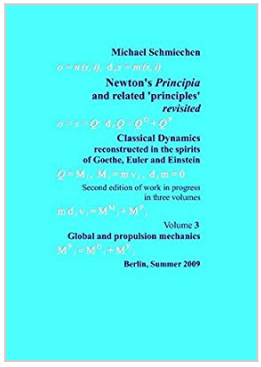

Newton's Principia Revisited

By Michael Schmiechen

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PROBLEM. The treatise is devoted to the reconstruction of our 'instinctive beliefs' in classical mechanics and to present them 'as much isolated and as free from irrelevant additions as possible'. The same motivation has driven many authors since the publication of Newton's Principia. IMPORTANCE. Classical mechanics will remain the basic reference and tool for mechanics on terrestrial and planetary scale as well as the proto-theory of relativistic and quantum mechanics. But it can only serve its purpose if it is not considered as obsolete, but if its foundations and implications are understood and made 'absolutely' clear. METHOD. Based on the 'instinctive belief' that the foundations of classical mechanics cannot be found and reconstructed within mechanics itself but only 'outside', classical mechanics is 'understood' by embedding it into an adequate theory of knowledge and adequate proto- and meta-theories in terms of the 'language of dynamics'. Evidence is produced that available philosophical expositions are not adequate for the purpose at hand. Mechanics is treated as part of physics, not of mathematics. Not sophisticated mathematical artifacts, necessary for solving specific problems, but the intellectually satisfactory foundation of mechanics in general is subject and purpose of the exercise. The goal is reached using axiomatic systems as models. SCOPE. Following an account of the unsatisfactory state of affairs the treatise covers the epistemological foundations, abstract proto-mechanics, i. e. the theories of time and space, meta-mechanics, i. e. the theories of state space models and of quantities proper, and, as an instance of the latter, abstract elementary mechanics, the theory of translational motions of 'small' solid bodies in three-dimensional Euclidean space, including classical general relativity. Subsequently the theory of classical kinematics is developed as basis for interpreted proto-mechanics and interpreted elementary mechanics. As an amus

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Editorial Review

About the Author
Until he retired in 1997 the author has been Deputy Director, Head of Research and Development at the Versuchsanstalt für Wasserbau und Schiffbau (VWS), the Berlin Model Basin, and apl. Professor for Hydromechanical Systems at the Institut für Schiffs- und Meerestechnik (ISM), Technische Universität Berlin (TUB). Ever since he continued to promote his ideas at lectures and conferences around the world. Details of his curriculum vitae and his personal background are to be found on his website www.m-schmiechen.de .

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