it is a part of our heritage, but with nothing to contribute to our contemporary lives? The survival of wells is a pledge of continuing environmental health, of the integrity and

health of the groundwater which is the lifeblood of the land: and in this sense too it is important to hand them on intact: they can be thought of as a benchmark that records ground water quality and a constant water table.

We have, in our time, reached another threshold of change in the way we interpret our relationship with the natural world: and for many divinity has melted back into a universe whose mystery and wonder grow deeper the more closely we weave our ever more profound understanding around it. Part of this change is a growth in awareness of what the concept of environmental value embraces, even to the extent among religious people (as many of us are) of being able to speak again of the earth as sacrament. In this context we can look at the wells with new eyes, and try to touch what was there in the beginning: that balance of landscape and water which the antennae of the most spiritually attuned members of the first community responded to as peculiarly focusing the ineffable and mysterious relationship between humanity and the earth which is our home and yet seems to draw us to something greater above and behind. In spite of all the change of centuries, of millennia, that is still there to be recovered and treasured.

In our own day we are beginning to develop a new sense of the value of water in our lives – precisely because it is threatened: for so long we have abused it, and are now faced with problems of pollution, declining supplies, dwindling stocks. Perhaps we have something to learn from the ancient respect, and could it even be that we can design a modern focus of ritual that re-awakens the lost sense of wonder in the earth? We should never lose sight of the fact that the virtue of the wells is old virtue, belonging not only to Christianity – and certainly not just to Catholics – but to the old earth belief that preceded it; so that it may be one of the things that can acquire new virtue in the ‘earth religion’ many younger people are seeking to formulate in our New Age.

The veneration of wells has waned greatly in recent decades. Today wells to which all the people of the parish might have flocked in an earlier time are visited only by a few old people. But in some places an attempt is being made to recover what has almost been lost. The stonework of sacred wells is being rebuilt, and the ritual of the visits restored.

Here is a project to inspire then: the inventory and assessment of all those named wells scattered the length and breadth of the country first of all, and then a programme of restoration and conservation that would have as its motivation the quickening of appreciation of water in landscape at the level of local community. Maybe it is beyond your remit, but some of you might like to take it home anyway and persuade the County Council to get behind it. There have been admirable examples scattered throughout the country, but they have not always had the benefit of the hydrological, ecological and landscape architectural expertise that would best allow each to become the focal point of landscape care it is capable of becoming, a place to reflect on the mystique of the rain that we need if we are to restore the purity of the rainfall and of all the forms in which it flows in the veins of this Irish landscape of ours.

REFERENCES

¹ *When the Rivers Run Dry: Water – The Defining Crisis of the Twenty-First Century* by Fred Pearce (2007). Boston, Beacon Press.

² Jonathan Chenoweth, 'Water, water everywhere,' *New Scientist* 2670 (28 August 2008), 28-32.

³ *Water: a shared responsibility*. The 2nd United Nations World Water Development Report (2006).

⁴ First published in 1653, but Walton continued to add to and revise it for a quarter of a century.

⁵ *The Compleat Angler*, edition of 1676, Chapter 1.

⁶ Gloves made from otter skin made 'the best fortification for your hands that can be thought of against wet weather' (*Ibid.*, Chapter 2). In 1861 a cape made entirely of otter skins was found under six feet of bog at Derrykeighan in Antrim: a beautiful piece of work: 'the workmanship of the sewing is wonderfully beautiful and regular: and the several parts are joined so as not to disturb the fur, so that from the outside it looks as if formed of one piece (P.W. Joyce (1908), *A Smaller Social History of Ancient Ireland*, 382-383).

⁷ It was around the time that Walton wrote his classic that the microscope was beginning to provide us with the new eyes to appreciate the marvels of smaller life forms (Robert Hooks's *Micrographia* appeared in 1665), but even in Walton (where there are no microscopes) we see the beginnings of an appreciation of the diversity of macroinvertebrates (there are chapters on flies and caddis worms), and there is an understanding of *how they fit into the scheme of things*: albeit viewed through the lens of how we can turn this understanding to advantage. However, it was really René Antoine Ferchault de Réaumur (1683-1757) who first began to reveal the sheer wonder of the lives of aquatic macroinvertebrates.

⁸ Butzer, K. W. (1977). Environment, Culture, and Human Evolution. *American Scientist* **65**, 572-84.

⁹ Heerwagen, J. H. and Orians, G. H. (1993). Humans, Habitats, and Aesthetics. In S. R. Kellert and E. O. Wilson (eds.), *The Biophilia Hypothesis*, 138-72.

¹⁰ Feehan, J., 1995. *The place and price of landscape diversity in Ireland*, First Jackson Memorial Lecture, GSI/RIA/RDS.

¹¹ Wilson, E.O. (1984), *Biophilia: the Human Bond with Other Species*, Cambridge, Harvard University Press; Kellert, S. R. and Wilson, E. O. (eds.) (1993), *The Biophilia Hypothesis*, Washington, D. C., Island Press.

¹² Réaumur is even now more exciting to read than most modern textbooks, and his style greatly influenced Fabre. What a great pity there were no rivers near Serignan in Provence, the village where Henri Fabre, 'the Insect Homer,' spent his long life, chronicling in unforgettable detail the lives of its invertebrate inhabitants, because he wrote little on the lives of aquatic insects. Fabre's main incursion into freshwater is in chapter 7 of *The Life of the Fly* (deliberately written in a style that children could understand):

Yes, a stagnant pool, though but a few feet wide, hatched by the sun, is an immense world, an inexhaustible mine of observation to the studious man and a marvel to the child. All these creatures of the water: what are they all doing here? I do not know. And I stare at them for ever so long, held by the incomprehensible mystery of the waters. The worlds of the ponds are so vast, I should lose myself in their immensities, where life swarms freely in the sun. Like the ocean, they are infinite in their fruitfulness.

J.H. Fabre (1913). *The Life of the fly; with which are interspersed some chapters of autobiography.*

Much of the early work on the natural history of aquatic insects by Réaumur, Lyonnet, de Geer (and himself) was synthesised by L.C. Miall in what is still the most inspirational introductory classic on the subject, a key work in popularisation without condescension, and without loss of necessary attention to detail: *The Natural History of Aquatic Animals*, first published in 1895 (and recently reprinted).