produces it be doubled. The law is without exception throughout the compass in which our ears can distinguish pitch, and so, of necessity, a string of twice the length of that whose vibrations induce the deepest perceivable sound must stir the air at such a rate as to cause a tone at an 8th below that lowest audible note. It is hence manifest that, however limited our sense of the range of musical sound, this range extends upward and downward to infinity. Tartini made his observations the basis of a theoretical system which he set forth in his *Trattato di Musica, seconde la vera scienzia dell' Armonia* (Padua, 1754) and *Dei Principij dell' Armenia Musi­cale,* (Padua, 1767). He also wrote a *Trattato delie Appogiature,* posthumously printed in French, and an unpublished work, *Delle Ragioni e delle Proporzioni,* the MS. of which has been lost.

**TAS-DE-CHARGE,** a French term in architecture, for which there is no equivalent in English, given to the lower courses of a Gothic vault, which are laid in horizontal courses and bonded into the wall, forming a solid mass; they generally rise about one-third of the height of the vault, and as they project forwards they lessen the span to be vaulted over.

**TASHKENT,** or Tashkend, one of the largest and most important cities of Russian Central Asia, and capital of Russian Turkestan, situated in the valley of the Chirchik, some 50 m. above its confluence with the Syr-darya, in 40º 20' N., 69º 18' E. It is connected by rail with Krasnovodsk (1085 m.) on the Caspian, and since 1905 with Orenburg (1150 m.). The city, formerly enclosed by walls (now ruinous), is surrounded by luxuriant gardens, and its houses are buried among the fruit and other trees which grow alongside of the irrigation canals. The buildings, which are of stone and sun-dried bricks, are mostly low, on account of the earthquakes which frequently disturb the region. The native city in 1871 had 78,130 in­habitants, and in 1897 156,414, mostly Sarts, with Uzbegs, Kirghiz, Jews, Russians and Germans. The Russian city, to the south-east, dating from 1865, has clean, broad streets lined with poplars, and canals, the low, pleasant-looking houses being surrounded by gardens. In 1875 its population, ex­clusive of the military, was 4860, mostly Russians, and in 1900 about 25,000. Tashkent has a public library containing a valuable collection of works on Central Asia, an astronomical observatory and a museum.

**TASHKURGHAN,** or Khulm, a khanate and town of Afghan Turkestan. The khanate lies between Kunduz and Balkh. The ancient town of Khulm stood in the Oxus plain, surrounded by orchards of famous productiveness; but it was destroyed by Ahmad Shah Abdali, who founded Tashkurghan in the middle of the ιSth century, and took all the inhabitants away from Khulm to populate it. Ancient Khulm is now only a mass of ruins; but Tashkurghan, lying two or three miles to the south of it, has become the great trade-mart of Afghan Turkestan and second only in importance to Mazar-i-Sharif, the military centre of the province; while it is much larger and more prosperous than the latter place. At Tashkurghan the caravans from India and Bokhara meet, and from here the merchandise is distributed all over the country. A hill fortress dominates the town and overlooks the debouchment of the road from Haibak and Kabul into the plains of the Oxus.

**TASMAN, ABEL JANSZOON** (c. 1603-1659), the greatest of Dutch navigators, the discoverer of Tasmania, New Zealand, the Tonga and the Fiji Islands, and the first circumnavigator of Australia, was born at Lutjegast in Groningen, about 1603. In 1634 we first meet with him in the East Indies, sailing from Batavia (Feb. 18) to Amboyna. On the 30th of December 1636 he sailed from Batavia for home; reached Holland August 1, 1637; started on his return to the East April 15, 1638; and reappeared at Batavia October 11, 1638. On the 2nd of June 1639 Tasman, along with Matthew (Matthijs Hendricxsen) Quast, was despatched by Antony Van Diemen, governor- general of the Dutch East Indies (1636-45), on a voyage to the north-western Pacific, in quest of certain “ islands of gold and silver,” supposed to lie in the ocean east of Japan. On this voyage Tasman and Quast visited the Philippines and im­proved Dutch knowledge of the east coast of Luzon; they also discovered and mapped various islands to the north, apparently the Bonin archipelago. Sailing on to N. and E. in search of the isles of precious metals, they ranged about fruitlessly in the northern Pacific, at one time believing themselves to be 600 Dutch miles east of Japan. After this the voyage was continued almost constantly westward, but in varying latitudes, reaching as high as 42º N., always without success. On the 15th of October the navigators decided to return, and, after touching at Japan, anchored at the Dutch fortress-station of Zeelandia in. Formosa on the 24th of November 1639. After this Tasman was engaged in operations in the Indian seas (sailing to Formosa, Japan, Cambodia, Palembang, &c., as a merchant captain in the service of the Dutch East India Com­pany) until 1642, when he set out on his first great “ South Land ” expedition. This was planned and organized by Governor Van Diemen, who cherished great schemes for the extension of the Dutch colonial empire. Several Dutch navi­gators had already discovered various portions of the north and west coasts of Australia (as in 1605-06, 1616, 1618-19, 1622, 1627-28, &c.), but Tasman now first showed that this great South Land did not stretch away to the southern pole, but was entirely encircled by sea within comparatively moderate limits. Sailing from Batavia on the 14th of August 1642 with two vessels, the “ Heemskerk ” and “ Zeehaen,” and calling at Mauritius (September 5 to October 8), Tasman sailed first S., then E., almost seven weeks, and on the 24th of November sighted (in 42º 25' S., as he made it) the land which he named *Anlhoonij Dan Diemen’s landt* after Van Diemen, now called Tasmania. He doubled the land, which he evidently did not perceive was an island, coasting its southern shores, and, running up Storm Bay, anchored on the 1st of December in Frederick Henry’s Bay, on the east coast of Tasmania (in 43º 10' S., according to his reckoning)—so named after Prince Frederick Henry of Nassau, then the head of the Dutch republic. There he set up a post on which he hoisted the Dutch flag. Quitting Van Diemen’s Land on the 5th of December, Tasman steered E. for the Solomon Islands, and on the 13th of December discovered (in 42º 10' S., as he reckoned) a “ high mountainous country,” which he called *Staten landt* (“ Land of the States,” *i.e.,* of Holland, now New Zealand). Tasman and his company believed the newly discovered land to form part of the same great antarctic continent as the other *Staten landt* which Schouten and Lemaire had sighted and named to the east of Tierra del Fuego. Cruising up N.E. along the west coast of the South Island, he anchored on the 18th of December in 40º 50' S., at the entrance of a “ wide opening,” which he took to be a “ fine bay ” (Cook’s Strait). He gave the name of *Moordenaars (Murderers,* now softened to *Massacre) Bay* to this spot, where several of his men were killed by the natives (December 19). From Murderers’ Bay Tasman sailed S.E. along the south shore of Cook’s Strait, apparently getting into Blind or Tasman Bay, but not dis­covering the full extent of the strait here dividing New Zealand into two main islands. Returning westward he then coasted the west side of the North Island, till, on the 4th of January 1643, he came to the northern extremity of New Zealand, in 34° 35' S. (in his reckoning). Thence he bore away to N.N.E., at first intending to keep that course for 30º of longitude from North Cape, New Zealand. On the 19th to 25th of January, in 22º 35', 21º 20', and 20º 15' S. (Tasman’s reckonings), he discovered various islands of the Tonga or Friendly group, especially Amsterdam (Tongatabu), Middelburg (Eva), and Rotterdam. Here the ships took in water and provisions, which they had not done since leaving Mauritius, and the crews went on shore for the first time since leaving Van Diemen’s Land. Rotterdam Island they explored with some care. Thence Tasman steered N. and W., reaching on the 6th of February the eastern part of the Fiji archipelago (in 17º 29' S., by his reckoning), which he called Prince William’s Islands and Heemskerk’s Shoals; on the 22nd of March he sighted the islands of Ontong Java (in 5º 2' S., according to Tasman, and in 159º 30' E., Greenwich). On the 1st of April he was near the north-eastern extremity of New Ireland (Neu Mecklenburg), mistaken by him for a part of New Guinea, in 40º 30' S., off a