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were "the primitive types from which all the organisms of the higher classes had arisen by gradual development," and he laid down as a fundamental proposition "that all living forms are the results of physical influences which are still in operation, and vary only in degree and direction." Like many after him, he directed attention to the influence of the male elements in fertilization as a source of variation, but laid emphasis only on the intra-organismal power of adaptation to surroundings. Whatever opinion be entertained in regard to the priority and the importance of the contribution made by Treviranus to the theory of evolution, it is at least certain that he was a learned naturalist and an acute thinker. His most important later work of a synthetic nature was entitled *Erscheinungen und Gesetze des organischen Lebens* (1831).

His younger brother, LUDOLPH CHRISTIAN TREVIRANUS (1779–1864), studied medicine at Jena, and was successively professor of medicine at Bremen lyceum (1807), professor of natural history at Rostock (1812), professor of botany and director of the botanical garden at Breslau (1816), and professor of botany at Bonn (1830).

TREVISO (anc. *Tarvisium*), a town and episcopal see of Venetia, Italy, capital of the province of Treviso, 49 ft. above sea-level. Pop. (1901), 16,933 (town); 36,433 (commune). It is situated on the plain between the Gulf of Venice and the Alps, 18 m. by rail N. of Venice, at the confluence of the Sile with the Botteniga. The former flows partly round its walls, the latter through the town; and it has canal communication with the lagoons. It is an old town, with narrow irregular colonnaded streets and some interesting old frescoed houses. The cathedral of San Pietro,

dating from 1141 and restored and enlarged in the 15th century by Pietro Lombardo, with a classical façade of 1836, has five domes. It contains a fine “Annunciation” by Titian (1519), an important “Adoration of the Shepherds” by Paris Bordone (born at Treviso in 1500), and frescoes by Pordenone. There are also sculptures by Lorenzo and Battista Bregno and others. The Gothic church of San Niccolo (1310–1352) contains a fine tomb by Tullio Lombardo, and a large altarpiece by Fra Marco Pensabene and others; in the church and adjoining chapter-house are frescoes by Tommaso da Modena (1352), some frescoes by whom (life of S. Ursula) are also in the Museo Civico. The Monte de Pietà contains an “Entombment” by an artist of the school of Pordenone (wrongly attributed to Giorgione). The churches of S. Leonardo, S. Andrea, S. Maria Maggiore, and S. Maria Maddalena also contain art treasures. The Piazza dei Signori contains picturesque brick battlemented palaces—the Salone del Gran Consiglio (1184) and the Palazzo del Commune (1268). Treviso is the seat of various manufactures—ironworks and pottery, macaroni, cotton-spinning and rice-husking, paper, printing, brushes, brickyards, flour mills—and is the centre of a fertile district.

The ancient Tarvisium was a *municipium*. It lay off the main roads, and is hardly mentioned by ancient writers, though Pliny speaks of the Silis as flowing “ex montibus Tarvisanis.” In the 6th century it appears as an important place and was the seat of a Lombard duke. Charlemagne

made it the capital of a marquisate. It joined the Lombard league, and was independent after the peace of Constance (1183) until in 1339 it came under the Venetian sway. From 1318 it was for a short time the seat of a university. In the 15th century its walls and ramparts (still extant) were renewed under the direction of Fra Giocondo, two of the gates being built by the Lombardi. Treviso was taken in 1797 by the French under Mortier (duke of Treviso). In March 1848 the Austrian garrison was driven from the town by the revolutionary party, but in the following June the town was bombarded and compelled to capitulate.

TREVITHICK, RICHARD (1771–1833), English engineer and inventor, was born on the 13th of April in the parish of Illogan, Cornwall, and was the only son of Richard Trevithick (1735–1797), manager of the Dolcoath and other important Cornish mines. He attended his first and only school at Camborne, and was in general a slow and obstinate scholar, though he showed considerable aptitude for figures. He inherited more than the average strength for which his family was famous; he stood 6 ft. 2 in. in height, and his feats in wrestling and throwing weights were unexampled in the district. At the age of eighteen he began to assist his manifesting great fertility of mechanical invention, father, and, was soon recognized as the great rival of James Watt in improvements on the steam-engine (*q.v.*). His earliest invention of importance was his improved plunger pole pump (1797) for deep mining, and in 1798 he applied the principle of the plunger pole pump to

the construction of a water-pressure engine, which he subsequently improved in various ways. Two years later he built a high-pressure non-condensing steam engine, which became a successful rival of the low-pressure steam-vacuum engine of Watt. He was a precursor of George Stephenson in the construction of locomotive engines. On Christmas Eve 1801 his common road locomotive carried the first load of passengers ever conveyed by steam, and on the 24th of March 1802 he and Andrew Vivian applied for a patent for steam-engines in propelling carriages. In 1803 another steam vehicle made by him was run in the streets of London, from Leather Lane along Oxford Street to Paddington, the return journey being made by Islington. He next directed his attention to the construction of a steam locomotive for tramways, with such success that in February 1804 at Pen-y-darran in Wales he worked a tramroad locomotive which was able to haul twenty tons of iron; a similar engine was supplied to the Wylam Colliery (Newcastle) in the following year. In 1808 he constructed a circular railway in London near Euston Square, on which the public were carried at the rate of twelve or fifteen miles an hour round curves of 50 or 100 ft. radius. Trevithick applied his high-pressure engine with great success to rock boring and breaking, as well as to dredging. In 1806 he entered into an engagement with the board of Trinity House, London, to lift ballast from the bottom of the Thames, at the rate of 500,000 tons a year, for a payment of 6d. a ton. A little later he was appointed to execute a driftway under the Thames, but the work was abandoned

owing to the water breaking in. He then set up workshops at Limehouse, for the construction of iron tanks and buoys. He was the first to recognize the importance of iron in the construction of large ships, and in various ways his ideas also influenced the construction of steamboats. In the application of steam to agriculture his name occupies one of the chief places. A high-pressure steam threshing engine was erected by him in 1812 at Trewithen, while in the same year, in a letter to the Board of Agriculture, he stated his belief that every part of agriculture might be performed by steam, and that such a use of the steam-engine would "double the population of the kingdom and make our markets the cheapest in the world." In 1814 he entered on an agreement for the construction of engines for mines in Peru, and to superintend their working removed to Peru in 1816. Thence he went in 1822 to Costa Rica. He returned to England in 1827, and in 1828 petitioned parliament for a reward for his inventions, but without success. He died, penniless, at Dartford on the 22nd of April 1835.

A Life of Richard Trevithick, with an account of his Inventions was published in 1872 by his third son, Francis Trevithick (1812–1877).

TREVOR, SIR JOHN (1626–1672), English politician, was a son of Sir John Trevor (d. 1673) of Trevelyn, Denbighshire. His father was a member of parliament under James I. and Charles I., and sat also in the parliaments of Oliver and of Richard Cromwell, and was a member of the council of state during the Commonwealth. One of his

uncles was Sir Sackvill Trevor (d. *c.* 1640), a naval officer, who was knighted in 1604; and another was Sir Thomas Trevor (1586–1656), the judge who decided in favour of the Crown in the famous case about the legality of ship-money, and was afterwards impeached and fined. Sir John Trevor was returned to parliament in 1646 as member for Flintshire. After filling several public positions under the Commonwealth and Protectorate he was a member of the council of state appointed in February 1660 and under Charles II. he rose to a high position. Having purchased the office of secretary of state he was knighted and entered upon its duties

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