This paper explores the relationship between physics and metaphysics in Leibniz. It argues that, for Leibniz, this relationship has two complementary aspects. On the one hand, Leibniz conceived the mathematical and mechanical explanation of natural phenomena as an autonomous enterprise in which there is no place for metaphysical entities such as substantial forms. On the other hand, he held that a proper account of the nature of bodies must go beyond this kind of inquiry. In order to achieve a deeper understanding of the physical world, it is necessary to reach its metaphysical foundations and appeal to metaphysical principles. The crucial point is, however, that these are meta-physical principles. They provide the metaphysical grounding of physics, the philosophical foundations of mechanism, as opposed to being the object of physics proper or being extended to physics itself. The paper concludes that Leibniz's proposal combined the ancient, medieval, and Renaissance tradition of the unity and systematicity of knowledge with a new understanding of the autonomy of science. In so doing, it paved the way to a modern conception of natural science in a manner which is different (but, arguably, philosophically richer) than that of other great architects of modern science such as Descartes, Galileo, and Newton.