10 Bibliography and further information

The Bibliography is arranged by sections. First I have given useful reference works for identification, then some general works and then more specific works appropriate to particular chapters. Some of these are papers in scientific journals that may need expensive subscriptions or access to a scientific library. However, papers are often available on other websites, for example University repositories or published under open access arrangements. A little exploration on the internet will often turn up a free copy. Where books are concerned, some are out of print. But again entry of the title into a search engine will usually turn up a set of second-hand booksellers offering used (pre-loved!) copies at low prices. No longer does one have to traipse round from shop to shop to find things. Finally I give some useful web sites and suppliers of equipment.

G. Evelyn Hutchinson, in one of his books on limnology, headed the bibliography section with the biblical quotation 'Let us now praise famous men' (Ecclesiasticus 44.1). But you may join the ranks of people who publish. Writing up is an important part of a research project, which communicates the findings to other people. A really thorough, critical investigation that has established new information of general interest may be worth publishing if the organisms on which it is based can be identified with certainty. There are opportunities in the Newsletter of the Freshwater Biological Association and in a number of natural history journals, and, for material with an educational slant, the Journal of Biological Education. Contact with your local university, museum or natural history society, or the Natural History Museum in London will usually bring willing advice as to what is available. Then look at current numbers of appropriate journals to see what sorts of thing they publish, and then write a paper along similar lines. Keep it short, but present enough information to establish the conclusions. Consult an appropriate expert who can give advice on whether and in what form the material might be published. An unbreakable convention of scientific publication is that results are reported with scrupulous honesty. Hence it is essential to keep detailed and accurate records throughout the investigation, and to distinguish in the write-up between certainty and probability, and between deduction and speculation. It will usually be necessary to

apply appropriate statistical techniques to test the significance of the findings. A book such as Wheater & Cook (2003) (see below) or *The OU Project Guide: Fieldwork and Statistics for Ecological Projects* (Chalmers & Parker, 1989, available from the Field Studies Council web site) will help, but this is an area where expert advice can contribute much to the planning, as well as the analysis, of the work. Hutchinson, the leading ecologist of the twentieth century, wrote his first publication (in 1918 in the *Entomologist's Record and Journal of Variation* 30, 138) based on observations of a swimming grasshopper whilst he was aged 15 and still at school.

Algae

(in order of comprehensiveness and general usefulness)

- John, D.M, Whitton, B.A. & Brook, A.J. (2011) *The Freshwater Algal Flora of the British Isles*. Natural History Museum and British Phycological Society. 878 pp. *This is now the standard work for the UK and will take you to species, except for diatoms. UK diatomists think that the taxonomy is still in too much flux to produce a standard key. There are, however, keys in German ,in several volumes though expensive. If you can, find a used copy.*
- Kelly, M. (2000) Identification of common benthic diatoms in rivers. *Field Studies* 9 (4), 83–700. *A key to river diatoms, but many also occur in ponds*. Available as an offprint from the Field Studies Council website (www.field-studies-council.org/publications/aidgap-guides.aspx)
- Belcher, J.H. & Swale, E. (1976) A Beginner's Guide to Freshwater Algae. London: HMSO. Freely downloadable at www.bf.lu.lv/ grozs/HidroBiologjijas/Algae_quide.pdf
- Belcher, J.H. & Swale E.M.F. (1979) An Illustrated Guide to River Phytoplankton. London: HMSO. Freely downloadable at nora. nerc.ac.uk/5243/1/Illustrated_river_phytoplankton.pdf. Belcher & Swale (1976, 1979) are particularly useful short guides with very attractive illustrations. Second-hand originals can be bought, but the downloaded scans are free.
- Canter-Lund, H. & Lund, J.W.G. (1995) Freshwater Algae: Their Microscopic World Explored. Bristol: Biopress. A lovely book of photographs of algae and their protozoan and fungal parasites, and interesting text.
- Moore, J.A. (1986) *Charophytes of Great Britain and Ireland*. BSBI Handbook 5. London: Botanical Society of the British Isles. *A key to charophytes, which has been updated and incorporated into John, Whitton and Brook* (2011).
- Hustedt, F. (1930) Die Süsswasser-Flora Mitteleuropas. Heft 10: Bacillariophyta (Diatomeae). Jena, Germany: Gustav Fischer. This has been replaced by very expensive multi-volume German diatom floras that give much more information on variation and updated nomenclature, and which are themselves being put out of date by revisions of diatom taxonomy, but for genera and many prominent species this small book is hard to beat. It is scarce and in German, but compact and very well illustrated. Revisions in taxonomy can always be traced through AlgaeBase (British Phycological Society) on the internet.

Protozoa

Both of the first two are useful but new copies are expensive. Hingley (1993) specialises on organisms in *Sphagnum*, including protozoans. Jahn, T.L., Bovee, E.C. & Jahn, F.F. (1978). *How to Know the*

Protozoa. New York: McGraw Hill. Patterson, D.J. (2003) *Free-living Freshwater Protozoa: a Color Guide*. Washington: ASM Press.

Hingley, M. (1993) *Microscopic Life in* Sphagnum. Naturalists' Handbooks 20. Slough: The Richmond Publishing Co. Ltd.

Aquatic plants

(in order of comprehensiveness and general usefulness) Stace, C. (2010) New Flora of the British Isles. Third edition. Cambridge: Cambridge University Press. The standard flora now for plants of the British Isles. It is published as a main work and as an excursion flora. It is a professional key demanding use of botanical terminology (there is a glossary) and without pictures.

Haslam, S., Sinker, C.A. & Wolseley (1982) British Water Plants. Field Studies Council. An easily usable key to most of the flora, available from the Field Studies Council website.

- Rose, F. (updated by C. O'Reilly) (2006) The Wildflower Key (Revised Edition). London: Warne. Less comprehensive than Stace, but with pictures. There are several other illustrated wild flower keys of the same type.
- Fitter, R., Fitter, A. & Farrer, A. (1984) Collins Pocket Guides. Grasses, Sedges, Rushes and Ferns of Britain and Northern Europe. London: Collins . Many emergents are in this group and are not well covered in wildflower books.
- Preston, C.D. & Croft, J.M. (1997) Aquatic Plants in Britain and Ireland. Colchester: Harley Books. Not a key, but a set of descriptions and distribution maps.
- Sphagnum. A free key is downloadable at www.bbsfieldguide. org.uk/sites/default/files/pdfs/otherpdfs/BBS%20Field%20 Guide%20Sphagnum%20Key.pdf . It includes most of the British species.

Invertebrates

(in order of comprehensiveness and general usefulness) Dobson, M., Pawley, S., Fletcher, M. & Powell, A. (2012) *Guide to Freshwater Invertebrates*. Freshwater Biological Association Special Publication 68. Ambleside: Freshwater Biological Association. *This is the first port of call. It will direct you to more detailed keys in many instances*. A lot are still available from the *Freshwater Biological Association* online shop at www.fba.org.uk/ shop/. Those out of print may be available for sale on the web.

Another useful source is the Field Studies Council (www.fieldstudies-council.org/publications/aidgap-guides.aspx) which produces the AIDGAP series of keys to stoneflies, water plants, freshwater invertebrates, freshwater fish, benthic diatoms, freshwater bivalves, caddis larvae, caddisflies and mayflies and also Royal Entomological Society keys to water beetles, the Synopses of British Fauna series (freshwater ostracods) and easily usable fold-out elementary charts to dragonflies and damselflies, wetland birds, fish and *Sphagnum*.

Donner, J. (1966) *Rotifers*. Translated by G.S. Wright. London: Frederick Warne. *A useful book on a group for which the literature is scattered*. Guthrie, M. (1989) Animals of the Surface Film. Naturalists' Handbooks 12. Slough: The Richmond Publishing Co. Ltd. A specialised but accessible guide to one aspect of ponds.

Fish

Maitland, P.S. (2004) Keys to the Freshwater Fish of Britain and Ireland, with Notes on their Distribution and Ecology. Freshwater Biological Association Scientific Publication 62. Ambleside: Freshwater Biological Association. There are several easily usable guides to fish but this is compact and authoritative.

Other vertebrates

- Beebee, T. (2013) *Amphibians and Reptiles*. Naturalists' Handbooks 31. Exeter: Pelagic Publishing.
- There are many bird guides that are readily available and which variously appeal to different tastes.

General works on ecology

- Begon, M., Townsend, C. & Harper, J.L. (2005) *Ecology: From Individuals to Ecosystems*. Fourth Edition. Chichester: Wiley. An excellent general text on ecological principles.
- Burgis, M.J. & Morris, P. (2007) *The World of Lakes: Lakes of the World*. Special Publications of the Freshwater Biological Association 15. Ambleside: Freshwater Biological Association. *Written for a lay audience and covering the world's lakes with attractive illustrations.*
- Clegg, J. (1965) The Freshwater Life of the British Isles. Wayside and Woodland Series. London: Frederick Warne. A general work, full of useful information on particular animals and plants.
- European Pond Conservation Network (2008) Manifesto. Downloadable at www.europeanponds.org The EPCN network works to conserve pond systems and this Manifesto describes the problems.
- Finlay B.J. & Maberly S.C. (2000) *Microbial Diversity in Priest Pot. A Productive Pond in the English Lake District.* Ambleside: Freshwater Biological Association. *Priest Pot is a very small lake, which has had a great deal of attention. The protozoans and algae have been extensively studied. Lists of all the organisms yet identified in it are given.*
- Fitter, R. & Manuel, R. (1994) Lakes, Rivers, Streams and Ponds. Collins Photo Guide. London: Harper Collins. A comprehensive general guide with good photographs or line diagrams of the commoner species.
- Fryer, G. (1991) A Natural History of the Lakes, Tarns and Streams of the English Lake District. Ambleside: Freshwater Biological Association. Lots of attractive drawings and a hand-lettered text by one of the most knowledgeable freshwater biologists and naturalists of recent decades.
- Kabisch, K. & Hemmerling, J. (1984) *Ponds and Pools: Oases in the Landscape*. Translated from the original German by Ilse Lindsay. London: Croom Helm. *Packed with ecological information and covers well the general principles.*
- Macan T.T (1973) Ponds and Lakes. London: Longmans. A well written classic that concentrates particularly on the ecology of the invertebrates.
- Macan, T.T. (1963) Freshwater Ecology. London: Longmans, Green and Co. A detailed, fairly heavy treatment, concentrating on invertebrates and their ecology.

Mellanby, H. (1963) Animal Life in Freshwater. London: Methuen.

rd edition. e standard flora r A small, straightforward book that systematically recounts the biology of all the freshwater invertebrate groups. A must. Moss, B. (2010) Ecology of Freshwaters, Fourth Edition, A View for

the Twenty-First Century. Chichester: Wiley. The current most comprehensive book on freshwater ecology in general.

Moss, B. (2012) Liberation Ecology: the Reconciliation of Natural and Human Cultures. Excellence in Ecology 24. Oldendorf/ Luhe, Germany: International Ecology Institute. An account of the major principles of ecology and environment, intended for a non-scientist audience and approached through the media of fine art, music and literature.

Moss, B. (2015) *Lakes, Loughs and Lochs.* London: Collins New Naturalist. *A New Naturalist book concentrating on Britain and Ireland and written for a general audience.*

Purseglove, J. (1988) *Taming the Flood*. Oxford: Oxford: University Press. Deals with river engineering and floodplain drainage and their consequences. Passionate and beautifully illustrated.

Thompson, G., Coldrey, J. & Bernard, G. (1985). *The Pond*. London: Collins. *Short on text but a collection of excellent photographs of pond organisms mostly* in situ.

Wheater, C.P. & Cook, P. (2003) *Studying Invertebrates*. Naturalists' Handbooks 28. Slough: The Richmond Publishing Co. Ltd. *Contains much information on sampling and use of simple statistics*.

Williams, P.J., Biggs, J., Whitfield, M., Thorne, A., Bryant, S., Fox, G. & Nicolet, P. (2010) The Pond Book: A Guide to the Management and Creation of Ponds. 2nd Edition, eds. Williams, P. and Julian, A.M. Oxford: Pond Conservation. Now available from Freshwater Habitats Trust, Oxford (freshwaterhabitats.org.uk/ habitats/pond/pond-book/). Another must. A wealth of practical information.

Chapter 1

Bennion, H., Harriman, R. & Battarbee, R. (1997) A chemical survey of standing waters in south-east England with reference to acidification and eutrophication. *Freshwater Forum*, 8, 28–44

Cereghino, R., Biggs, J., Oertli, B. & Declerk, S. (2008) The ecology of European ponds: defining the characteristics of a neglected freshwater habitat. *Hydrobiologia* 597, 1–6.

De Meester, L., Declerck, S., Stoks, R., Louette, G., Van de Meutter, F., De Bie, T., Michels, E. & Brendonck, L. (2005) Ponds and pools as model systems in conservation biology, ecology and evolutionary biology. *Aquatic Conservation: Marine and Freshwater systems* 15, 715–725.

Jeffries, M. (2011) Ponds and the importance of their history: an audit of pond numbers, turnover and the relationship between the origins of ponds and their contemporary plant communities in south-east Northumberland, UK. *Hydrobiologia* 689, 11–21.

Oertli, B., Cereghino, R., Hull, A. & Miracle, R. (2009) Pond conservation: From science to practice. *Hydrobiologia* 634, 1–9.

Sutcliffe, D.W. (1998) The ionic composition of surface waters in the English Lake District, related to bedrock geology, with some singular facts and speculation on the existence of mineral-rich groundwaters. *Freshwater Forum* 11, 30–51.

Verpoorter, C., Kutser, T., Seekell, D.A. & Tranvik, L.J. (2014) A global inventory of lakes based on high-resolution satellite imagery. *Geophysics Research Letters* 41, 6396–6402.

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Bronmark, C. & Hansson, L.-A. (Eds) (2012) Chemical Ecology in Aquatic Systems. Oxford: Oxford University Press. *High level and deals with chemical communication among animals in the water, but mainly marine.*

Pennak, R.W. (1985) The fresh-water invertebrate fauna: Problems and solutions for evolutionary success. *American Zoologist* 25, 671–87. *A very readable account*.

Chapters 3 and 4

Cook, J, Chubb, J.C. & Veltkamp, C.J. (1998) Epibionts of *Asellus aquaticus* (L.) (Crustacea, Isopoda): and SEM study. *Freshwater Biology* 39, 423–438. *Illustrates just how complex and intricate, relationships can be in pond animals.*

Finlay, B.J. & Esteban, G.F. (1998) Freshwater protozoa: biodiversity and ecological function. *Biodiversity and Conservation* 7, 1163–1186. A very useful general account, but uses the older classification system before new information became available on the organisation of kingdoms.

Walker, G., Dorrell, R.G., Schlacht, A. & Dacks, J.B. (2011) Eukaryotic systematics: a user's guide for cell biologists and parasitologists. *Parasitology* 138, 1638–63. *An account of the new classification of kingdoms. Hard going.*

Whittaker, R.H. (1969) New concepts of the kingdoms of organisms. *Science* 163, 150–60. *A classic of its time and still interesting to read*.

Chapter 5

Cribb, S., Cribb, J. (1998) *Whisky on the Rocks*. Edinburgh: British Geological Survey.

Elser, J.J., Bracken, M. E.S., Cleland, E.E., Gruner, D.S., Harpole, W.S., Hillebrand, H., Ngai, J.T., Seabloom, E.W., Shurin, J.B. & Smith, J.E. (2007) Global analysis of nitrogen and phosphorus limitation of primary producers in freshwater, marine and terrestrial systems. *Ecology Letters* 10, 1135–1142.

Chapter 6

Forbes, S. (1887) The lake as a microcosm. Bulletin of the Scientific Association (Peoria, IL) 1887, 77–87. An important early paper that set the scene for the development of freshwater science.

Gill, J.L., Williams, J.W., Jackson, S.T., Lininger, K.B. & Robinson, G.S. (2009) Pleistocene megafaunal collapse, novel plant communities, and enhanced fire regimes in North America. *Science* 326, 1100–1103.

Hutchinson, G.E. (1959) Homage to Santa Rosalia or why are there so many kinds of animals? *American Naturalist* 93, 145–59. *A classic in the development of niche theory.*

Lindeman, R.L. (1942) The trophic-dynamic aspect of ecology. Ecology 23, 399–417. Another classic that developed the main ideas of food webs and the importance of detritus in lakes. The previous four papers are widely available for free on the Web.

MacArthur, R.H. & Wilson, E.W. (1967, reprinted 2001) *The Theory of Island Biogeography*. Princeton: Princeton University Press.

Moss, B. (2015) Mammals, freshwater reference states, and the mitigation of climate change. *Freshwater Biology* 60, 1964–1976.

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An example of how new ideas can emerge from casual observations. Odum, E.P. (1969) The strategy of ecosystem development. *Science* 164, 262–270.

Oertli, B., Joye, D.A., Castella, E., Juge, R., Cambin, D. & Lachavanne, J.-B. (2002) Does size matter: The relationship between pond area and biodiversity. *Biological Conservation* 104, 59–70.

Chapter 7

Boll, T., Johansson, L.S., Lauridesen, T.L., Landkildehus, F., Davidson, T.A., Søndergaard, M., Andersen, F.O. & Jeppesen, E. (2012) Changes in benthic macroinvertebrate abundance and lake isotope (C, N) signals following biomanipulation: an 18-year study in shallow Lake Vaeng, Denmark. *Hydrobiologia* 686, 135–145.

Brooks, J.L. & Dodson, S.I. (1965) Predation, body size and composition of plankton. *Science* 150, 28–35.

Giles, N. (1992) Wildlife after Gravel: Twenty Years of Practical Research by the Game Conservancy and ARC. Fordingbridge: Game Conservancy. Ecological studies in restored gravel pit ponds.

Hurlbert, S.H., Zedler, J. & Fairbanks, D. (1972) Ecosystem alteration by mosquitofish (*Gambusia affinis*) predation. *Science* 175, 639–641.

Ings, N.I., Hildrew, A.G. & Grey, J. (2012) House and garden: larval galleries enhance resource availability for a sedentary cadddisfly. *Freshwater Biology* 57, 2526–2538.

Scheffer, M., Carpenter, S., Foley, J.A. & Walker, B. (2001) Catastrophic shifts in ecosystems. *Nature* 413, 59–596.

Scheffer, M. (2009) *Critical Transitions in Nature and Society*. New Jersey: Princeton University Press. *The wider application of alternative states ideas*.

Chapter 8

Andrews, J. & Kinsman, D. (1990). *Gravel Pit Restoration for Wildlife*. Sandy: Royal Society for the Protection of Birds.

Aston, S. (1988) *Mediaeval Fish, Fisheries and Fishponds in England*. British Archaeological Research British Series 182. Oxford: British Archaeological Society.

Bulleid, A. (1924, revised 1958). *The Lake-Villages of Somerset*. Glastonbury: Glastonbury Antiquarian Society.

Johnes, P., Moss, B. & Phillips, G. (1996) The determination of total nitrogen and total phosphorus concentrations in freshwaters from land use, stock headage and population data: testing of a model for use in conservation and water quality management. *Freshwater Biology* 36, 451–473. *The use of desk studies to calculate approximate nutrient budgets for catchments.*

Moore, N.V. (2002) Oaks, Dragonflies and People. Leiden: Brill Books. An account of the construction, after his retirement, of a pond specifically to support a high diversity of dragonflies by one of the most prominent of twentieth century conservation scientists.

Williams, P., Whitfield, M. and Biggs, J. (2008) How can we make new ponds biodiverse? A case study monitored over 7 years. *Hydrobiologia* 597, 137–148.

Wood, P.J., Greenwood, M.T. & Agnew, M.D. (2003) Pond diversity and habitat loss in the U.K. Area 35, 206–216

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Cole, J., Prairie, Y.T., Caraco, N.F., McDowell, W.H., Tranvik L.J., Striegl, R.G., Duarte, C.M., Kortelainen, P., Downing, J.A., Middelburg, J.J. & Melack, J. (2007) Plumbing the global carbon cycle: Integrating inland waters into the terrestrial carbon budget. *Ecosystems* 10, 171–84. *The role of small lakes, ponds and wetlands in the carbon cycle. Heavy going.*

Food and Agriculture Organization of the United Nations (2014). The State of World Fisheries and Aquaculture. Rome: FAO. Downloadable at www.fao.org/3/a-i3720e.pdf. The current situation of fisheries.

Hickling, C.F. (1971) Fish Culture. London: Faber and Faber. An account packed with interesting detail and concentrating particularly on fish culture in the tropics.

Lenton, T. & Watson, A. (2011). Revolutions That Made the Earth. Oxford: Oxford University Press. An account of Earth's somewhat dramatic ecological history.

Lovelock, J. (2000) Gaia: A New Look at Life on Earth. 2nd Edition. Oxford: Oxford Paperbacks. A classic that examines how atmospheric and ocean composition are maintained within equable limits for life. The book has caused a great deal of controversy and vehement rejection by some evolutionary biologists on the basis of one romantic but probably wrong idea in it that caught the imagination of the environmental movement. However, it was well received by earth chemists, oceanographers and geologists. You should read it because of the controversy and extreme reaction, but also read Lenton & Watson (2011) and Tyrell (2013), which gives a balanced examination of the evidence, rejects the Gaia hypothesis of an Earth superorganism but also clearly establishes that Lovelock raised important issues and made a major contribution.

Moss, B. (2010) Climate change, nutrient pollution and the bargain of Dr Faustus. *Freshwater Biology* 55, 171–183. *One of two accounts (see also Yvon-Durocher* et al. (2010) *published in the same year showing that rising temperatures are likely to increase dramatically the carbon dioxide content of the atmosphere through increased respiration of stored carbon*.

Moss, B. (2014) Freshwaters, climate change and UK conservation. Freshwater Reviews 7, 25–75. A comprehensive review of what is happening.

Raebel, E.M. Merckx, T., Feber, R.E., Riordan, P., MacDonald, D.W. & Thompson, D.J. (2012) Identifying high-quality pond habitats for Odonata in lowland England: implications for agri-environment schemes. *Insect Conservation and Diversity* 5, 422–432.

Sayer, C., Andrews, K., Shilland, E., Edmonds, N., Edmonds-Brown, R., Patmore, I., Emson, D. & Axmacher, J. (2012) The role of pond management for biodiversity conservation in an agricultural landscape. *Aquatic Conservation: Marine and Freshwater Ecosystems* 22, 626–638.

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Watts, G. and 24 others (2015) Climate change and water in the UK-past changes and future prospects. *Progress in Physical Geography* 39, 6–28.

Yvon-Durocher, G., Jones, J.I., Trimmer, M., Woodward, G. & Montoya, J.M. (2010) Warming alters the metabolic balance of ecosystems. *Philosophical Transactions of the Royal Society* B 365, 2117–2126. See also Moss (2010).

Useful websites

Freshwater Habitats Trust (Pond Action). This organisation is an enthusiastic proponent for pond conservation and creation. It has a number of schemes in which amateurs can get involved and an archive of useful articles for downloading. Its website is well worth an exploration: freshwaterhabitats.org.uk

British Geological Survey (Maps, Regional Handbooks) www. bgs.ac.uk/catalogue/home.html

Environment Agency River Basin Management Plans www. gov.uk/government/collections/river-basin-managementplans#current-river-basin-management-plans

Natural Resources Wales River Basin Management Plans naturalresources.wales/water/quality/submission-of-river-basinmanagement-plans/?lang=en

Scottish Environment Protection Agency River Basin Management Plan www.sepa.org.uk/media/28300/scotland_ rbmp_sea_environmental_report.pdf

Equipment suppliers

Brunel microscopes (www.brunelmicroscopes.co.uk). General supplies for microscopy including Naphrax diatom mountant. Duncan Associates (www.duncanandassociates.co.uk). This company makes higher quality equipment for freshwater sampling than that offered by general scientific suppliers. It is especially worth buying high quality pond and plankton nets. Fisher Scientific (www.fisher.co.uk). A general supplier of equipment.

Hanna Instruments (www.hannainstruments.co.uk). Hanna make excellent pocket conductivity probes at a very reasonable price. See: www.hannainstruments.co.uk/conductivity-tds. html