CONTENTS

The Treatise on Musical Objects *and the GRM, by Daniel Teruggi* xv
Translators' Introduction, by Christine North xxi
Pierre Schaeffer's Treatise on Musical Objects *and Music Theory, by John Dack* xxix
Acknowledgments xxxv
Preface xxxvii

Introductory Remarks: The Historical Situation of Music 1

Need for a Reappraisal, 1 · *Three New Phenomena,* 2 · *The Three Dead Ends of Musicology,* 4 · *A Priori Music,* 5 · *Musique Concrète,* 7 · *Experimental Music,* 8 · *No-Man's-Land,* 10 · *Divergence of Disciplines,* 11 · *Music as Interdiscipline,* 12 · *Resources for Musical Experimentation,* 14 · *The Aims of Musical Experimentation: Objects, Structures, Languages,* 15 · *Musical Research,* 17

BOOK ONE. MAKING MUSIC

1. The Instrumental Prerequisite 23

1. Homo Faber *or* Homo Sapiens, 23 · *2. Neanderthal Music,* 24 · *3. The Instrumental Paradox: The Birth of Music,* 24 · *4. From the Instrument to the Work,* 25 · *5. From the Instrument to the Musical Domain: Musical Civilizations,* 26 · *6. Concrete and Abstract in Music,* 27 · *7. Registers and Musical Domains,* 28 · *8. Limitations of "Musical Catechisms,"* 30

2. Playing an Instrument 31

1. Definition of an Instrument, 31 · *2. Composition of Instruments,* 32 · *3. Simple or Multiple Instruments,* 33 · *4. Instrumental Analysis,* 34 · *5. Triple Nature of the Instrument,* 35 · *6. The Electronic Instrument,* 36 · *7. Musique Concrète,* 38 · *8. Confusion over Instruments,* 39 · *9. Critique of the Electronic Instrument,* 40 · *10. Critique of "Musique Concrète,"* 42 · *11. Faults Common to Both Musics,* 43 · *12. Concept of the Pseudo-instrument,* 45

3. Capturing Sounds 46

1. The Paradox of Discovery, 46 · *2. Mystery of the Cylinder and Powers of the Ear,* 47 · *3. The Historical Contribution of Radio Broadcasting,* 48 · *4. The Myth of Sound Reproduction,* 49 · *5. From One Sound Field to Another,* 50 · *6. The Physical Object in the Transformation,* 50 · *7. Transformations in the Sound Field,* 52 · *8. Properties of Recorded Sound,* 54 · *9. Fidelity,* 55 · *10. Timbre of the Equipment,* 57 · *11. The Sound Recordist as Interpreter,* 57 · *12. Musicians Have No Ear,* 58 · *13. Prose Composition and Translation,* 59 · *14. "Radiogenicity,"* 60 · *15. Advice from an Elder,* 61 · *16. Nothing New under the Sun,* 62

4. Acousmatics 64

1. Relevance of an Ancient Experiment, 64 · *2. Acoustic and Acousmatic,* 65 · *3. The Acousmatic Field,* 65 · *4. On the Sound Object: What It Is Not,* 67 · *5. Originality of the Acousmatic Approach,* 69

BOOK TWO. HEARING

5. "What Can Be Heard" 73

1. To Hear (Entendre) *According to* Littré, 73 · *2. To Perceive Aurally* (Ouïr), 74 · *3. To Listen* (Écouter), 75 · *4. To Hear* (Entendre), 76 · *5. To Understand* (Comprendre), 78

6. The Four Listening Modes 80

1. The Functional Aspect of the Ear, 80 · *2.* Littré *(Cont.): The Communication Circuit,* 81 · *3. The Individual and Objects: Perceptual Intentions,* 82 · *4. Stages and Outcomes of Listening: Diversity and Complementarity,* 84 · *5. Two Pairs: Subjective-Objective and Concrete-Abstract,* 85 · *6. Two Pairs of Listening Modes: Natural and Cultural, Ordinary and Specialized,* 86 · *7. Exclusives of Specialized Listening,* 88 · *8. Comparison between Specialized Modes of Listening,* 91

7. Scientific Prejudice 94

1. The Prestige of Logic, 94 · *2. Practice: Musical Communication,* 95 · *3. An Option for Music: A Language in Itself,* 96 · *4. Another Option: Synthetic Music,* 97 · *5. From Physics to Music,* 98 · *6. The System,* 99 · *7. Ambitions and Inadequacies of Physics,* 100 · *8. Possible Musical Experimentation,* 101

8. The Hearing Intention 103

1. Pleonasm, 103 · *2. The Two Pathways,* 104 · *3. The Hearing Intention from a Scientific Point of View,* 105 · *4. The Stumbling Block,* 107 · *5. Correlations,* 108 · *6. The Hearing Intention from a Philosophical Point of View,* 109 · *7. On Some Musical Hearing Intentions,* 110 · *8. Musical Listening Modes,* 111 · *9. Final Summary of Intentions,* 113

BOOK THREE. CORRELATIONS BETWEEN THE PHYSICAL SIGNAL AND THE MUSICAL OBJECT

9. Ambiguities in Musical Acoustics 119

1. An Ambiguous Concept, 119 · *2. Sight and Hearing,* 119 · *3. The "Theory of Theories,"* 121 · *4. Traditional Doctrine: Acoustic Basis of Music,* 123 · *5. The Acoustics of Music,* 124 · *6. Psychoacoustics and Experimental Music,* 126 · *7. Investigate or Use the "Black Box,"* 127

10. Correlation between Spectra and Pitches 130

1. The Traditional Doctrine, 130 · *2. Helmholtz's Resonators,* 131 · *3. Fourier's Series,* 133 · *4. The Perception of Pitches,* 135 · *5. Experiments on Residuals,* 136 · *6. Experiment on Unisons,* 138 · *7. Musical and Psychoacoustic Calibrations,* 139 · *8. Pitch Differentiation Thresholds: Importance of Context,* 140 · *9. Conclusions: The Various Pitch Structures,* 142 · *10. Sound Mass and Filtering,* 144 · *Appendix: Experiment on Unisons,* 146

11. Thresholds and Transients 150

1. Transient Phenomena, 150 · *2. Physicists' Musical Postulates,* 151 · *3. Critique of the Approach to Music through Transients,* 152 · *4. The Ear as a Device,* 154 · *5. Temporal Thresholds,* 155 · *6. Mechanical Time Constant of the Ear,* 156 · *7. Time Constant of the Ear's Physiological Power of Integration,* 157 · *8. Pitch, Articulation, and Timbre Recognition Thresholds,* 158 · *9. Comparison between Time Thresholds and Duration of Transients,* 160 · *10. Spatialization,* 161 · *11. Mechanism and Function,* 162

12. Temporal Anamorphoses I: Timbres and Dynamics 163

1. Time Localization, 163 · *2. Beginnings of Sounds,* 164 · *3. The Spliced Piano,* 169 · *4. Scissor Attack,* 171 · *5. Cutting Sounds Other Than Percussive,* 173 · *6. General Interpretation of These Findings,* 174 · *7. Laws of Perception of Attack,* 175 · *8. Effect of Dynamic on the Perception of Timbres,* 179

13. Temporal Anamorphoses II: Timbre and Instrument 180

1. Timbre of an Instrument and of an Object, 180 · *2. Timbre of Piano Notes,* 181 · *3. Concept of a Musical Instrument: Law of the Piano,* 182 · *4. Experiments on the Timbre of the Piano: Transmutations and Filtering,* 183 · *5. Timbres and Causalities,* 185 · *6. Causalities and Harmonic Structures: Functional Anamorphoses,* 187 · *7. Causality and Music,* 189

14. Time and Duration 190

1. A Long Digression, 190 · *2. Rhythms and Durations,* 191 · *3. Experiment on the "Seven Dissymmetrical Sounds,"* 192 · *4. Duration and "Information,"* 194 · *5. Sound Played Backward,* 195 · *6. Temporal Symmetry and Dissymmetry: Aspects of Temporal Anamorphosis,* 196 · *7. Hearing Time,* 197 · *8. Musical Durations,* 199 · *9. Duration and Information,* 200

BOOK FOUR. OBJECTS AND STRUCTURES

15. Reduction to the Object 205

1. From Experiment to Explanation, 205 · *2. Transcendence of the Object,* 206 · *3. The Naive Theory of the World:* Époché, 208 · *4. The Sound Object,* 210 · *5. Reduced Listening,* 212 · *6. Gestalttheorie,* 214 · *7. Gestalt, Form, Structure,* 216 · *8. The Object-Structure Pair,* 217

16. Perceptual Structures 220

1. The Two Infinities, 220 · *2. Ambition for the Elementary,* 221 · *3. Significance of Values,* 222 · *4. Code and Language,* 223 · *5. Linguistic Structures, Musical Structures,* 224 · *6. The Levels of Language: Signification and Differentiation,* 224 · *7. Phonemes: Or Distinctive Features,* 225 · *8. From the Phoneme to the Musical Note,* 227 · *9. Sound Object and Phonetics,* 228 · *10. Direction of Research,* 230

17. Comparative Structures: Music and Language 232

1. The Higher Level, 232 · *2. Language,* 233 · *3. The Rules of Language,* 234 · *4. Application of the Rules of Language to Music,* 236 · *5. Permanence and Variation in Musical Structures,* 237 · *6. Values and Characteristics,* 239 · *7. Divergences,* 240 · *8. Language Systems and Speech,* 241 · *9. The Two Exclusives in Language Systems,* 242 · *10. A Possible Musical Language System: Pure Music, Musical Writing,* 246 · *11. Instrumental Music,* 247

18. The Conventional Musical System: Musicality and Sonority 249

1. A Delightful Assortment, 249 · *2. A Dangerous Intersection,* 250 · *3. Musicality and (Traditional) Sonority,* 252 · *4. Instrumental Overview,* 255 · *5. What Is Your Favorite Instrument, and Why?* 256 · *6. Identification and Description,* 258 · *7.* Diabolus in Musica, 260

19. Natural Sound Structures: Musicianly Listening 263

1. The Universal Symphony, 263 · *2. The Repertoire of Causalities,* 265 · *3. The Language of Things,* 266 · *4. The Child with the Grass,* 268 · *5. The Musical in Embryo,* 269 · *6. The Child with the Violin,* 270 · *7. Overview of "Sonority,"* 272 · *8. Relationship between Musicianly and Natural Listening,* 273 · *9. Toward a Musicianly Classification of Sound Objects,* 274 · *10. From Sound to the Musical,* 274

20. The Reduced Listening System: Musical Dualism 276

1. Dilemma or Dualism, 276 · *2. Argument for a General Musicology,* 277 · *3. Argument for Sound as Given,* 278 · *4. Musical Activity,* 279 · *5. Two Pitfalls,* 280 · *6. Musicianly Invention,* 282 · *7. Musical Invention,* 283

21. Musical Research 285

1. Fundamental Research, 285 · *2. Interwovenness of Levels of Complexity and Sectors of Activity,* 286 · *3. Preparatory Exercises,* 287 · *4. How the Experimental System Works,* 288 · *5. Contents of the Traditional System,* 290 · *6. Origins of the Experimental System,* 293 · *7. Invariants in the Experimental System,* 295 · *8. Suitable Objects,* 296 · *9. Perceptual Field,* 297 · *10. Object and Structures,* 297 · *11. Meaning and Signification,* 298 · *12. Constituent Activities: The Four Axioms of Music,* 299 · *13. Synthesis of Musical Structures or the Invention of Musics,* 301 · *14. Properties of the Perceptual Musical Field,* 303 · *15. Contents of the Experimental System,* 304

BOOK FIVE. MORPHOLOGY AND TYPOLOGY OF SOUND OBJECTS

22. Morphology of Sound Objects 309

1. Theory and Practice, 309 · *2. Prose Composition and Translation in Sound,* 310 · *3. Prose Composition,* 311 · *4. Translation,* 312 · *5. Example of a Classification,* 313 · *6. Morphology and Typology,* 315 · *7. The Form-Matter Pair,* 317 · *8. Objects with Fixed Form: Criterion of Matter,* 318 · *9. Objects with Fixed Matter: Criterion of Form,* 318 · *10. Evolving Sounds: The Norm,* 319

23. The Laboratory 321

1. Electroacoustic Prerequisites, 321 · *2. The Electroacoustic System,* 322 · *3. Repercussions of the System on Fundamental Research,* 326 · *4. Description and Use of Sound Bodies,* 327 · *5. Factures: Invention of Sound Objects and Sound Recording,* 328 · *6. Preparing the Object,* 330 · *7. The Transpositions of the Object,* 332 · *8. Transmutations of the Object,* 333 · *9. Electronic Generators,* 334 · *10. The Bare Essentials,* 336 · *Appendix A: The Time Regulator,* 337 · *Appendix B: The Form Modulator,* 338

24. Typology of Musical Objects (I): Classification Criteria 340

1. The Parable of the Attic, 340 · *2. The Search for Typological Criteria,* 341 · *3. Duration and Variation,* 343 · *4. Objects in Sheaves,* 343 · *5. Balance and Originality,* 344 · *6. Summary of Typological Criteria,* 345 · *7. A Study of the Diagram Column by Column,* 347 · *8. A Study of the Diagram Row by Row,* 348 · *9. Foundational Schema of the Typology of Sound Objects,* 350

25. Typology of Musical Objects (II): Balanced and Redundant Objects 352

1. Balanced Objects, 352 · *2. Analysis Based on the Criterion of Facture,* 352 · *3. Analysis Based on the Criterion of Mass,* 355 · *4. Redundant or Not Very Original Objects,* 356 · *5. Pure Sounds,* 358 · *6. Summary Diagram of Redundant or Not Very Original Sounds,* 358

26. Typology of Musical Objects (III): Eccentric Sounds 360

1. Eccentric Sounds, 360 · *2. Samples,* 361 · *3. Accumulations,* 361 · *4. Cells, Ostinati, and Fragments,* 362 · *5. Large Notes and Wefts,* 363 · *6. Unisons,* 365 · *7. Summary Diagram of Typology,* 365

27. Working at Our Instrument 367

1. Sound Reels, 367 · *2. Makeup of a Translation Reel,* 367 · *3. Study of Internal Morphology,* 369 · *4. External Morphology,* 370 · *5. Relativity of Analyses,* 371 · *6. Typological Formulae,* 372 · *7. Prose Composition: The Study of Sustained Sounds,* 373 · *8. General Plan for a Reel of Sustained Sounds,* 374 · *9. Comments on the Experimental Technique,* 375

BOOK SIX. THEORY OF MUSICAL OBJECTS

28. Musical Experience 379

1. Moving toward the Musical, 379 · *2. The Sociological Factor in Musical Experience,* 380 · *3. Deconditioning Exercises,* 382 · *4. Reconditioning Exercises,* 383 · *5. Talking about Sounds, or the "Metalanguage,"* 384 · *6. Two Sorts of Musical Experiences,* 385 · *7. Inventing Objects,* 386 · *8. Experimental Reels,* 388 · *9. Studies on Objects,* 389

29. Generalizing Music Theory 391

1. Traditional Music Theory, 391 · *2. The Two Scores,* 392 · *3. Signs and Musical Thought,* 393 · *4. Objective of a Music Theory,* 394 · *5. Sound Architecture,* 394 · *6. The Four Musicianship Procedures,* 396 · *7. Typological Recapitulation (Sector 2),* 398 · *8. Morphological Criteria (Sector 3),* 398 · *9. Music Theory of Extreme Examples: Deponent Sound Objects,* 399 · *10. Musical Analysis of the Criteria (Sector 4),* 400 · *11. The Three Dimensions of the Musical Perceptual Field,* 401 · *12. Final Diagram for the Theory: Types, Classes, Genres, Species of Sounds,* 402 · *13. Analogical Criteria,* 403

30. Theory of Homogeneous Sounds: Criterion of Mass 406

1. Experimental Material, 406 · *2. Analogical Criteria from Traditional Musical Experience,* 407 · *3. Scientific Criteria: Additional Properties of Pure Sounds,* 408 · *4. Method of Approach,* 411 · *5. Harmonic Timbre and Mass,* 411 · *6. Classes of Mass in Homogeneous Sounds,* 412 · *7. Characteristic of Mass: Texture of a Sound,* 414 · *8. Species of Mass,* 415 · *9. The Two Pitch Fields,* 416 · *10. Pitch Calibrations,* 416 · *11. Temperament,* 417 · *12. Criterion of Harmonic Timbre: Classes and Characteristics,* 418 · *13. Species of Timbre,* 419 · *14. Importance of the Criterion of Mass,* 421

31. Theory of Fixed Masses: Dynamic Criterion 422

1. Concept of the Note, 422 · *2. Method of Approach,* 423 · *3. Criterion of Attack: Genres of Forms,* 424 · *4. Criterion of Profile: Classes of Forms,* 427 · *5. Manipulations on Forms,* 431 · *6. The Dynamic Field,* 432 · *7. Dynamic Sound Species,* 434

32. Theory of Sustainment 436

1. Concrete Criteria, 436 · *2. Sustainment Criteria,* 437 · *3. The Signature of Facture,* 438 · *4. Types of Grain,* 439 · *5. Genres of Grain,* 440 · *6. Species of Grain,* 441 · *7. Analogical Criteria: Classes of Grain,* 443 · *8. Allures,* 443 · *9. Typomorphology of Allures,* 444 · *10. Species of Allure,* 446

33. Theory of Variations 447

1. Musical Variation, 447 · *2. Perception of Variations,* 448 · *3. Variation and Structure,* 449 · *4. Typology of Variations,* 451 · *5. Variation Criteria,* 453 · *6. Typology of Melodic Variations,* 455 · *7. Musical Tradition of Melodic Variations: Neumes,* 457 · *8. Classes, Genres, and Species of Melodic Variations,* 458 · *9. Mass Variations,* 459 · *10. Sustainment Variations,* 459 · *11. Structures of Variations,* 460

34. Analysis of the Musical Object as It Generally Appears 462

1. The Troublesome Example, 462 · *2. Analytical Diagram,* 463 · *3. Summary Diagram,* 464 · *4. Layout of the Diagram,* 468 · *5. Evaluation of Criteria in the Perceptual Field,* 469 · *6. Musical Scales,* 471 · *7. Numbers and Nuances,* 472 · *8. Object Identification Chart,* 473 · *9. Meaning of the Analytical Diagram and How to Use It,* 474

BOOK SEVEN. MUSIC AS A DISCIPLINE

35. Implementation 479

1. How Should We Make and What Should We Listen For? 479 · *2. On the Right Use of a Music Theory,* 480 · *3. Attempt at an Exploration of Traditional Musics,* 481 · *4. Calibrations of Values,* 482 · *5. Simple Relationships,* 484 · *6. Reference Structures,* 486 · *7. Listening to Contemporary Musics,* 489 · *8. A Priori Musics,* 491 · *9. Serial Genetics in Electronic Music,* 493 · *10. Outside the Series,* 497 · *11. The Three Tiers,* 499 · *12. Musics,* 500 · *13. Tablatures,* 503 · *14. Music and Machines,* 504 · *15. The Two Musics,* 505 · *16. The Continuous and the Discontinuous,* 506 · *17. Polyphony and Polymorphy,* 508 · *18. Music and Aesthetics,* 510 · *19. Music and the Disciplines,* 511

36. The Meaning of Music 513

1. Orpheus, 513 · *2. Musical Consumption,* 514 · *3. The Musical Environment,* 515 · *4. Musicians,* 517 · *5. The Inspiration of the Moment,* 518 · *6. From the Scribe to the Acrobat,* 518 · *7. The Experts,* 520 · *8. The Role of Orpheus,* 521 · *9. Respect for Humankind,* 522 · *10. Orpheus in the Underworld,* 523 · *11. A Spiritual Technique,* 524 · *12. The Meaning of Words,* 526 · *13. The Language of Things,* 527

Penultimate Chapter: In Search of Music Itself 530

Anamorphoses between Music and Acoustics, 532 · *Return to the Object and the Musical Endeavor,* 535 · *The Four Listening Modes,* 539 · *Beyond the Mark, Short of the Mark,* 542 · *The Musical Relationship,* 544 · *Back-to-Front Music,* 548 · *The Composer's Noise,* 551 · *Typology of Contemporary Musics,* 552 · *An Undesirable Teaching Method,* 554 · *The Three Levels of the Score,* 556 · *Music as Will or Representation,* 558 · *The Target,* 559

Postscript 561

Index 563