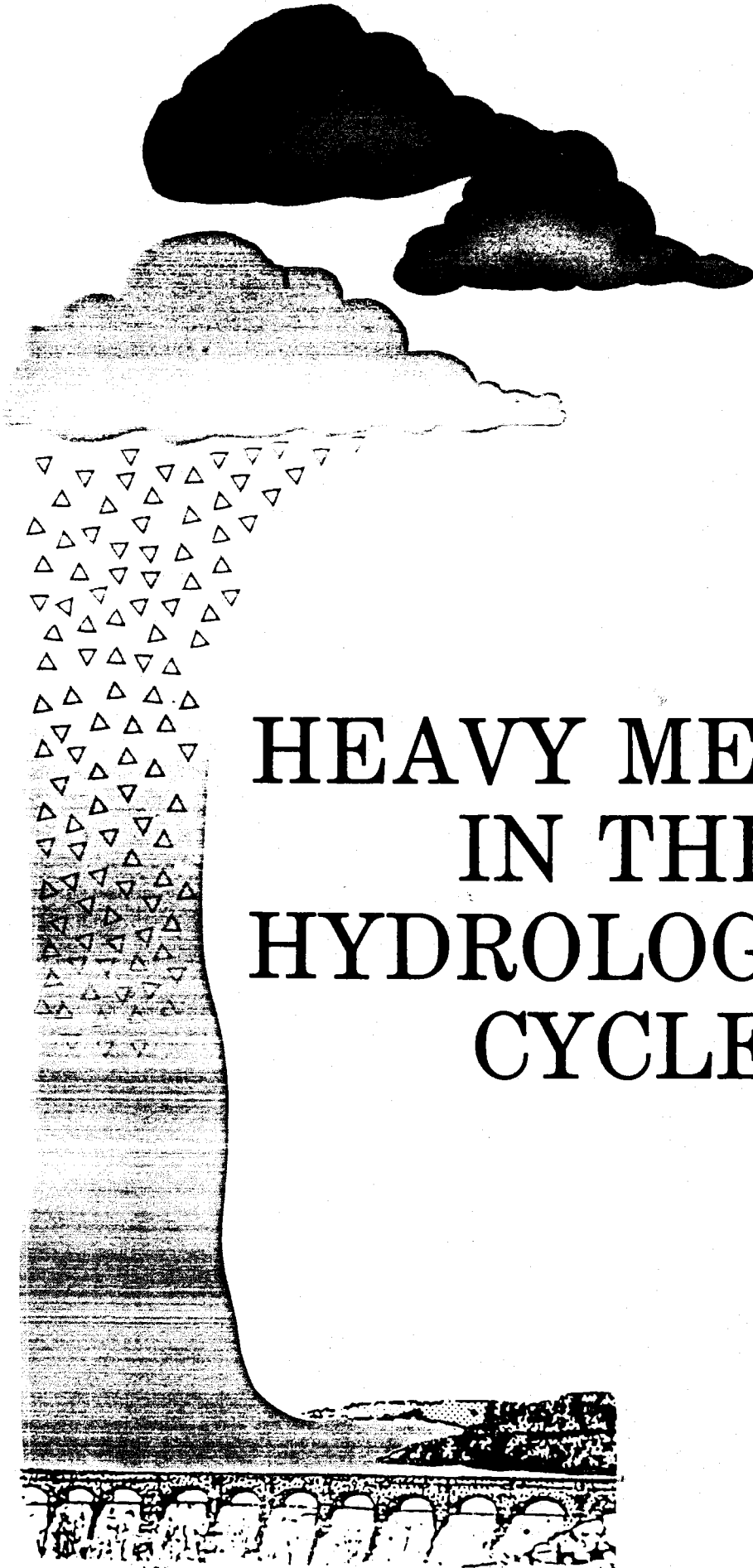


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# HEAVY METALS IN THE HYDROLOGICAL CYCLE

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## PREFACE

This book presents an integrated approach to the problems associated with heavy metals in the hydrological cycle. Research and practical experience from a broad spectrum of disciplines are drawn together concentrating on the following themes : water quality, domestic and industrial wastes, sludge and dredge materials, soil interactions, effects on aquatic ecosystems, organometallics ( with particular reference to tin compounds ), speciation, the marine environment and health effects.

The emphasis on environmental research with regard to heavy metals has changed considerably over the years. The discharge of heavy metals to sewers might be regarded as the origins of our concern with associated problems of blockage of sewers and inhibition of biological sewage treatment. Attention was focussed in the 1940's and 1950's on the fate and effects of heavy metals during sewage treatment. With improvements in analytical capability this initial observational work was later complemented by mechanistic studies. In the 1970's and 1980's research has been directed towards the receiving environment. Effluent discharge and sewage sludge disposal place a burden on the hydrological cycle which must be quantified, understood and regulated. The biological transformation of certain heavy metals was exemplified by the Minamata incident and the study of metallo-organics has attracted considerable research effort. Indeed the importance of the speciation of heavy metals in the aquatic environment has been recognised as determining the bioavailability, fate and effects of heavy metals in the water cycle. Heavy metal interactions in the soil and in groundwaters have been the subject of considerable attention in addition to an examination of accepted practice in water and waste treatment on the health of the population.

This book addresses the scientific, engineering and health aspects of heavy metals in the hydrological cycle. Each chapter has been compiled from a number of thematically consistent presentations made at the Chemicals in the Environment (Heavy metals in the Water Cycle) Conference held in Lisbon between 6 and 8 September 1988 under the auspices of a Technical Committee including: H.E. Allen (USA), A. Bourg (France), U. Forstner (F.R.G.), R.M. Harrison (UK), B.T. Hart (Australia), T. Lekkas (Greece), P.J. Matthews (UK), B.H. Olsen (USA), J.A. Oleszkiewicz (Canada), D. Perl (USA), R. Perry (UK), O. Ravera (Italy), F.P. Santana (Portugal), F.M. Saunders (USA), W. Salomons (Netherlands), T.D. Waite (Australia), and J.H. Weber (USA).

The editors gratefully acknowledge the work of this Committee

M.Astruc

J.N. Lester

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