

Preface

Before he died aged twenty, shot in a mysterious early-morning duel at the end of May 1832, Évariste Galois created mathematics which changed the direction of algebra. His revolutionary ideas date from around May 1829 to June 1830, the twelve to thirteen months surrounding his eighteenth birthday. An article published in June 1830 created the theory of Galois imaginaries, a fore-runner of what are now known as finite fields; his so-called *Premier Mémoire* created group theory and Galois Theory—the modern version of the theory of equations. The *Lettre testamentaire*, the letter that he wrote to his friend Auguste Chevalier on 29 May 1832, the eve of the duel, is an extraordinary summary of what he had achieved and what he might have achieved had he lived to develop and expound more of his mathematical ideas.

Although there have been several French editions of his writings, there has never until now been a systematic English translation. Translations of historical material are of little use without the originals alongside, however. What is offered here therefore is a bilingual edition. The French transcription is a new one. Following precedents set by Tannery in 1906/07 and by Bourgne & Azra in 1962 it is as close to the original manuscripts as I have been able to make it. Main text, afterthoughts, deletions, insertions, over-writings—all are recorded as faithfully as I could manage within the inevitable constraints imposed by the differences between manuscript and print.

In addition I offer three levels of commentary. First there is general contextual information; secondly there are notes on the physical state of the manuscripts and on the disposition of their content; third, there are comparisons of the various previous editions, including variant readings, in minutely pedantic and minutely printed marginal notes. Little of the commentary here is mathematical. It is focussed on the symbols on the page, on the syntax, on establishing an accurate text. Commentaries on the semantics, the meaning of what Galois wrote, would be a quite different exercise. That comes next, but must be the subject of other studies. I have neither the space nor the time. Space is a concern because the book is already substantially longer than I had anticipated in light of the shortness of Galois' productive life. Time is short because a proper modern study of his writings would take years, whereas it is planned that this book should appear on 25 October 2011 as homage to Galois on the 200th anniversary of his birth.

The book is conceived as a contribution to the history of mathematics. I hope, however, that it may bring the mathematical writings of this extraordinary genius to a wider mathematical public than has hitherto been able to appreciate them. At the very least it may serve to dispel some of the common myths that surround Galois and his understanding of mathematics. It is simply not true, for example, that he proved and used the simplicity of alternating groups. He did not need to: he was much cleverer than that; his treatment of solubility of equations is at once simpler and more elegant than what has now become textbook tradition. The details of what he did, the proper evidence of his genius, deserve to be as well understood and appreciated amongst mathematicians as amongst historians of mathematics. If this

edition extends his readership beyond the bounds presently imposed by linguistic constraints it will have succeeded.

Acknowledgements. It is a pleasure to be able to publish my very warm thanks to a large number of people without whose help and advice this book would have been greatly the poorer. First come Mme Mireille Pastoureau, Director of the Library of the Institut de France, and her staff. They have all accorded me the highest level of kindness and assistance. If I pick out two people, Mme Fabienne Queyroux and Mme Annie Chassagne, as having earned my special thanks for the many times they have given me special help, I hope it will not detract from my thanks to all their colleagues. I thank also the Commission des bibliothèques et archives de l'Institut de France, and its president, Mme Hélène Carrère d'Encausse, Secrétaire perpétuel de l'Académie française, for kind permission to include images of some of the Galois manuscripts in this work; these thanks extend to Mme Florence Greffe, Archivist of the Académie des Sciences, who has made available an image of Galois' letter of 31 March 1831 and a pamphlet by Jacques Tits. Professor Jean-Pierre Kahane, a member of that committee, has been very supportive and it is a pleasure to record my personal thanks to him. Mr F. Xavier Labrador of the Société d'Ingénierie et de Microfilmage made those high quality photographs, and I am very grateful to him. I thank also Jonathan Crayford for photographs and much enthusiasm about Galois and his work. The Governing Body of the Queen's College, Oxford, and the Research Committee of the Mathematical Institute in the University of Oxford provided financial support towards the purchase of digital images of the manuscripts and I thank them also.

Several colleagues read an early draft of the book, or parts of it, and I have benefitted from their suggestions. Two referees, Massimo Galuzzi and Caroline Ehrhardt, sent pertinent and very helpful criticisms. It is a great pleasure to be able to thank them publicly, not only for their kind comments and help, but also for agreeing to waive the conventional anonymity that usually prevents such thanks and acknowledgment. Jackie Stedall and Sabine Rommevaux also checked the whole work for me—they know already how grateful I am. I am grateful also to Catherine Goldstein and Adrian Rice for bibliographical advice, and to Tessa Shaw and Lynette Dobson of the Queen's College library for detailed and highly skilled bibliographical assistance. Professor Roger Pearson, FBA, Tutor in French at The Queen's College, offered help with the mottos and some other mysterious constructions. I am not the first, nor will I be the last, to be grateful for his great scholarship and tutorial skills. [Added July 2013: I am grateful to Jon Pepper and Michael Mudarri for drawing my attention to mistakes in the 2011 version of this book.]

Throughout the whole project my editors Manfred Karbe and his wife Irene Zimmermann have provided an extraordinary level of support and encouragement, freely and patiently sharing with me their technical and \TeX nical expertise, experience and wisdom. One could not possibly have a better editorial team.