



Chapter 8

REFERENCES

- Albert, A. 1963. Correlations between microbiological morphology and the chemistry of biocides. In : *Advances in Applied Microbiology*, Volume 5. Edited by W.W. Umbreit. Academic Press, London, pp 1 - 50.
- Al-Hoti, B.A. 1989. A predictive model to find the optimum chlorine treatment scenario for biofouling control. *Desalination* 74, 227 - 241.
- Allison, P.J. 1990. Mitigation of microbial corrosion in cooling water systems. Presented at *Microbial Corrosion, Problems in South African Industry*, Indaba Conference Centre, Johannesburg, September 18.
- Anon. 1977. *Principles of Industrial Water Treatment*. Drew Chemical Corporation, Boston.
- Anon. 1980. *Handbook of Industrial Water Conditioning*, Eighth Edition. Betz Laboratories, Trevose, USA.
- Anon. 1986. Department of Water Affairs, *Management of the water resources of the Republic of South Africa*. CTP Book Printers, Cape Town.
- Anon. 1988. *Nalco Water Handbook*. Second Edition. Edited by F.N. Kemmer. McGraw-Hill Book Company, New York.
- Anon. 1989. Eskom guideline for cooling water. Eskom, TRI, Rosherville, Johannesburg. NWG7049.
- Anwar, H. and Strapp, J.L. 1992. Changing characteristics of aging biofilms. *International Biodeterioration and Biodegradation* 30, 177 - 186.
- Atlas, R.M. and Bartha, R. 1987. Evolution and structure of microbial communities. In : *Microbial Ecology : Fundamentals and Applications*. Second Edition. Benjamin/Cummings Publishing Company, Menlo Park, California, pp 61 - 98.
- ASTM D932-72. 1972. Standard test method for iron bacteria in water and water-formed deposits. American Society for Testing and Materials. 578 - 591.

- Baecker, A.W., Bondonno, A. and von Holy, A. 1988. A new technique for evaluation of microbiologically induced corrosion by scanning electron microscopy. *Electron Microscopy Society of Southern Africa* 18, 9 - 10.
- Baier, R.E. 1980. Substrate influence on adhesion of microorganisms and their resultant new surface properties. In : *Adsorption of Microorganisms to Surfaces*. Edited by G. Bitton and K. Marshall. Wiley Interscience, New York, pp 59 - 104.
- Beech, I., Gaylarde, C., Smith, J. and Geesey, G. 1990. Polysaccharides in biofilms and in free EPS of *D. desulfuricans* in the presence of mild and stainless steel and their role in corrosion. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 2-53 - 2-58.
- Benarde, M.A., Snow, W.B., Olivieri, V.P. and Davidson, B. 1967. Kinetics and mechanism of bacterial disinfection by chlorine dioxide. *Appl. Microbiol.* 15, 257 - 265.
- Bennet, C. 1988. The control of microbiological problems in the paper industry. *International Biodeterioration* 24, 381 - 386.
- Berkley, K.G.C. 1968. Cathodic protection. Theory and practice in the water industry. *Water and Water Engineering* October, 416 - 423.
- Bessems, E. 1983. Biological aspects of the assessment of biocides. In : *Microbial Corrosion*, Proceedings of the Metals Society Conference, Teddington, March 8 - 10, pp 84 - 89.
- Bibb, M. and Hartman, K.W. 1984. Bacterial corrosion. *Corrosion and Coatings* October, 12 - 29.
- Blackburn, F.E. and Mullin, L.J. 1990. Detection and control of bacterial corrosion using internal corrosion monitors. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-9 - 6-18.
- Blake, R. and Bowers-Irons, G. 1990. Microbially influenced corrosion of metal arsenides. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 3-87 - 3-93.

- Blenkinsopp, S.A. and Costerton, J.W. 1991. Understanding biofilms. *TIBTECH* 9, 138 - 143.
- Bondonno, A. and Robinson, F.P.A. 1990. Microbial corrosion of aluminium alloys in mine waters. In : *SAIWA '90*, Conference proceedings. The Southern African Industrial Water Association Symposium, Indaba Conference Centre, Johannesburg, September 27 - 28.
- Bondonno, A., von Holy, A. and Beacker, A.W. 1989. Effects of *Desulphovibrio* and *Thiobacillus* biofilms on the corrosion of electroless nickel plated mild steel. *International Biodeterioration* 25, 285 - 298.
- Booth, G.H. and Tiller, A.K. 1960. Polarization studies of mild steel in cultures of sulphate-reducing bacteria. *Trans. Farad. Soc.* 56, 1689 - 1705.
- Booth, G.H., Cooper, A.W. and Cooper, P.M. 1967. Rates of microbial corrosion in continuous cultures. *Chem. and Ind.* 86, 2084 - 2098.
- Borenstein, S.W. 1988. Microbiologically influenced corrosion failures of austenitic stainless steel welds. *Corrosion '88*, National Association of Corrosion Engineers, St Louis, March 21 - 25, Paper number 78.
- Bos, P. and Kuenen, J.G. 1983. Microbiology of sulphur-oxidising bacteria. In : *Microbial Corrosion*, Proceedings of the Metals Society Conference, Teddington, March 8 - 10, pp 18 - 24.
- Bott, T.R., Miller, P.C. and Patel, T.D. 1983. Biofouling in an industrial cooling water system. *Process Biochemistry* January/February, 10 - 18.
- Bradley, G. and Pritchard, D.T. 1990. Surface charge characteristics of sulphate reducing bacteria and the initiation of a biofilm on mild steel surfaces. *Biofouling* 2, 299 - 310.
- Brennenstuhl, A., Doherty, P., King, P. and Dunstall, T. 1990. The effects of biofouling on the corrosion of nickel heat exchanger alloys at Ontario Hydro. In : *Microbiologically Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 4-25 - 4-31.
- Breske, T.C. 1990. Microbiologically influenced corrosion (MIC) in cooling water systems. *Corrosion Australasia* 16, 5 - 10.

Brown, B.W. and Hollander, M. 1977. *Statistics A Biomedical Introduction*. John Wiley and Sons, New York.

Brözel, V.S. 1990. Evaluation of nutrient agars for the enumeration of viable heterotrophs in cooling water. MSc. thesis, University of Pretoria.

Brözel, V.S. and Cloete, T.E. 1991. Resistance of bacteria from cooling waters to bactericides. *Journal of Industrial Microbiology* 8, 273 - 276.

Brözel, V.S., Hall, A.N. and Cloete, T.E. 1990. Biofilm monitoring using scanning electron microscopy. *Electron Microscopy Society of Southern Africa* 20, 131 - 132.

Buchanan, R. and Stansbury, E. 1990. Fundamentals of coupled electrochemical reactions as related to microbially influenced corrosion. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 1-11 - 1-18.

Buchanan, R., Zhang, X., Li, P., Stansbury, E., Dowling, P., Hall, T. and Lindberg, A. 1990. Effects of surface condition on susceptibility to microbially influenced corrosion: Stainless steel weldments and carbon steel. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 3-99 - 3-102.

Challinor, C.J. 1991. The monitoring and control of biofouling in industrial cooling water systems. *Biofouling* 4, 253 - 263.

Chaplin, C.E. 1952. Bacterial resistance to quaternary ammonium disinfectants. *J. Bacteriol.* 63, 453 - 458.

Characklis, W.G. 1973. Attached microbial growths - II Frictional resistance due to microbial slimes. *Water Research* 7, 1249 - 1258.

Characklis, W.G., Lee, W., Peyton, B. and Lewandowski, Z. 1990. Interactions between process waters, microbial biofilms, and metal substrata. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 2-59 - 2-67.

- Characklis, W.G. and Marshall, K.C. 1990. *Biofilms*. John Wiley and Sons, New York.
- Characklis, W.G., Trulear, M.G., Bryers, J.D. and Zilver, N. 1982. Dynamics of biofilm processes: Methods. *Water Research* 16, 1207 - 1216.
- Clancy, J.L. and Cimini, L. 1991. Improved methods for recovering bacteria from HPW water. *Ultrapure Water* May/June, 1991.
- Clesceri, L.S., Greenburg, A.E. and Trussel, R.R. 1989. *Standard Methods for the Examination of Water and Wastewater*. Seventeenth Edition. American Public Health Association, Washington.
- Cloete, T.E., Brözel, V.S. and von Holy, A. 1992. Practical aspects of biofouling control in industrial water systems. *International Biodeterioration and Biodegradation* 29, 299 - 341.
- Cloete, T.E., Smith, F. and Steyn, P.L. 1989. The use of planktonic bacterial populations in open and closed recirculating water cooling systems for the evaluation of biocides. *International Biodeterioration* 25, 155 - 122.
- Colturi, T.F. and Kozelski, K.J. 1984. Corrosion and biofouling control in a cooling tower system. *Materials Performance* August, 43 - 47.
- Connell, G.F. and Jones, W.B. 1991. Water treatment with liquid chlorine (Direct feed of elemental, liquid chlorine into water). *International Water Conference*, Pittsburgh, October 21 - 23, 1991, Paper number IWC91-46.
- Costello, J.A. 1974. The mechanism of cathodic depolarisation exhibited by sulphate reducing bacteria during metal corrosion. PhD thesis, University of Cape Town.
- Costerton, J.W. and Boivin, J. 1990. The role of biofilms in microbial corrosion. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 5-85 - 5-90.
- Costerton, J.W., Cheng, K.J., Geesey, G.G., Ladd, I.I., Nickel, J.C., Dasgupta, M. and Mari, J.J. 1987. Bacterial biofilms in nature and disease. *Ann. Rev. Microbiol.* 41, 436 - 464.

Costerton, J.W., Geesey, G.G. and Cheng, K.T. 1978. How bacteria stick. *Scientific American* 238, 86 - 95.

Costerton, J.W., Geesey, G.G. and Jones, P.A. 1988. Bacterial biofilms in relation to internal corrosion monitoring and biocide strategies. *Materials Performance* April, 49 - 53.

Costerton, J.W., Irvin, R.T. and Cheng, J.K. 1981. The bacterial glycocalyx in nature and disease. *Ann. Rev. Microbiol.* 33, 459 - 479.

- Costerton, J.W. and Lashen, E.S. 1983. The inherent biocide resistance of corrosion-causing biofilm bacteria. *Corrosion '83*, National Association of Corrosion Engineers, Anaheim, April 18 - 22, Paper number 246.

Costerton, J.W., Marrie, T.J. and Cheng, K.J. 1985. Phenomena of bacterial adhesion. In : *Bacterial Adhesion*. Edited by D.C. Savage and M. Fletcher. Plenum Press, New York, pp 3 - 40.

Costerton, J.W., Nickel, J.C. and Ladd, T.I. 1986. Suitable methods for the comparative study of free-living and surface associated bacterial populations. In : *Bacteria in nature*, Volume 2. Edited by J.S. Pointdexter and E.R. Leadbetter. Plenum Press, New York, pp 49 - 84.

Cragolino, G. 1983. The role of sulfate-reducing and sulfur-oxidising bacteria on localised corrosion. *Corrosion '83*, National Association of Corrosion Engineers, Anaheim, April 21 - 25, Paper number 244.

Dean, S.W. and Sprowls, D.O. 1987. In service monitoring. In : *Metals Handbook*, Volume 13, Ninth Edition. Edited by J.R. Davis. A.S.M. International, Ohio, pp 197 - 203.

de Bruyn, E. 1993. Microbial ecology of sulphide producing bacteria in water cooling systems. PhD Thesis, University of Pretoria.

Denyer, S.P. 1990. Mechanisms of action of biocides. *International Biodeterioration* 26, 89 - 100.

Donlan, R.M., Muia, R.A. and Gibbon, D.L. 1990. Sulphate reducing bacteria colonization of mild steel in recirculating cooling water. In : *Microbially Influenced Corrosion and Biodete-*

rioration. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 2-69 - 2-74.

Duddridge, J.E. and Pritchard, A.M. 1983. Factors affecting the adhesion of bacteria to surfaces. In : *Microbial Corrosion*, Proceedings of the Metals Society Conference, Teddington, March 8 - 10, pp 28 - 34.

Eaton, A.C., Chamberlain, C. and Cooney, M. 1980. Colonisation of Cu-Ni surfaces by microfouling organisms. In : *Condenser Biofouling Control*. Edited by J.F. Garey, R.M. Jordan, A.H. Aitken, D.T. Burton and R.H. Gray. Ann Arbor Science, Ann Arbor, pp 105 - 120.

Edyvean, R.G.J., Maines, A.D., Hutchinson, C.J., Silk, N.J. and Evans, L.V. 1992. Interactions between cathodic protection and bacterial settlement on steel in seawater. *International Biodeterioration and Biodegradation* 29, 251 - 272.

Elliott, T.C. 1973. Cooling towers. *Power* March, S1 - S24.

Elmer, K. and Besold, D. 1988. Efficiency loss of power plants due to biological fouling of the cooling water systems and evaluation of counter measures under environmental aspects. *VGB Kraftwerkstechnik* 68, 552 - 558.

Fellers, B. 1990. Strategies for control of fouling and microbiologically influenced corrosion. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-37 - 6-42.

Ferguson, R.J. 1981. Determination of seasonal variations in microbiological fouling factors and apparent slime thickness. *Ann. Cooling Tower Institute Meeting*, Houston, January 19 - 21.

Feron, D. 1990. Chemical and electrochemical aspects of the corrosion of stainless steels in the presence of sulphate reducing bacteria. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 5-73 - 5-84.

Fischer, K.P. 1983. Cathodic protection in saline mud containing sulphate-reducing bacteria. In : *Microbial Corrosion*, Proceedings of the Metals Society Conference, Teddington, March 8 - 10, pp 110 - 116.

Fletcher, M. 1985. Effect of solid surfaces on the activity of attached bacteria. In : *Bacterial Adhesion. Mechanisms and physiological significance*. Plenum Press, New York, pp 339 - 362.

Fletcher, M. and Marshall, K.C. 1982. Are solid surfaces of ecological significance to aquatic bacteria? In : *Advances in Microbial Ecology, Volume 6*. Edited by K.C. Marshall. Plenum Press, New York, pp 199 - 236.

Freedman, A.J. 1984. Cooling water technology in the 1980s. *Materials Performance* November, 9 - 16.

Gaylarde, C.C. 1990. Advances in detection of microbiologically induced corrosion. *International Biodeterioration* 26, 11 - 22.

Gaylarde, C.C. and Johnston, J.M. 1983. The effect of some environmental factors on biocide sensitivity in *Desulfovibrio* : implications for biocide testing. In : *Microbial Corrosion, Proceedings of the Metals Society Conference, Teddington, March 8 - 10*, pp 91 - 97.

Geesey, G.G., Mittelman, M.W., Iwaoka, T. and Griffiths, P.R. 1986. Role of bacterial exopolymers in the deterioration of metallic copper surfaces. *Materials Performance* February 37 - 40.

Geesey, G.G., Mutch, R.J., Costerton, J.W. and Green R.B. 1978. Sessile Bacteria: An important component of the microbial population in small mountain streams, *Limnol. Oceanogr.* 23, 1214 - 1223.

Goysich, M.J. and McCoy, W.F. 1989. A quantitative method for determining the efficacy of algicides in industrial cooling towers. *J. Industrial Microbiol.* 4, 429 - 434.

Guezennec, J. 1991. Influence of cathodic protection of mild steel on the growth of sulphate reducing bacteria at 35°C in marine sediments. *Biofouling* 3, 339 - 348.

Guezennec, J., Dowling, N.J.E., Conte, M., Antoine, E. and Fiksdal, L. 1990. Cathodic protection in marine sediments and the aerated seawater column. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-43 - 6-50.

- Halleux, P. 1990. Regulatory demands for biocides today and in the 1990's. *International Biodeterioration* 26, 251 - 258.
- Hamilton, W. 1990. Sulphate-reducing bacteria and their role in microbially influenced corrosion. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp i - iv.
- Hart, R.A., Hughes, D.H., Templet, H.P. and Whitaker, J.M. 1990. Iron deposition and the effect of water treatment in mitigating a suspected MIC failure of 304 stainless steel. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-61 - 6-69.
- Heidersbach, R.H. 1987. Cathodic protection. In : *Metals Handbook*, Volume 13. Ninth Edition. Edited by J.R. Davis. ASM International, Ohio, pp 466 - 477.
- Hernandez-Duque, G., Pedersen, A., Thierry, D., Hermansson, M. and Kucera, V. 1990. Bacterial effects on corrosion of steel in sea water. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 2-41 - 2-52.
- Honeysett, D.G., van den Bergh, W.D. and O'Brien, P.F. 1985. Microbiological corrosion control in a cooling water system. *Materials Performance* 24, 34 - 39.
- Horacek, G. 1988. Biocorrosion in the oilfield 1. Experimental methods development, scanning electron microscopy technique. *Corrosion '88*, National Association of Corrosion Engineers, St Louis, March 21 - 25 Paper number 86.
- Hugo, W.B. 1967. The mode of action of antibacterial agents. *J. Appl. Bacteriol.* 30, 17 - 50.
- Isaacson, R.E. 1985. Pilus Adhesion. In : *Bacterial Adhesion*. Edited by D.C. Savage and M. Fletcher. Plenum Press, New York, pp 307 - 338.
- Iverson, W.P. 1984. Mechanism of anaerobic corrosion of steel by sulfate reducing bacteria. *Materials Performance* March, 28 - 30.
- Iverson, W.P. 1987. Microbial corrosion of metals. *Adv. Appl. Microbiol.* 32, 1 - 36.

- Jack, T.R., Worthingham, R.G. and Ferris, F.G. 1990. External corrosion of line pipe under disbonded coatings, field observations and mechanistic studies. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 4-19 - 4-24.
- Johnson, C. and Howells, M. 1981. Biofouling: new insights, new weapon. *Power* April, 90 - 91.
- Jones, J.M. and Walch, M. 1990. MIC of coated 4140 steel by mixed communities of anaerobic and facultatively anaerobic bacteria. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 3-73 - 3-86.
- Jorgensen, B.B. and Revsbech, N.P. 1983. Colourless sulfur bacteria, *Beggiatoa* spp. and *Thiobacillus* spp. on O_2 and H_2S microgradients. *Appl. Environ. Microbiol.* 45, 1261 - 1270.
- Kaiser, P. 1984. Cathodic protection of wastewater treatment and equipment. *Materials Performance* May, 50 - 54.
- Karl, D.M. 1986. Determination of *in situ* microbial biomass, viability, metabolism and growth. In : *Bacteria in Nature*, Volume 2. Edited by J.S. Pointdexter and E.R. Leadbetter, Plenum Press, New York, pp 49 - 84.
- Kasahara, K. and Kajiyama, F. 1990. Electrochemical aspects of microbiologically influenced corrosion on buried pipes. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 2-33 - 2-40.
- King, R.A. and Miller, J.D.A. 1971. Corrosion by the sulphate-reducing bacteria. *Nature* 233, 491 - 492.
- Kulpa, C. and Baker, C. 1990. Involvement of sulfur-oxidising bacteria in concrete degradation. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 4-7 - 4-10.
- Le Chevallier, M.W., Cawthorn, C.D. and Lee, R.G. 1988. Inactivation of biofilm bacteria. *Appl. Environ. Microbiol.* 54, 2492 - 2499.

Ledandowski, Z., Walser, G. and Characklis, W.G. 1991. Reaction kinetics in biofilms. *Biotechnol. Bioengineer.* 38, 877 - 882.

Licina, G., Nekoksa, G. and Ward, G. 1990. An electrochemical method for monitoring the development of biofilms in cooling water. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 5-41 - 5-46.

Liptak, B.G. 1987. *Optimization of Unit Operations*. Chilton Book Company, Pennsylvania.

Loeb, G. 1985. The properties of nonbiological surfaces and their characterisation. In : *Bacterial Adhesion*. Edited by D.C. Savage and M. Fletcher. Plenum Press, New York, pp 111 - 129.

Lutey, R. W. 1980. Microbial corrosion. *Corrosion '80*, National Association of Corrosion Engineers, Chicago, March 3 - 7, Paper number 192.

Lutey, R.W., King, V.M. and Cleghorn, M.Z. 1989. Mechanisms of action of dimethylamides as a penetrant/dispersant in cooling water systems. 50th Annual Meeting, *International Water Conference*, Pittsburg.

Lutey, R.W. and Allison, P.J. 1991. Strategies for the mitigation of MIC in industrial water systems. 52nd Annual Meeting, *International Water Conference*, Pittsburg.

Mansfeld, F. and Little, B. 1990. A critical review of the application of electrochemical techniques to the study of MIC. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7-12, pp 5-33 - 5-39.

Mara, D.D. and Williams, D.S.A. 1970. The evaluation of media used to enumerate sulphate reducing bacteria. *J. App. Bact.* 33, 543 - 552.

Mara, D.D. and Williams, D.S.A. 1972. The mechanism of sulphide corrosion by sulphate-reducing bacteria. In : *Biodeterioration of Materials*, Volume 2. Edited by A.H. Walters and E.H. Hueck-van der Plas, Applied Science, Barking, pp 103 - 113.

Marshall, K.C. 1985. Mechanisms of bacterial adhesion at solid-water interfaces. In : *Bacterial Adhesion*. Edited by D.C. Savage and M Fletcher. Plenum Press, New York, pp 133 - 156.

- Marshall, K.C., Stout, R. and Mitchell, R. 1971. Mechanism of the initial events in the sorption of marine bacteria to surfaces. *J. Gen. Microbiol.* 68, 337 - 348.
- Marsalek, D.S., Gerchakov, S.M. and Udey, L.R. 1979. Influence of substrate composition on marine microfouling. *App. Environ. Microbiol.* 38, 987 - 995.
- Martin, C.F., Brand, P.A.J., van Eeden, D., Basson, A.K. and Steyn, H.S. 1988. Counting and isolating nitrifying bacteria from water and soil. *S. Af. J. Science* 84, 905 - 907.
- Matson, J.V. and Characklis, W.G. 1982. Biofouling control in recycled cooling water with bromo chloro dimethylhydantoin. *Journal of the Cooling Tower Institute* 4, 27 - 33.
- Maxwell, S. 1986. Effect of cathodic protection on the activity of microbial biofilms. *Materials Performance* November, 53 - 56.
- Maxwell, S. and Hamilton, W.A. 1986. Modified radiorespirometric assay for determination of the sulphate reduction activity of biofilms on metal surfaces. *J. Microbiological Methods* 5, 83 - 91.
- McCoy, J.W. 1969. *Chemical analysis of industrial water*. MacDonald Technical and Scientific, London.
- McCoy, J.W. 1980. *Microbiology of cooling water*. Chemical Publishing Company, New York.
- McKelvey, K.K. and Brooke, M. 1959. *The Industrial Cooling Tower*. Elsevier Publishing Company, Amsterdam.
- Mollica, A. 1992. Biofilm and corrosion on active-passive alloys in seawater. *International Biodeterioration and Biodegradation* 29, 213 - 230.
- Moosavi, A.N., Pirrie, R.S. and Hamilton, W.A. 1990. Effect of sulphate reducing bacteria activity on the performance of sacrificial anodes. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 3-13 - 3-27.

- Mosley, M. and Holt, D. 1990. Corrosion of steel by thermophilic sulphate-reducing bacteria from UK north sea oil production facilities. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-90 - 6-101.
- Murphy, T.J. and Nel, D.J.C. 1988. Effluent desalination via tubular reverse osmosis "an overview". In : *SAIWA '88 Conference proceedings*. The Southern African Industrial Water Association Symposium, Indaba Conference Centre, Johannesburg, September.
- Nekoksa, G. and Gutherman, B. 1990. Determination of cathodic protection criteria to control microbially influenced corrosion in power plants. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-1 - 6-8.
- Nell, L.R. and Aspden, J.D. 1990. Effective utilisation of water resources. In : *SAIWA '90 Conference proceedings*. The Southern African Industrial Water Association Symposium, Indaba Conference Centre, Johannesburg, September 27 - 28.
- Neu, H.C. 1984. Changing mechanisms of bacterial resistance. *American Journal of Medicine* 77, 11 - 23.
- Neu, T.R. and Marshall, K.C. 1991. Microbial "footprints" - a new approach to adhesive polymers. *Biofouling* 3, 101 - 112.
- Nivens, D.E., Chambers, J.Q. and White, D.C. 1990. Non-destructive monitoring of microbial biofilms at solid-liquid interface using on-line devices. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7-12, pp 5-47 - 5-56.
- Nivens, D.E., Nichols, P.D., Henson, J.M., Geesey, G.G. and White, D.C. 1986. Reversible acceleration of the corrosion of AISI 304 stainless steel exposed to seawater induced by the growth and secretions of the marine bacterium *Vibrio natriegens*. *Corrosion* 42, 204 - 210.
- Obuekwe, C.O., Westlake, D.S., Cook, F.D. and Costerton, J.W. 1981. Surface changes in mild steel coupons from the action of corrosion-causing bacteria. *Appl. Environ. Microbiol.* 41, 776 - 774.

Palmer, C.M. 1962. *Algae in water supplies*. US Department of Health Education and Welfare, Public Health Service Publication no. 657.

Parr, J.A. 1990. Industrial biocide formulation - the way forward. *International Biodeterioration* 26, 237 - 244.

Paul, J.H. and Jeffrey, W.H. 1985. Evidence for separate adhesion mechanisms for hydrophilic and hydrophobic surfaces in *Vibrio proteolytica*. *App. Environ. Microbiol.* 50, 431 - 437.

Pedersen, K. 1982. Method for studying microbial biofilms in flowing-water systems. *Appl. Microbiol.* 43, 6 - 13.

Pope, D.H. 1986. A study of Microbiologically influenced corrosion in nuclear power plants and a practical guide for countermeasures. Electric Power Research Institute, Palo Alto, Report number EPRI NP-4582.

Pope, D.H. 1987. Microbial corrosion in fossil-fired power plants. A study of microbiologically influenced corrosion and a practical guide for its treatment and prevention. Electric Power Research Institute, Palo Alto, Report number EPRI CS-5495.

Pope, D.H., Duquette, D.J., Johannes, A.H. and Wayner, P.C. 1984. Microbiologically influenced corrosion of industrial alloys. *Materials Performance* April, 14 - 18.

Pope, D.H., Soracco, R.J. and Wilde, E.W. 1982. Studies on biologically induced corrosion in heat exchanger systems at the Savanna River Plant, Aiken, SC. *Materials Performance* July, 43 - 50.

Pope, D.H. and Zintel, T.P. 1988. Methods for the investigation of under-deposit microbiologically influenced corrosion. *Corrosion '88*, National Association of Corrosion Engineers, St Louis, March 21 - 25 Paper number 249.

Pope, D.H., Zintel, T.P., Kuruvilla, A.K. and Siebert, O.W. 1988. Organic acid corrosion of carbon steel : a mechanism of microbiologically influenced corrosion. *Corrosion '88*, National Association of Corrosion Engineers, St Louis, March 21 - 25, Paper number 79.

Postgate, J.R. 1981. *The sulphate-reducing bacteria*. Cambridge University Press, Cambridge.

- Postgate, J.R. 1988. Bacterial worlds built on sulphur. *New Scientist* July, 58 - 62.
- Poulton, W.I.J. and Nixon, M. 1990. Microbial corrosion at Eskom. Presented at *Microbial Corrosion, Problems in South African Industry*, Indaba Conference Centre, Johannesburg, September 18.
- Puckorius, P.R. 1983. Massive utility condenser failure caused by sulfide producing bacteria. *Materials Performance* December, 19 - 22.
- Puckorius, P.R. 1991. Utility cooling water systems treatment requirements. *Industrial Water Treatment* January/February, 24 - 29.
- Quinn, J.P. 1984. The modification and evaluation of some cytochemical techniques for the enumeration of metabolically active heterotrophic bacteria in the aquatic environment. *J. Appl. Bacteriol.* 57, 51 - 57.
- Ridgeway, H.F. and Olson, B.H. 1981. Scanning electron microscope evidence for bacterial colonization of a drinking-water distribution system. *Appl. Environ. Microbiol.* 41, 274 - 287.
- Ridgeway, H.F., Means, E.G. and Olson, B.H. 1981. Iron bacteria in drinking-water systems: Elemental analysis of *Gallionella* stalks, using X-ray energy-dispersive microanalysis. *Appl. Environ. Microbiol.* 41, 288 - 297.
- Ringas, C. and Robinson, F.P.A. 1987. Microbial corrosion of iron-based alloys. *J. S. Afr. Inst. Min. Metall.* 87, 425 - 437.
- Ruseska, I., Robbins, J. and Costerton, J.W. 1982. Biocide testing against corrosion-causing oil-field bacteria helps control plugging. *Oil and Gas Journal* 8, 253 - 264.
- Russell, A.D. 1982. *The destruction of bacterial spores*. Academic Press, London.
- Russell, A.D. 1990. Mechanisms of bacterial resistance to biocides. *International Biodeterioration* 26, 101 - 110.
- Russell, A.D. and Gould, G.W. 1988. Resistance of Enterobacteriaceae to preservatives and disinfectants. *J. Appl. Bacteriol., Symposium Series* 65, 167S - 195S.

Rutter, P.R. and Vincent, B. 1980. The adhesion of microorganisms to surfaces. Physio-chemical aspects. In : *Microbial Adhesion to Surfaces*. Edited by R.C.W. Berkley, J.M. Lynch, J. Melling, P.R. Rutter and B. Vincent. Horwood, Chichester, pp 79 - 92.

SABS 1497-1989. 1989. South African Standard Specification for Biocides for use in industrial cooling water, South African Bureau of Standards, Pretoria.

Salvago, G., Taccani, G. and Fumagalli, G. 1990. Electrochemical approach to biofilms. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 5-1 - 5-8.

Sanders, P.F. 1988. Control of biocorrosion using laboratory and field assessments. *International Biodeterioration* 24, 239 - 246.

Santos, R., Callow, M.E. and Bott, T.R. 1991. The structure of *Pseudomonas fluorescens* biofilms in contact with flowing systems. *Biofouling* 4, 319 - 330.

Sartory, D.P. 1982. Spectrophotometric analysis of chlorophyll *a* in freshwater plankton. South African Department of Environment Affairs, Hydrological Research Institute, Technical Report TR 155.

Schnurer, J. and Rosswall, T. 1982. Fluorescein diacetate hydrolysis as a measure of total microbial activity in soil and litter. *Appl. Environ. Microbiol.* 43, 1256 - 1261.

Schwieger, R.G. 1970. Heat exchangers. *Power* June, 34 - 48.

Scully, J.R. and Taylor, D.W. 1987. Electrochemical methods of corrosion testing. In : *Metals Handbook*, Volume 13, Ninth Edition. Edited by J.R. Davis. A.S.M. International, Ohio, pp 212 - 220.

Severyn, G. 1990. Concrete protection system for repair of deteriorated infrastructures from MIC. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-23 - 6-27.

Shapiro, J.A. 1991. Multicellular behaviour of bacteria. *A.S.M. News* 57, 247 - 253.

Shariff, N. and Hassan, R.S. 1985. Engineering and nutritional parameters affecting biofilm development. *Effluent and Water Treatment Journal* December, 423 - 425.

Siefert, L. and Krueger, W. 1950. Unusually high friction factor in a long water supply line. *VDIZ* 92, 189 - 191.

Sinha, U., Wolfram, J. and Rogers, R. 1990. Microbially influenced corrosion of stainless steels in nuclear power plants. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 4-51 - 4-60.

Smart, J.S. and Smith, G.L. 1992. Pigging and chemical treatment for oil and gas pipelines. *Materials Performance* January, 47 - 50.

Smith, J.E. and Oliver, J.D. 1991. The effects of hydrostatic pressure on bacterial attachment. *Biofouling* 3, 305 - 310.

Sondossi, M., Rossmoore, H.W. and Williams, R. 1989. Relative formaldehyde resistance among bacterial survivors of biocide-treated metalworking fluid. *International Biodeterioration* 25, 423 - 437.

Soracco, R.J., Pope, D.H., Eggers, J.M. and Effinger, T.N. 1988. Microbiologically influenced corrosion investigations in electric power generating stations. *Corrosion* 88, National Association of Corrosion Engineers, St Louis, March 21 - 25, Paper number 83.

Spires, G.V. 1990. Epoxy linings prevent corrosion of austenitic stainless steel in power plant circulating water system. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 6-85 - 6-89.

Staley, J.T. and Konopka, A.E. 1985. Measurement of *in situ* activities of nonphotosynthetic microorganisms in aqueous and terrestrial habitats. *Ann. Review Microbiol.* 39, 321 - 346.

Stanier, R.Y., Ingraham, J.L., Wheels, M.L. and Painter, P.R. 1986. *General Microbiology*. Fifth Edition. McMillan Education Ltd., London.

Steyn, A.G.W., Smit, C.F. and du Toit, S.H.C. 1989. *Moderne Statistiek vir die Praktyk*. van Schaik, Pretoria.

Stoecker, J.G. 1984. Guide for the investigation of microbiologically induced corrosion. *Materials Performance* August, 48 - 55.

Strauss, S.D. and Puckorius, P.R. 1984. Cooling-water treatment for control of scaling, fouling, corrosion. *Power* June, S1 - S24.

Tatnall, R.E. 1981. Fundamentals of bacteria induced corrosion. *Materials Performance* September, 32 - 38.

Tatnall, R.E. and Horacek, G.L. 1990. New perspectives on testing for sulfate reducing bacteria. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 5-17 - 5-32.

Tatnall, R.E., Stanton, K.M. and Ebersole, R.C. 1988. Methods of testing for the presence of sulfate-reducing bacteria. *Corrosion '88*, National Association of Corrosion Engineers, St Louis, March 21 - 25, Paper number 88.

Thierry, D. 1987. Field observation of microbiologically influenced corrosion in cooling water systems. *Materials Performance* 26, 35 - 41.

Tiller, A.K. 1983a. Electrochemical aspects of microbial corrosion: an overview. In : *Microbial Corrosion*, Proceedings of the Metals Society Conference, Teddington, March 8 - 10, pp 54 - 65.

Tiller, A.K. 1983b. Is stainless steel susceptible to microbial corrosion. In : *Microbial Corrosion*, Proceedings of the Metals Society Conference, Teddington, March 8 - 10, pp 104 - 107.

Trulear, M.G. 1980. Dynamics of biofilm processes in an annular reactor. MSc Thesis, Rice University, Houston.

Tullmin, M., Rothwell, N. and Lawson, K. 1992. Advanced electrochemical on-line corrosion monitoring technology. *Technology SA*. 25 - 27.

van Leeuwen, J., Jooste, S.H.J., van der Westhuizen, H.T., Wille, P., Konig, E., van der Merwe, P.J. and Saayman, G.B. 1990. Research into physical-chemical water and wastewater treatment methods at the University of Pretoria. In : *SAIWA '90 Conference proceedings*. The Southern African Industrial Water Association Symposium, Indaba Conference Centre, Johannesburg, September 27 - 28.

Videla, H.A. and Characklis, W.G. 1992. Biofouling and microbially influenced corrosion. *International Biodeterioration and Biodegradation* 29, 195 - 212.

von Holy, A. 1988. Microbiologically induced corrosion - are we on target? *Paper Southern Africa March*, 23 - 27.

von Holy, A. and Cloete, T.E. 1988. Practical aspects of monitoring biofilms and microbially induced corrosion in industrial water systems. *S. Afr. J. Science* 84, 17 - 19.

von Wolzogen Kuhr, C.A.V. and van der Vlugt, L.S. 1934. De grafiteering van gietijzer als elektrobiochemisch proces in anaerobe groden. *Water* (Der Haag) 18, 147 - 165.

Walker, J., Dowsett, A., Dennis, P. and Keevil, C. 1990. A laboratory model to evaluate control of microbially associated corrosion of copper pipes. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 4-61 - 4-68.

White, D.C. 1983. Analysis of microorganisms in terms of quantity and activity in natural environments. In : *Microbes in Their Natural Environments*. Cambridge University Press, Cambridge.

White, D.C., Jack, R. and Dowling, N. 1990. The microbiology of MIC. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 1-1 - 1-10.

Witt, F. 1990. A regulatory perspective in microbially influenced corrosion. In : *Microbially Influenced Corrosion and Biodeterioration*. Edited by N. Dowling, M. Mittleman and J. Danko, Knoxville, Tennessee, October 7 - 12, pp 7-1 - 7-4.

Wolfaardt, G.M., Archibald, R.E.M. and Cloete, T.E. 1991. The use of DAPI in the quantification of sessile bacteria on submerged surfaces. *Biofouling* 4, 265 - 274.

Wolfaardt, G.M. and Cloete, T.E. 1992. The effect of some environmental parameters on surface colonisation by microorganisms. *Water Research* 26, 527 - 537.

Woodall, G.M., Pancorbo, O.C., Blevins, R.D. and Ferslew, K.E. 1987. Mutagenic activity associated with cooling tower waters treated with a biocide containing 5-chloro-2-methyl-4-isothiazolin-3-one. *Environ. Sci. Technol.* 8, 815 - 820.

Zivtins, G. and Casedy, G. 1980. *Data Book and Buyers Directory*. Practical Refridgerating Engineers Association, U.S.A.

Zobell, C.E. 1943. The effect of solid surfaces upon bacterial activity. *J. Bacteriol.* 46, 39 - 56.