

Preface to the Second Edition

Since writing the first edition of *Biology of Wastewater Treatment* the wastewater industry has changed quite dramatically. While the basic concepts remain the same, the processes and the industry that design, build and operate treatment systems have all radically altered. So why has wastewater technology changed so much since 1990? In Europe the introduction and rapid implementation of the Urban Wastewater Treatment Directive has to be a major factor. Nutrient removal, especially biological phosphorus removal, is now commonplace. This in turn has forced us back to the use of the original batch reactor designs for activated sludge. The large increase in sludge production has required the development of integrated disposal strategies linked with better recovery and reuse technologies. The rapid expansion of wastewater treatment is allowing manufacturers to experiment with new innovative designs and processes, and for the first time in nearly half a century new sewage treatment plants are being built rather than existing plants merely being upgraded or retrofitted. Privatisation in the UK has also been hugely influential bringing into play the often-conflicting factors of cost, especially operational cost, and accountability. Better regulation and control in all countries, coupled with better process management has resulted in better treatment overall. The concept of sustainability has also become an important factor, although it is still to have any real influence on long-term design or planning. Growing urbanization, climate change, and new analytical techniques that are constantly allowing us to identify new pollutants and understand the fate of others during treatment and subsequently in receiving waters, have all significantly influenced the wastewater industry. However, many fear that wastewater treatment will

eventually reach crisis point where existing technologies will prove to be too expensive and energy dependent to be able to satisfy all the needs of a modern society. Also, long-term planning is difficult with legislation and regulation constantly changing. So now is the time to stand back and take a new look at the whole concept of the wastewater cycle from production at the household level through to treatment. Our highly diluted wastewaters, heavily contaminated with metals, pharmaceutical drugs, oestrogen mimicking compounds, more varied and dangerous pathogens, and an alarmingly wide range of trace organic compounds is simply too difficult to treat effectively in a manner that is going to be sustainable. Rather than developing better and more efficient process designs we need to start by looking at the basic concepts of treatment and redesign the system as though starting from scratch. For, example new separation technologies and water reuse at the household level is reducing wastewater loadings. New advances with in-sewer treatment have been very successful in reducing organic loads to treatment plants and at the same time creating a more treatable wastewater entering the wastewater treatment plant. Localised treatment plants rather than centralized systems are now thought to be more efficient. Removing pollutants at source rather than at the treatment plant is making effluents and sludges in particular less hazardous. What is clear is that wastewater treatment will have to become a joint venture between all the stakeholders, with every person having to take some responsibility for their waste.

I have tried to retain as much of the original text as possible, but due to the rapid changes that have occurred over the past decade then considerable revision was necessary. All sections have been updated with many expanded to reflect the new importance or popularity of processes. There is also a new chapter on sustainability.

It is often forgotten by environmentalists, and the public in general, what an important role wastewater treatment plays in protecting both the environment and the health of the public. Without it there would be no development and growth, without it our environment and our very lives would be at risk. It is a huge credit to all those involved in the industry that this vital service is carried out in such a discreet and professional manner. For all those of you who have made it your career, thank you. For those who would like to, then welcome and I hope that you will also find it equally as rewarding and exciting as I have.

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