Contemporary Mathematicians

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Editor

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Editor

Raoul Bott: Collected Papers

Volume 5

Editor

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Riemann-Roch and Raoul Bott, computer image by Hannibal Poenaru (then fifteen)

Preface

This volume brings together all of Raoul Bott's publications since 1991, some unpublished articles, as well as some earlier published articles not included in prior volumes of his *Collected Papers*. For each article, whenever appropriate, I have asked an expert in the field or a coauthor of Raoul Bott to write a commentary about the circumstance of the article, its origin, influence, and current development. These commentaries will make this volume especially useful as a guide to current research.

In 1991, Raoul Bott was sixty-eight years old. He passed away fourteen years later. This volume spans his twilight years, so to speak. Nonetheless, some of these later articles still spawned an entire field of research. For example, the articles [95] and [96] on stable bundles sparked the interest of many on Verlinde's formula, the articles [99], [107], [108], [109], and [114] led to new manifold invariants, and the article [106] with Clifford Taubes laid the foundation for the study of finite-type knot invariants using configuration space integrals.

Some of the general articles are historical, for example, on the periodicity theorem and the Woods Hole fixed point theorem. Others are biographical, for example, on Georges de Rham, Stephen Smale, Shiing-Shen Chern, and Robert D. MacPherson. Still others are his reflections on the relation between mathematics and physics, as in [100] and [102]. In addition, several of the articles are expository and are really wonderful places to learn about the subject matter. I want to single out in particular the article [113], an introduction to equivariant cohomology.

Perhaps nowhere does Raoul's colorful personality shine through as much as in his speeches, so I have included four of his previously unpublished speeches.

In his lifetime, Bott's lectures were legendary. In compiling this volume, I unearthed several videotapes of Raoul Bott's lectures, in both his younger and more mature years. For those who have never had the opportunity of listening to him in person, this is an invaluable resource. While the videorecordings are not included as part of this volume, I hope to have them digitized and placed on the web at some point.

I have also included biographies and reminiscences of Raoul Bott written by his collaborators, students, colleagues, and friends. Together these articles give a well-rounded portrait of Bott as a mathematician and as a person.

From the large collection of photographs provided by the Bott family, I have selected a goodly number that give a panoramic look at his life and his interaction with other mathematicians.

It is a pleasure to thank the many people who have helped to bring this volume to fruition. First, I want to thank James Carlson and the Bott family, Phyllis, Jocelyn, Candace, and Renee, for giving me access to Raoul Bott's papers and photos and for identifying the family members in various photos. Next, I am grateful to Jeffrey Carlson for gathering permissions to reprint and providing many helpful comments, to Zach Himes for gathering permissions, to George Leger for unfailing support and feedback, to Megan Monaghan for scanning the articles and photos, and to Michael Atiyah, Sig Helgason, Alice Mackey, Mary Moise, Erica Mosner of the Institute for Advanced Study at Princeton, and John and Carol Tate for identifying the people in the photographs. Of course, the various contributors whose names are in the Table of Contents deserve thanks for their commentaries on the articles in this volume. I also want to thank the National Center for Theoretical Sciences, Taipei, Taiwan for hosting me during the final preparation of this book. Finally, a special thank goes to Steve Schnably of the University of Miami Law School for years of moral support, advice, and feedback on my writings.

Loring W. Tu

Contents

Bibliography of Raoul Bott	xiii
Part I: Biographies and Commentaries	
Photographs	3
Curriculum Vitae	23
Raoul Bott	
Obituary: Raoul Harry Bott, FRS, 1923–2005	27
Sri Michael Atiyah	
The Life and Works of Raoul Bott	41
Loring W. Tu	
Remembering Raoul Bott (1923–2005)	61
Rodolfo Gurdian, Stephen Smale, David Mumford, Arthur Jaffe, Shing-Tung Yau, and Loring W. Tu	
Memories of Raoul Bott	83
Dennis Sullivan	
Memories of Raoul Bott	85
Thomas G. Goodwillie	
Stable Bundles (Commentary on [95])	87
Lisa Jeffrey	
On E. Verlinde’s Formula (Commentary on [96])	89
Lisa Jeffrey	
Memories of Raoul Bott (Commentary on [96])	91
András Szenes	
On Raoul Bott’s “On Invariants of Manifolds” (Commentary on [106], [107])	93
Dror Bar-Natan	
Configuration Space Integrals: Bridging Physics, Geometry, and Topology of Knots and Links (Commentary on [106], [108], [109])	95
Ismar Volić	

Integral Invariants of 3-Manifolds (Commentary on [111], [114])	101
Alberto Cattaneo	
Equivariant Characteristic Classes (Commentary on [116])	103
Loring W. Tu	
On the Genesis of the Woods Hole Fixed Point Theorem (Commentary on [118], [119], [123], [124]).....	107
Loring W. Tu	
Commentary on “Surjectivity for Hamiltonian Loop Group Spaces” [120]	117
Jonathan Weitsman	
Woods Hole (Commentary on [124])	121
Michael Atiyah	
Part II. Papers of Raoul Bott Since 1991	
[94] Georges de Rham: 1901–1990.....	125
Raoul Bott	
[95] Stable Bundles Revisited	129
Raoul Bott	
[96] On E. Verlinde’s Formula in the Context of Stable Bundles.....	149
Raoul Bott	
[98] Topological Aspects of Loop Groups	163
Raoul Bott	
[99] On Knot and Manifold Invariants	185
Raoul Bott	
[100] Book Review: The Geometry and Physics of Knots by Michael Atiyah.	205
Raoul Bott	
[101] For the Chern Volume	215
Raoul Bott	
[102] Life on the Slippery Lane—Between Mathematics and Physics	221
Raoul Bott	
[103] Reflections on the Theme of the Poster.....	233
Raoul Bott	
[104] Luncheon Talk and Nomination for Stephen Smale.....	245
Raoul Bott	
[105] The Work of Robert D. MacPherson.....	255
Raoul Bott	

[106] On the Self-Linking of Knots	259
Raoul Bott, Clifford Taubes	
[107] On Invariants of Manifolds	303
Raoul Bott	
[108] Configuration Spaces and Imbedding Invariants.....	317
Raoul Bott	
[109] Configuration Spaces and Imbedding Problems	337
Raoul Bott	
[110] Critical Point Theory in Mathematics and in Mathematical Physics	347
Raoul Bott	
[111] Integral Invariants of 3-Manifolds.....	381
Raoul Bott, Alberto S. Cattaneo	
[112] Lars Valerian Ahlfors (1907–1996)	427
Raoul Bott, Clifford Earle, Dennis Hejhal, James Jenkins, Troels Jorgensen, Steven G. Krantz, Albert Marden, Robert Osserman	
[113] An Introduction to Equivariant Cohomology	437
Raoul Bott	
[114] Integral Invariants of 3-Manifolds, II.....	463
Raoul Bott, Alberto S. Cattaneo	
[115] A Remark on Integral Geometry	479
Raoul Bott, Clifford Taubes	
[116] Equivariant Characteristic Classes in the Cartan Model	507
Raoul Bott, Loring W. Tu	
[117] Interview with Raoul Bott.....	527
Allyn Jackson	
[118] Response to Shimura’s Letter.....	539
Raoul Bott	
[119] Introduction to <i>Woods Hole Mathematics: Perspectives in Mathematics and Physics</i>	543
Raoul Bott	
[120] Surjectivity for Hamiltonian Loop Group Spaces.....	553
Raoul Bott, Susan Tolman, Jonathan Weitsman	
[121] On the Early History of the Periodicity Theorem	583
Raoul Bott	

Part III. Earlier Articles Not Included in Prior Volumes of Collected Papers

[20] In Memoriam Sumner B. Myers 1910–1955..... 603
Raoul Bott, T. H. Hildebrandt, R. K. Ritt, E. H. Rothe,
H. Samelson

[122] Induced Representations 611
Raoul Bott

**[123] Report on the Fixed Point Formula,
Séminaire N. Bourbaki.....** 619
Raoul Bott

**[124] Report on the Woods Hole Fixed Point
Theorem Seminar.....** 629
Michael Atiyah, Raoul Bott

Part IV. Speeches

**[125] On the Occasion of Twenty-Five Years of Service
at Harvard.** 637
Raoul Bott

[126] Convocation Address at McGill 647
Raoul Bott

**[127] On Receiving an Honorary Degree at Carnegie
Mellon University** 655
Raoul Bott

**[128] On Mathematics, Commencement Lecture
at the University of Costa Rica.** 661
Raoul Bott

Bibliography of Raoul Bott

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Speeches:

- [125] On the occasion of twenty-five years of service at Harvard, May 17, 1984, 4 pages.
- [126] Convocation address at McGill, 1987, 5 pages.
- [127] On receiving an honorary degree at Carnegie Mellon University, May 1989, 3 pages.
- [128] On Mathematics, Commencement lecture at the University of Costa Rica, March 13, 2002, 10 pages.

Videos: (Not included as part of this volume)

- [129] Raoul Bott explains topology on a TV program, 1960s.
- [130] The Topological Constraints on Analysis, AMS Centennial Celebration, August 1988.
- [131] A Peek Into the Book: A documentary portrait of Raoul Bott, by Vanessa Scott, 2003, 22 minutes.