The conceptual problems of natural philosophy remained a subject of enduring interest for Kant. Despite shifts in outlook, engendered by a deeper understanding of natural philosophy and the transformation in philosophical perspective which led to the development of the critical philosophy, the conceptual status of ‘force’ and the relationship between ‘force’ and ‘matter’ remained at the core of Kant’s treatment of the problems of natural philosophy. These issues pervade the chapters on ‘Dynamics’ and ‘Mechanics’ in the Metaphysical foundations of natural science (1786), Kant’s mature and most systematic discussion of natural philosophy, where he elaborated the ways in which the transcendental categories of the Critique of pure reason (1781) were to be applied to the concept of matter. It has become a commonplace to describe Kant’s intentions as an attempt to demonstrate the validity of Newtonian physics, but as Buchdahl has emphasised Kant’s ‘metaphysics of nature’ purports to demonstrate links between physical theory and the transcendental principles rather than to claim that the actual inductive validity of Newtonian physics can be derived from a priori premises. Moreover, in the Metaphysical foundations Kant’s examination of the metaphysical foundations of Newtonian physical concepts led him to a reappraisal of the conceptual status of ‘force’, ‘matter’ and inertia’ in physical theory. The argument of the Metaphysical foundations thus has a complex relationship to the conceptual structure of Newtonian natural philosophy.

In this paper I propose to follow a single strand in the complex of problems associated with the status of ‘Newtonian physics’ in Kant’s philosophy, tracing his changing attitude to the relationships between the concepts of ‘force’, ‘matter’ and ‘inertia’ from his early writings on natural philosophy to the mature formulation in the Metaphysical foundations. To do so necessarily imposes limitations, both historical and philosophical, but may serve to highlight some important features of Kant’s treatment of natural philosophy. In focusing on the conceptual status of ‘force’ and ‘inertia’ in Kant’s natural philosophy, I shall emphasise the impact of Johann Bernoulli’s theory of ‘living force’ and of Euler’s treatment of the conceptual status of ‘force’ and ‘inertia’ on Kant’s discussions of physical theory. While Kant’s discussions of natural philosophy display a marked divergence from the theories of

nature formulated by Bernoulli and Euler, he drew important insights from their work which influenced his construal of the problems of natural philosophy. In the *Metaphysical foundations* Kant follows Euler in stressing the disjunction between the concepts of 'force' and 'inertia', but rejects Euler's view that 'inertia' was a defining property of 'matter', maintaining that 'forces' were the defining characteristics of material substances. Nevertheless, the arguments of Bernoulli and Euler helped to shape Kant's treatment of natural philosophy. For Euler, and for the Kant of the *Metaphysical foundations*, the problems posed by Newton's concepts of 'force' and 'inertia' were of crucial importance, and in particular Kant seeks to provide an analysis of the conceptual framework of natural philosophy, the assumptions about 'matter' and 'force' which underlie Newton's statement of the laws of motion and the concept of universal gravitation. Kant's examination of the metaphysical foundations of 'Newtonian' physical concepts led him to a reappraisal of the conceptual status of 'force' and 'inertia' in physical theory, and to reject the 'Newtonian' concept of 'inertia' as a defining property of 'matter' in favour of the ontological priority of 'force' over the concept of 'matter'. In the *Metaphysical foundations* this re-location of the conceptual relations between 'force', 'inertia' and 'impenetrability' was developed under the formal guidance of the categorial principles, and fostered by Euler's critique of Newtonian natural philosophy. Kant's account of the 'metaphysics of nature' yields a framework of principles which differs from the philosophical assumptions of Newton's theory of nature, providing a reappraisal of the conceptual structure of 'Newtonian' natural philosophy.

Before turning to an account of relevant aspects of Kant's early writings on natural philosophy and an examination of Euler's critique of Newton's discussion of the concept of 'force of inertia [vis inertiae]' and its impact on Kant's argument in the *Metaphysical foundations*, some preliminary remarks on Kant's notion of 'metaphysical foundations' are necessary. Kant's treatment of the 'metaphysics of nature' sought to remedy a crucial deficiency in his early writings on natural philosophy, viz. the gap between a mathematical theory of nature and physical reality. In the 'Preface' to the *Metaphysical foundations* he makes a distinction between the general part of the metaphysics of nature (in the *Critique*), concerned with the general 'laws which make possible the concept of a nature in general', and a 'special metaphysics of nature' (the subject-matter of the *Metaphysical foundations*), in which the transcendental concepts and principles are applied to the empirical concept of matter. Kant maintains that the demonstration of the possibility of 'determinate natural things', as distinct from the demonstration