

Contents

	Page No.		Page No.
Section 1			
MARINE POLLUTION IN THE WORLD TODAY			
Summary of discussion	2		
North Sea Pollution	<i>H. A. Cole</i>		
Pollution control	3		
Domestic sewage	4		
Pesticides, industrial waste, oil and radioactive waste	5		
Programme for the future	7		
	8		
A Pollution Survey of the Trondheim Fjord, as Influenced by Sewage and the Pulp Mill Industry			
<i>G. Berge, R. Ljøen and K. H. Palmork</i>	10		
Hydrography and particle distribution	10		
Production and pollutants	13		
Pollution in the Baltic	<i>B. I. Dybern</i>		
Hydrographical conditions	15		
Organic pollution	16		
Toxic substances	19		
Pollution control	21		
	22		
On Eutrophication and Pollution in the Baltic Sea			
<i>S. H. Fonselius</i>	23		
Fertilization effects of pollutants	23		
DDT, PCB, mercury and oil pollution	26		
Review on the State of Pollution in the Mediterranean Sea			
<i>GFCM/ICSEM Group of Experts on Marine Pollution</i>	28		
Domestic sewage and industrial waste	29		
Oil, pesticides and other pollutants	30		
La Pollution dans le Bassin Méditerranéen (Quelques Aspects en Méditerranée Nord-occidentale et en Haute Adriatique: leurs Enseignements)			
<i>G. Bellan et J.-M. Pérès</i>	32		
Région de Trieste	33		
Région de Marseille	34		
Etat Actuel de la Pollution Bactérienne au Large des Côtes Françaises <i>M. Aubert, J. Aubert, S. Daniel et N. Desirote</i>			
Côtes de l'océan Atlantique	36		
Côtes de la Méditerranée	37		
Application aux lois de la diffusion bactérienne en mer	38		
Estuarine and Coastal Pollution in the United States			
<i>T. A. Wastler and L. C. Wastler</i>	39		
The coastal zone of the United States	40		
Social and economic development	41		
Pollution in major regions	44		
Pollution control	45		
Future pollutional trends and effects	53		
	54		
The Gulf of St. Lawrence from a Pollution View-point			
<i>R. W. Trites</i>	59		
Hydrographical features	60		
Pollutants: pesticides, industrial wastes, mercury, petroleum and others	67		
Pollution Problems in the Strait of Georgia			
<i>T. R. Parsons</i>	72		
Agencies and methods in pollution research	72		
Sources and extent of pollution	73		
Marine Pollution in Japan	<i>T. Nitta</i>		
Effects on fish and shellfish	77		
Effects on the environment	79		
Marine Pollution and Research in the Philippines			
<i>R. M. Lesaca</i>	82		
Sources of pollution	82		
Research and control	82		
Marine Pollution Studies at Hong Kong and Singapore			
<i>H. R. Oakley and T. Cripps</i>	83		
Hong Kong study	83		
Singapore study	88		
Marine Pollution in Australia: a Review of the Present Situation Regarding Problems, Research Investigations and Management Techniques			
<i>A. J. Gilmour</i>	91		
Institutional framework	93		
Sources of pollution	93		
Reported sites of pollution	96		
Research and management investigations	97		
Panorama General de la Contaminación de las Aguas en México			
<i>J. L. Cifuentes Lemus, R. Rodríguez Castro y A. Zarur Menez</i>	100		
Fuentes de contaminación	102		
Efectos sobre recursos pesqueros	104		
Contaminantes Potenciales que Pueden Afectar a los Organismos del Ambiente Marino a lo Largo de la Costa del Perú			
<i>L. Chang Reyes</i>	106		
Fuentes de contaminación	107		
Reglamento para la presentación de las aguas marítimas	109		
Section 2			
BEHAVIOUR AND FATE OF POLLUTANTS IN THE MARINE ENVIRONMENT			
Summary of discussion	113		
Dilution and Dispersion of Pollutants by Physical Processes			
<i>H. Weidemann and H. Sendner</i>	115		
Influence of physical properties on pollutants	115		
Environmental physical properties	116		
Diffusion and dispersion of pollutants	117		

	Page No.		Page No.
The Influence of Tides, Waves and Other Factors on Diffusion Rates in Marine and Coastal Situations		Effects of Effluent Discharge on Concentration of Nutrients in the Saronikos Gulf	
<i>J. W. Talbot</i>		<i>R. C. Dugdale, J. C. Kelley and T. Becacos-Kontos</i>	166
Practical measurements on diffusion rates	122	Water analysis technique	166
Effect of turbulence, steady velocity shear and wave action	122	Distribution of nutrients and chlorophyll	167
	126		
Experimental Studies of Horizontal Diffusion in the Black Sea Coastal Zone	130	Trace Elements, Radionuclides and Pesticide Residues in the Hudson River	
<i>V. I. Zats</i>		<i>T. J. Kneip, G. P. Howells and M. E. Wrenn</i>	169
“Richardson” diffusion	131	Trace element concentration	171
Aerial photography of dye patches in the sea	133	Radionuclide distribution	171
		Pesticide residues in the food web	172
On the Predictability of Waste Concentrations			
<i>G. Abraham and G. C. van Dam</i>		Etude de la Pollution Marine par les Détergents Anioniques Provenant des Eaux d’Égouts de Marseille	
Continuous release model by superposition method	135	<i>A. Arnoux et F. Caruelle</i>	174
Schematizing complicating physical factors	136	Méthodologie	174
	137	Apport des égouts en détergents anioniques	175
		Dispersion et distribution	176
State of the Art for Simulation of Pollution Problems and Controls in Estuaries			
<i>D. J. Baumgartner and R. J. Callaway</i>		Etude d’un Site Marin dans la Perspective de Rejets d’Effluents Radioactifs	
Deterministic models	140	<i>J. Ancellin, M. Avargues et P. Bovard</i>	180
Mathematical solutions via computer	141	Bionomie et radioactivité littorale	181
Physical models	143	Expériences sur la concentration de radioéléments par certaines espèces marines	182
Model verification	144	Observations <i>in situ</i>	183
	145		
Investigation and Prediction of Dispersion of Pollutants in the Sea with Hydrodynamical numerical (HN) Models		Chemical and Physical Investigations on Marine Pollution by Wastes of a Titanium Dioxide Factory	
<i>P. M. Wolff, W. Hansen and J. Joseph</i>		<i>G. Weichert</i>	186
HN models and their verifications	146	Hydrochemical changes in the water	187
Dispersion equations	147	Waste penetration to the sea bed	187
	148	Accumulation of pollutants in water and sediment	187
Studies of Biodegradation of Organic Materials in the Deep Sea	150		
<i>H. W. Jannasch and K. Eimhjellen</i>			
Findings with research submersible “Alvin”	150		
Degradation experiments	151		
Waste Removal and Recycling by Sedimentary Processes	152	Section 3	
<i>M. G. Gross</i>			
Sources of particles in sea water	153	EFFECTS OF POLLUTANTS ON THE BIOLOGY AND LIFE CYCLE OF MARINE ORGANISMS	
Ion exchange reactions in particulate matter	154		
Information on behaviour of waste in the ocean	154		
Waste disposal in the New York metropolitan region	156		
		L’action des Polluants sur la vie Marine. Du Choix de Critères Expérimentaux	
		<i>M. Fontaine</i>	194
		Besoin de nouvelles méthodes sensibles	194
		Effets de polluants sur diverses fonctions biologiques	195
		Besoin de standardisation des méthodes	201
Water Sediment Exchange and Recycling of Pollutants through Biogeochemical Processes			
<i>E. Olausson</i>		The Use of Marine Invertebrates as Indicators of Varying Degrees of Marine Pollution	
Marine environments in terms of pH and Eh	158	<i>D. J. Reish</i>	203
Recycling of pollutants	158	Validity of pollution indicator organisms	205
	159	Effects of environmental variables	206
		Pollution monitoring by indicators	206
Dissolved Oxygen as an Indicator of Water Pollution in Egyptian brackish-water Lakes	161		
<i>M. A. H. Saad</i>		Utilisation de la Chaîne Trophodynamique dans l’Etude de la Toxicité des Rejets d’Eaux Chimiquement Polluées	
Oxygen distribution	161		
Pollution effects on fish	162	<i>M. Aubert, J. Aubert, B. Donnier et M. Barelli</i>	208
		Chaîne alimentaire-test	208
The Discharge of Nutrients from Estuaries and their Effect on Primary Productivity		Produits toxiques et toxicité des rejets	209
<i>A. James and P. C. Head</i>		Transmission de la toxicité	210
Extent of discharge from River Tyne estuary	163		
Effect on primary production	164		
Nutrient budget of the North Sea	164		

✓ Results of Acute Toxicity Tests with Marine Organisms, Using a Standard Method	Page No.	Page No.
J. E. Portmann Toxicity test method Results of tests with various toxicants	212 212 213	
Toxicity-testing with Particular Reference to oil-removing Materials and Heavy Metals		
J. E. Portmann Methods of testing Simulated field tests with oil dispersants and metals Tainting effects	217 218 220 221	248 248 249
Effect of Oil Pollution on Flora and Fauna of the Black Sea		
O. G. Mironov Effect of oil on plankton, benthos and fish Incubating and hatching experiments with <i>Rhombus maeoticus</i>	222 222 223	250 251
Toxicity of Crude Oil and Detergents to Two Species of Edible Molluscs Under Artificial Tidal Conditions		
D. de G. Griffith Experimental proceedings Tests with <i>Littorina littorea</i> Tests with <i>Mytilus edulis</i>	224 224 225 226	252 253 254
Pesticide-induced Stress Profiles		
R. Eisler Biological effects of insecticides Stress profiles on effects of pesticides on fish and clams	229 230 230	257 258 258
Etude Physiologique du Degré de Toxicité de différentes Substances Contenues dans l'eau de Mer		
E. Halsband Méthodologie et effets de produits toxiques sur: métabolisme basal, formule sanguine conductibilité du corps, potentiel du courant d'action du <i>nervus lateralis</i>	233 234 234	260 260 261
Influencia del Dimecrón en la Supervivencia de la Langosta <i>Panulirus argus</i> en Relación con la Circulación de Agua Sobre la Plataforma de Cuba		
G. Suárez, M. E. Ramiro y J. J. Tápanes Características hidrográficas de la plataforma cubana Influencia de la circulación marina sobre la distribución del contaminante	236 238 240	262 263 264
Chlorinated By-Products from Vinyl Chloride Production: a New Source of Marine Pollution		
S. Jensen, A. Jernelöv, R. Lange and K. H. Palmork Toxicity tests with C-C1 compounds Chemical analysis of C-C1 compounds Degradation and accumulation of C-C1 compounds	242 242 243 244	264 264 264 265
Action <i>in vitro</i> de Détergents sur Quelques Espèces Marines		
G. Bellan, J.-P. Foret, P. Foret-Montardo et R. A. Kaim-Malka Processus expérimental Etude de la mortalité totale	245 245 246	266 267 269
Toxicity and Degradation of Tensides in Sea Water		
H. G. W. Mann Tests with <i>Anguilla</i> , <i>Gammarus</i> and <i>Artemia</i> Degradation of tensides in sea water		273 273
Acute Effects of Heated Effluents on the Copepod <i>Acartia Tonsa</i> from a Sub-Tropical Bay and Some Problems of Assessment		
M. R. Reeve and E. Cosper Effect on a plankton population Experimental problems	250 251	274
Sublethal Effects of Pollutants on Fish		
V. V. Mitrović Heavy metals, detergents Phenols, pesticides	252 253	275
Sublethal Chronic Effects of DDT and Lindane on Glycolytic and Gluconeogenic Enzymes of the quahog <i>Mercenaria mercenaria</i>		
R. H. Engel, M. J. Neat and R. E. Hillman Exposure procedure Histological examinations and enzyme studies	257 258 258	276
Accumulation and Metabolism of DDT-^{14C} (dichloro-diphenyl-trichloro-ethane) in Marine Organisms		
W. Ernst Feeding experiments on polychaetes and flatfish Accumulation and concentration of DDT	260 260	277 277
The Association of DDT Residues with Losses in Marine Productivity		
P. A. Butler, R. Childress and A. J. Wilson DDT content in seatrout DDT residues in oysters DDT in water and sediment DDT content in juvenile menhaden	262 263 264 264	278 278 278 278
Monitoring Organochlorine Contamination of the Marine Environment by the Analysis of Residues in Seals		
A. V. Holden Gas-liquid chromatography analysis Geographical distribution of residues in marine animals Relation to food intake and physiological effects	266 267 269	279 279 279
Potential Hazards from Radioactive Pollution of the Estuary		
T. R. Rice, J. P. Baptist, F. A. Cross and T. W. Duke Experimental cycling of radionuclides Biological effects of radiation	272 273 275	280 280 280
Mercury as a Marine Pollutant		
S. Keckes and J. K. Miettinen Biochemistry of mercury Mercury as a pollutant Biological effects of mercury	276 277 280	282
Experiments on Microbiological Methylation of Mercury (2+) Ion by Mud and Sludge Under Aerobic and Anaerobic Conditions		
K. Rissanen, J. Erkama and J. K. Miettinen Methodology and analytical procedure Methylation of mercury	289 290 291	291

Page No.	Page No.
Mercury as a Hydroscopic Pollutant. I. Accumulation and Excretion of $^{203}\text{HgCl}_2$ in <i>Tapes decussatus</i> <i>L. M. Y. Liu, M. Heyraud and S. Keckes</i>	292
Hg uptake in <i>Tapes decussatus</i>	293
Accumulation and loss rate of mercury in the uptake period	294
Mercury as a Hydroscopic Pollutant. II. Biological Half-Time of Methyl Mercury in Four Mediterranean Species: a Fish, a Crab, and Two Molluscs <i>J. K. Miettinen, M. Heyraud and S. Keckes</i>	295
Uptake of methyl mercury by marine animals	296
Biological half-time of mercury	296
Preliminary Study on the Distribution and Effects of Two Chemical Forms of Methyl Mercury in Pike and Rainbow Trout <i>V. Miettinen, E. Blankenstein, K. Rissanen, M. Tillander, J. K. Miettinen and M. Valtonen</i>	298
Application of labelled mercury to fish	299
Toxicity of methyl mercury to pike	300
Toxicity of methyl mercury to rainbow trout	301
Excretion Rate of Methyl Mercury in the Seal (<i>Pusa hispida</i>) <i>M. Tillander, J. K. Miettinen and I. Koivisto</i>	303
Uptake of methyl mercury by a seal	304
Whole body measurement of ^{203}Hg activity	305
The Effects of Pollutants on the Reproduction of Marine Organisms <i>C. C. Davis</i>	305
Influence of thermal pollution and salinity changes	306
Insecticides, oil and detergents	307
Inorganic pollutants, radioactive wastes	309
Eutrophication effects	309
Effects of Low Concentrations of Free Chlorine on Eggs and Larvae of Plaice, <i>Pleuronectes platessa</i> L. <i>R. Alderson</i>	312
Experimental system for constant chlorine concentrations	312
LD ₅₀ tests with various chlorine concentrations	313
The Influence of Crude Oils on Fish Fry <i>W. W. Kühnhold</i>	315
Exposure of fish eggs and larvae to various crude oils	316
Toxicity of crude oils and dispersants	317
Toxicity of Oil-Spill Dispersants to Embryos and Larvae of Some Marine Fish <i>K. W. Wilson</i>	318
Measurement of acute toxicity	319
Delayed effects of acute exposure to dispersants	320
Behavioural changes at sublethal concentrations	321
Physiological Changes Experienced by Pacific Salmon Migrating Through a Polluted Urban Estuary <i>L. S. Smith, R. D. Cardwell, A. J. Mearns, T. W. Newcomb and K. W. Watters</i>	322
Experiments at various levels of dissolved oxygen	322
Physiological observations	323
A Preliminary Study of Salmon Movements in a Polluted Estuary <i>P. F. Elson, L. N. Lauzier and V. Zitko</i>	325
Estuarial mixing and distribution of organic matter	327
Determining salmon movements	328
Patterns of salmon movements	329
Marine Algae and their Relation to Pollution Problems <i>W. J. North, G. C. Stephens and B. B. North</i>	330
Metallic and other stimulating and inhibiting substances	332
Organic compounds, pesticides, detergents, radioactive compounds	333
Sewage, petroleum spillage and heated effluents	335
Stimulating effects and nutritional potential of organics	336
Nutrient and Pollutant Concentrations as Determinants in Algal Growth Rates <i>P. J. Hannan and C. Patouillet</i>	340
Experiments with <i>Chlorella</i> and <i>Phaeodactylum</i>	340
Toxicant-time interaction	341
Short-term changes in fluorescence	342
Possible Dangers of Marine Pollution as a Result of Mining Operations for Metal Ores <i>J. E. Portmann</i>	343
Antimony, arsenic, beryllium and bismuth	343
Cadmium, chromium, cobalt, copper, lead, mercury and nickel	344
Selenium, tin, uranium, zinc, phosphorites and manganese nodules	345
 Section 4	
ECOSYSTEM MODIFICATIONS AND EFFECTS ON MARINE COMMUNITIES	
Summary of discussion	348
Méthode d'Approche pour l'Evaluation des Niveaux de Pollution Chimique des Milieux Marins et des Chaînes Alimentaires Marines	
R. Bittel et G. Lacourly	349
Modèle mathématique: pollutions radioactive et chimiques	350
Evaluation des niveaux limites de pollution	352
Effects of Radiation in the Marine Ecosystem	
W. L. Templeton, R. E. Nakatani and E. E. Held	353
Pacific and Oak Ridge tests	354
Effect on resources	354
Biological Effects of Oil Pollution in the Santa Barbara Channel	
D. Straughan	355
Plankton, benthos and intertidal investigations	357
Fisheries analysis, bird and mammal surveys	357

<i>Page No.</i>	110.
The Biological Effects of Oil Pollution and Oil-Cleaning Materials on Littoral Communities, Including Salt Marshes	
<i>E. B. Cowell, J. M. Baker and G. B. Crapp</i>	
Effects on salt marshes	359
Effects on rocky shores	360
	362
Coral Reefs and Pollution	<i>R. E. Johannes</i>
Sedimentation	364
Sewage	365
Thermal pollution and desalination effluents	367
Oil and radioactive pollution	368
Acanthaster, ciguatera and other causes of reef damage	370
	371
Aperçu sur l'Influence des Pollutions sur les Peuplements Benthiques	<i>J.-M. Pérès et G. Bellan</i>
Pollution industrielle et domestique	375
Pollution thermique	376
Pollution par rejets solides	380
Pollution pétrolière	381
	382
Monitoring of Creeping Over-Fertilization in the Baltic	<i>I. Haahtela</i>
Biocenoses studies	386
Phytoplankton and primary production	387
	389
On the Influence of Industrial Waste Containing H_2SO_4 and $FeSO_4$ on the Bottom Fauna Off Helgoland (German Bight)	<i>E. Rachor</i>
Waste disposal and sampling	390
Studies on bottom macrofauna	390
	391
	392
	393
	394
Long-Term Laboratory Experiments on the Influence of Ferric Hydroxide Flakes on the Filter-Feeding Behaviour, Growth, Iron Content and Mortality in <i>Mytilus edulis</i> L	<i>J. E. Winter</i>
Filter-feeding behaviour	392
Growth and iron content of soft parts	393
Mortality	394
Influence de la Pollution sur les Peuplements Marins de la Région de Marseille	<i>G. Bellan et D. Bellan-Santini</i>
Modifications dans la composition des peuplements	396
Modifications dans la composition quantitative	397
	399
Problems and Approaches to Baseline Studies in Coastal Communities	<i>J. R. Lewis</i>
Natural changes in littoral populations	401
A baseline programme for coastal areas	402
	402
The Effects of Solid Waste Disposal on Benthic Communities in the New York Bight	<i>J. B. Pearce</i>
Sewage sludge disposal area	404
Dredge spoil disposal area	405
Benthic crustaceans	409
	410
Waterfront Housing Developments: Their Effect on the Ecology of a Texas Estuarine Area	
<i>W. L. Trent, E. J. Pullen and D. Moore</i>	411
Substrate and hydrology	412
Phytoplankton	413
Benthos, oysters, crustaceans and fishes	415
A Trawl Study in an Area of Heavy Waste Discharge: Santa Monica Bay, California	
<i>J. G. Carlisle Jr</i>	417
Bottom fish populations and pollution	417
Effect of pollutants on algal growth	420
The Place of Ecological Monitoring in the Study of Pollution of the Marine Environment	
<i>D. J. Bellamy, D. M. John, D. J. Jones, A. Starkie and A. Whittick</i>	421
Ecosystem attributes	421
The fauna of kelp holdfasts	422
Chemical analysis for toxicoids	423
Thermal Pollution of a Tropical Marine Estuary	
<i>R. G. Bader, M. A. Roessler and A. Thorhaug</i>	425
Circulation patterns, chemical variables	425
Lethal temperature limits	426
Tissue Levels in Animals and Effects Caused by Chlorinated Hydrocarbon Insecticides, Chlorinated Biphenyls and Mercury in the Marine Environment Along the Netherlands Coast	
<i>J. H. Koeman and H. van Genderen</i>	428
The sandwich tern	429
The eider	432
Distribution of persistent compounds along the coast	434
Subtle Effects of Pollution on Inshore Tropical Plankton	<i>R. I. Clutter</i>
Kaneohe Bay plankton distribution	435
Taxonomic composition and trophic structure	436
Changes in phyto- and zooplankton	437
	438
Plankton in the North Atlantic—an Example of the Problems of Analysing Variability in the Environment	
<i>R. S. Glover, G. A. Robinson and J. M. Colebrook</i>	439
Continuous Plankton Recorder Survey	440
Annual fluctuations in the plankton	441
Variability in solar radiation	443
Antagonism of the Native Microflora to Microbial Pollutants in the Sea	<i>R. Mitchell</i>
Destruction of coliform bacteria	445
Inactivation of viruses, fungi and algae	446
	447
Section 5	
TECHNICAL ASPECTS OF MINIMISING POLLUTION AND COUNTERING ITS EFFECTS	
Summary of discussion	451

	Page No.	Page No.
Chemical and Biological Aspects of Waste Treatment		
<i>W. W. Eckenfelder Jr</i>		
Characteristics of treatment processes	453	
Biological treatment	453	
Tertiary treatment	454	
Waste Water Treatment in Chemical Industries in the Federal Republic of Germany		
<i>K. J. Bock</i>		
Examples of treatment methods	457	
Effects of Proposed Second Entrance on the Flushing Characteristics of San Diego Bay, California		
<i>H. B. Simmons and F. A. Herrmann Jr</i>		
Verification of hydraulic model	460	
Dye dispersion verification	461	
Technical Aspects of Waste Disposal in the Sea Through Submarine Outlets		
<i>H. B. Fischer and N. H. Brooks</i>		
Diffusers and initial dilution	464	
Prediction of coastal waste concentrations	465	
Warm water discharges	468	
Full-Scale Experiments on Disposal of Waste Fluids into Propeller Stream of Ship		
<i>G. Abraham, W. D. Eysink, G. C. van Dam, J. S. Sydow and K. Müller</i>		
Kinetic energy and potential energy	471	
Full-scale experiments	472	
The Disposal of Containers with Industrial Waste into the North Sea: a Fisheries Problem		
<i>G. Berge, R. Ljøen and K. H. Palmork</i>		
Nature of the waste and its possible effects	474	
Oil Contamination and the Living Resources of the Sea		
<i>M. Blumer</i>		
Characteristics and effects of petroleum	476	
Counter measures	477	
Control of oil pollution	479	
Mycological Degradation of Petroleum Products in Marine Environments		
<i>S. P. Meyers and D. G. Ahearn</i>		
Yeasts in different natural petroleum-bearing environments	481	
Experimental data	482	
Experiments on Combating Accidental Release of Oil		
<i>H. Hellmann and H.-J. Marcinowski</i>		
Emulsifiers and dispersants	485	
Burning off	485	
Eliminación de Petróleo en el mar Mediante Solidificación		
<i>E. Castellanos</i>		
Nuevo procedimiento y pruebas prácticas	487	
Global Monitoring of Atmospheric Pollution and its Possible Relation to a Global Monitoring Scheme		
<i>E. Ericksson</i>		
Baseline and regional air pollution stations	489	
Atmospheric and marine pollution networks	490	
*Automation of Monitoring Equipment for Marine Pollution Studies		
<i>R. D. Gafford</i>		
Classification of pollutants	491	
Methods of analysis: atomic absorption spectro-photometry, absorption photometry	492	
Sampling, sample and data processing	497	
Multi-Spectral Remote Sensing for Monitoring of Marine Pollution		
<i>V. E. Noble</i>		
Detection and mapping of oil slicks	500	
Water colour measurements for pollution monitoring	501	
The Constructive Use of Sewage, with Particular Reference to Fish Culture		
<i>G. H. Allen</i>		
Fish production from sewage fertilized water	506	
Research and development possibilities	507	
Thermal Pollution: Use of Deep, Cold, Nutrient-rich Sea Water for Power Plant Cooling and Subsequent Aquaculture in Hawaii		
<i>K. Gunderson and P. Bienfang</i>		
Tests on mixed plankton populations	513	
Carbon fixation compared in deep and surface water	514	
Possibilities for Constructive Use of Domestic Sewage (with an Example of the Lake of Tunis)		
<i>J. Stirn</i>		
Phytoplankton communities and nutrients	517	
Cultivation experiments	518	
Utilization of sewage in mariculture	518	
The Use of Nutrients in the Enrichment of Sockeye Salmon Nursery Lakes (a Preliminary Report)		
<i>T. R. Parsons, C. D. McAllister, R. J. LeBrasseur and W. E. Barraclough</i>		
Great Central Lake—nutrient enrichment	519	
Addition of nutrients	520	
Growth of young sockeye salmon	522	
Use of Potential Lagoon Pollutants to Produce Protein in the South Pacific		
<i>G. L. Chan</i>		
Undesirable effects of excreta on water	525	
Apparatus for use of sewage effluents	526	
Algae and fish ponds	527	
Engineering-Economic Approaches to the Management of Marine Water Quality		
<i>J. A. Crutchfield</i>		
Problem of non-responsibility	527	
Problems of water quality control	528	
Who is to pay the costs ?	528	
Section 6		
EFFECTS OF POLLUTANTS ON QUALITY OF MARINE PRODUCTS AND EFFECTS ON FISHING		
<i>E. Ericksson</i>		
Summary of discussion	533	

	Page No.		Page No.		
Effects of Pollutants on Quality of Marine Products and Effects on Fishing	<i>D. R. Idler</i>	535	Salmonellæ and Bacterial Indicator Organisms in Polluted Coastal Water and their Hygienic Significance	<i>Y. Yoshpe-Purer and H. I. Shuval</i>	574
Marine biotoxins	536		Sampling procedure and methods	575	
Industrial intoxicants	536		Results of field studies in Tel Aviv area	576	
Coastal pollution and the fishing industry	537		Die-away rates in laboratory studies	577	
 Canadian Experience on Sewage Pollution of Coastal Waters: Effect on Fish Plant Water Supplies					
<i>C. M. Blackwood</i>	542				
Water quality requirements and standards	542				
Sanitary engineering, biological assessment	544				
Pollution in shellfish-growing areas	545				
 A Kerosene-like taint in Mullet (<i>Mugil Cephalus</i>)					
<i>G. S. Sidhu, G. L. Vale, J. Shipton and K. E. Murray</i>	546				
Sample analysis and radiotracer studies	547				
Chemical nature of volatile oil	549				
 DDT Residue Levels in Some U.S. Fishery Products and Some Treatments in Reducing Them					
<i>V. F. Stout, F. L. Beezhold and C. R. Houle</i>	550				
Attempts to lower residue levels	551				
Fish protein concentrate	551				
Industrial fishery products	552				
 Effects of Pollution: Loss of an \$18 Million/Year Shellfishery					
<i>R. T. Dewling, K. H. Walker and F. T. Brezenski</i>	553				
FWQA programme	554				
Shellfish resources and studies	555				
Microbiological investigations	557				
 The Principles and Methods Employed for the Sanitary Control of Molluscan Shellfish <i>P. C. Wood</i>					
Selection of indicator organisms and examination of shellfish	560				
Examination of seawater from shellfish growing areas	561				
Standards on pathogenic viruses and significance of non-faecal bacteria	562				
	563				
 Sanitary Control of Shellfish and Marine Pollution					
<i>D. A. Hunt</i>	565				
Responsibility for control in the U.S.A.	566				
"Conditionally approved" shellfish growing areas	567				
 Polynuclear Aromatic Hydrocarbon Pollution of the Marine Environment					
<i>M. J. Suess</i>	568				
PAH in the marine environment	568				
Carcinogenic effects	568				
Laboratory investigations	569				
 The Occurrence of Human Viruses and Coliphage in Marine Waters and Shellfish					
<i>T. G. Metcalf, J. M. Vaughn and W. C. Stiles</i>	570				
Coliphage and enteric virus isolation	571				
Studies in estuary area	572				
Survival analysis	573				
 Phénomènes Lytiques dans l'Auto-épuration des Eaux de Mer					
<i>A. Paoletti</i>	581				
<i>Bdellovibrio bacteriovorus</i> et souches bactériolytiques	582				
 Toxicity of Marine Organisms Caused by Pollutants					
<i>B. W. Halstead</i>	584				
Naturally occurring marine biotoxins	585				
Heavy metals and other inorganics	586				
Petroleum, petrochemicals and other organics	589				
Pesticides	590				
 Ciguatera—Marine Fish Poisoning—a Possible Consequence of Thermal Pollution in Tropical Seas?					
<i>D. P. de Sylva and A. E. Hine</i>	594				
Symptoms and occurrence	595				
Role of algae and factors influencing their populations	595				
Role of thermal pollution	596				
 Ciguatera et Intervention Humaine sur les Écosystèmes Coralliens en Polynésie Française					
<i>R. A. Bagnis</i>	597				
Analyse de cas observés en Polynésie Française	598				
 Section 7					
 SCIENTIFIC BASIS FOR INTERNATIONAL LEGISLATIVE CONTROL OF MARINE POLLUTION IN THE INTERESTS OF MARINE RESOURCES AND FISHERIES					
Summary of discussion	602				
 The Control of Marine Pollution and the Protection of Living Resources of the Sea—a Comparative Study of International Controls and National Legislation and Administration					
<i>G. Moore</i>	603				
International measures	603				
National measures	607				
Pollution control legislation	609				
Product controls	611				
 Present Needs for Scientific Advice on Legislation on Pollution					
<i>J. Lopuski</i>	614				
Problems of control and prevention	615				
Collaboration between law makers and scientists	615				
 Legal Aspects of Sea Water Pollution Control					
<i>K. W. Cuperus</i>	616				
River and surface-water pollution	616				
Marine pollution from continental and non-continental activities	616				

	<i>Page No.</i>		<i>Page No.</i>		
Les Bases Scientifiques Nécessaires et Préalables à l'Adoption des Mesures Législatives Contre la Pollution des Eaux de Mer	<i>E. Du Pontavice</i>	618	Information Requirements for Rational Decision-making in Control of Coastal and Estuarine Oil Pollution	<i>J. B. Glude</i>	622
Données économiques	619		Type of information required	623	
Données d'ordre technique	620		Resource atlas series	624	

Errata

P 189. Authorship of the paper listed as commencing on p 238 should read: *G. Suárez, M. E. Ramiro y J. J. Tapanes.*

P 189. The title of the paper listed to commence on p 289 should read in the final line "aerobic and anaerobic conditions".