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(*b*. Tarascon, Bouches-du-Rhône, France, 1677; *d*. Paris, France, 12 May 1742)

Physics, mathematics.

The son of Charles Privat de Molières and Martine de Robins de Barbantane, Privat de Molières was born into a prominent Provencal family. He showed an early aptitude for philosophical and scientific studies and received an excellent education at Oratorian schools at Aix, Marseilles, Arles, and, finally, Angers, where he studied under the mathematician Charles-Rene Reyneau during 1698–1699. Against his parents' wishes, Privat de Molières chose an ecclesiastical life and entered the Congregation of the Oratory. He taught at the order's colleges at Saumur, Juilly, and Soissons but left in 1704 to pursue a more active scientific career in paris. There he became an intimate of Malebranche studying mathematics and metaphysics with him until the latter's death in 1715. Elected to the Académie Royale des Sciences as *adjoint mécanicien* in 1721, Privat de Molières succeeded to the chair of philosophy at the Collége Royal in 1723, following the death of Varignon. He was raised to the rank of *associé* in the Academy in 1729 and became fellow of the Royal Society of London in the same year.

A major figure in the protracted struggle against the importation of Newtonian science into France, Privat de Molières devoted his career to developing and improving Cartesian physics. Cognizant of the superiority of Newtonian precision in comparison with Cartesian vagueness in the explication of natural phenomena, he was nonetheless convinced of the rectitude of Descartes's ideal of a purely mechanical science. In a series of memoirs read to the Academy, in articles in the *Journal de Trévoux*, and in the published version of his lectures at the Collége Royal, the four-volume *Lecons de physique, contenant leséléments de la physique déterminés par les seules lois des mecaniques* (1734–1739), Privet de Molières offered an emended Cartesian program which, by incorporating Newton's calculations and mathematical techniques, would accord with exact experimental and observational data. Central to his system was the existence of small vortices (*petits tourbillons*), an idea borrowed from Malebranche to replace the discredited Cartesian theory of matter. Unlike Descartes's elements, the *petits tourbillons* were elastic rather than hard particles and constituted the basic structural units of the universe.

The hypothesis of *petits tourbillons* was adopted to establish the superiority of the concepts of the plenum and impulsion over the rival ideas of the void and attraction. Privat de Molières sought to answer Newton's refutation of the vortex theory (propositions LII and LIII of book II of the *Principia*) by obviating the objection that planetary vortices were incompatible with Kepler's laws. He offered an elaborate mathematical demonstration showing that the subtle movements of *petits tourbillons* within the larger planetary vortices could produce the motion of the planets required by astronomical data. His system, extended to include electrical and chemical phenomena, was influential in France and was cited by Fontenelle, secretary of the Academy, as one of the most effective rehabilitations of Cartesian science. Privat de Molières's ingenious use of the vortex hypothesis, intended as a reconciliation between Cartesian and Newtonian ideas, succumbed however, to the cogent attacks by French Newtonians, notably Pierre Sigorgne.

BIBLIOGRAPHY

I. Original Works. Privat de Molières's major books include*Leçons de mathématiques nécessaires pour l'intelligence des principes de physique qui s'enseignent actuellement au Collège royal* (Paris, 1725), trans. into English by T. Haselden as *Mathematic Lessons… Delivered at the College Royal of Paris…*(London, 1730); *Leçons de physique, contenant les éléments de la physique déterminés par les seules lois des mécaniques*, 4 vols. (Paris, 1734–1739); and *Tranité synthétique des lignes du premier et du second genre, ou éléments de géométrie dans l'ordre de leur génération* (Paris, 1740). Among his more important memoirs presented to the Academy are "Loix générales du mouvement dans le tourbillon sphérique," in *Mémories de l'Académie royale des sciences* (1728), 245–267; and "Problèms physico-mathématique, dont la solution tend à servir de réponse à une des objections de M.. Newton contre la possibilité des tourbillors calesses," *ibid*. (1729), 235–244.

II. Secondary Literature. For biographical details consult Jean-Jacques Dortous de Mairan, *Éloges des académiciens de l'Académie royale des sciences, morts dans les années 1741, 1742, 1743* (Paris, 1747), 201–234; F. Hoefer, ed., *Nouvelle biographie générale*, XXXV (Paris, 1861), 887–889; and Alexandre Savérien, *Histoire des philosophes modernes*, VI (Paris, 1773), 217–248. The best recent study of Privat de Molières's physics is Pierre Brunet, *L'introduction des théories de Newton en France au XVIIIe siècle. I: Avant 1738* (Paris, 1931), 157–165, 240–262, 327–338. Also useful is E. J. Aiton, *The Vortex Theory of Planetary Motions* (London-New York, 1972), 209 ff. A brief discussion of the use of *Petits tourbillons* in chemistry is Hélène Metzger, *Les doctrines chimiques en France du début de XVIIe à la fin du XVIIIe siècle*, **I** (Paris, 1923), 462–467.

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