temporaries in admiring these claims to fame, but it has discovered in Stevinus’s works various inventions which did not at once receive the notice they deserved. He was the first to show how to fashion regular and semiregular polyhedra by delineating their frames in a plane. Stev- inus also distinguished stable from unstable equilibrium. He proved the law of the equilibrium on an inclined plane. He demonstrated before Varignon the resolution of forces, which, simple consequence of the law of their com­position though it is, had not been previously remarked. He discovered the hydrostatic paradox that the downward pressure of a liquid is independent of the shape of the vessel, and depends only on its height and base. He also gave the measure of the pressure on any given portion of the side of a vessel. He had the idea of explaining the tides by the attraction of the moon.

It remains to enumerate those claims of Stevinus to immortality which were recognized from the first and which succeeding ages have not lessened,—his writings on military science, on book-keeping, and on decimal fractions.

That the man who was quartermaster-general to Maurice of Orange should have been possessed of more than ordinary merit, and have left behind him military papers of lasting value, is hardly more than might have been expected. This expectation, in the case of Stevinus at least, is fully borne out in the opinion of competent judges. Prince Maurice is known as the man who con­quered the greatest number of fortresses in the shortest time, and fortification was the principal aim of his adviser. Stevinus seems to be the first who made it an axiom that strongholds are only to be defended by artillery, the defence before his time having relied mostly on small fire­arms. He wrote upon temporary fortifications, but the excellence of his system was only slowly discerned. He was the inventor of defence by a system of sluices, which proved of the highest importance for the Netherlands. His plea for the teaching of the science of fortification in universities, and the existence of such lectures in Leyden, have led to the impression that he himself filled this chair ; but the belief is quite erroneous, as Stevinus, though living at Leyden, never had direct relations with its uni­versity.

Book-keeping by double entry may have been known to Stevinus as clerk at Antwerp either practically or through the medium of the works of Italian authors like Paccioli and Cardan. He, however, was the first to recommend the use of impersonal accounts in the national household. He practised it for Maurice, and recommended it in a small pamphlet to Sully the French statesman; and, if public book-keeping has grown more and more lucid by the intro­duction of impersonal accounts, it is certainly to Stevinus that the credit of the improvement is due.

His greatest success, however, was a small pamphlet, first published in Dutch in 1586, and not exceeding seven pages in the French translation (which alone we have seen). This translation is entitled *La Disme, enseign­ant facilement expédier par Nombres Entiers sans rompuz, tous Comptes se rencontrans aux Affaires des Hommes.* Decimal fractions had been employed for the extraction of square roots some five centuries before his time, but nobody before Stevinus established their daily use ; and so well aware was he of the importance of his innovation that he declared the universal introduction of decimal coinage, measures, and weights to be only a question of time. His notation is rather unwieldy. The point separating the integers from the decimal fractions seems to be the invention of Bartholomæus Pitiscus, in whose trigonometrical tables (1612) we have found it, and it was accepted by Napier in his logarithmic papers (1614 and 1619). Stevinus printed little circles round the ex­

ponents of the different powers of one-tenth. For instance, 237578/1000 was printed 237 ® 5 Q 7 08 0; and the fact that Stevinus meant those encircled numerals to de­note mere exponents is evident from his employing the very same sign for powers of algebraic quantities, *e.g.,* 9 θ-14 ® + 6®-5 to denote 9*x*4-14*x*;3+6*x*-5. He does not even avoid fractional exponents (“Racine cubique de ®) serait 2/3 en circle ”), and is ignorant only of negative exponents. Powers and exponents have also been carried back to a period several centuries earlier than Stevinus, and it is not here intended to give him any undue credit for having maintained them ; but we believe it ought to be recognized more than it generally is, that for our author there was a connexion between algebraic powers and decimal fractions, and that even here Stevinus the pro­found theorist is not lost to view behind Stevinus the man of brilliant practical talents. (m. ca.)

STEWART, or Stuart. For the royal house of this name, see Stuart.

STEWART, Dugald (1753-1828), one of the most influential of the Scottish philosophers, was born at Edinburgh on the 22d of November 1753. His father, Matthew Stewart (1715-85), was professor of mathematics in the university of Edinburgh from 1747 till 1772, and was an eminent investigator in his own department, applying the geometrical methods of Simson, who had been his teacher in Glasgow. Dugald Stewart’s early years were passed partly in Edinburgh and partly at Catrine in Ayrshire, where his father had a small property, to which the family removed every summer on the close of the academical session. Burns was an occasional visitor at Catrine, which is only a few miles from Mossgiel ; and the philosopher and the poet had various meetings as well as some slight correspondence in later years. Dugald Stewart was educated at the high school and university of his native town. At school he laid the foundation of the classical knowledge and literary taste which are con­spicuous in his works, and which lent a charm to his prelections. At the university his chief subjects were the mathematical sciences—in which he attained great pro­ficiency—and philosophy. Adam Ferguson, the historian of the Roman republic, was then professor of moral philo­sophy in Edinburgh, and his bracing ideal of ethical and political virtue commended itself highly to Stewart. In 1771, having thoughts of entering the English Church, Stewart proceeded to Glasgow with a view to the Snell exhibitions tenable by Glasgow students at Oxford. Here he listened to the lectures of Reid, whose *Inguiry,* pub­lished seven years before, had laid the effective founda­tion of what is called distinctively the Scottish philosophy. Reid became Stewart’s acknowledged master and also his friend, while Stewart’s academic eloquence and powers of elegant exposition gained for their common doctrines a much wider acceptance than they could have secured in the clumsier and less attractive presentation of Reid him­self. In Glasgow Stewart boarded in the same house with Archibald Alison, afterwards author of the *Essay on Taste,* and a close friendship sprang up between them, which remained unbroken through life. After no more than a single session in Glasgow, Dugald Stewart was summoned by his father, whose health was beginning to fail, to conduct the mathematical classes in the university of Edinburgh. Though only nineteen years of age he discharged his duties with marked ability and success ; and after acting three years as his father’s substitute he was elected professor of mathematics in conjunction with him in 1775. Three years later Adam Ferguson was appointed secretary to the commissioners sent out to the American colonies, and at his urgent request