is intermixed with that of columbium. In 1801 C. Hatchett detected a new element, which he named columbium, in a mineral from Massachusetts, and in 1802 A. G. Ekeberg discovered an element, tantalum, in some Swedish yttrium minerals. In r809 W. H. Wollaston unsuccessfully endeavoured to show that columbium and tantalum were identical. In 1844 II. Rose detected two new elements in the columbites of the Bodenmais, which he named *niobium* and *pelopium; dianium* was discovered by W. X. F. von Kobell in various columbites; and *ilmenium* and *neptunium were* discovered by R. Hermann. The researches of C. W. Blomstrand, and others, especially of Marignac, proved the identity of columbium, dianium and niobium, and that ilmenium was a mixture of columbium and tantalum. It is very probable that neptunium is a similar mixture. Berzelius, who prepared tantalic acid from the mineral tantalite in 1820, ob­tained an impure metal by heating potassium tantalofluoride with potassium. In 1902 H. Moissan obtained a carbon-bearing metal by fusing the pentoxide with carbon in the electric furnace. The preparation of the pure metal was successfully effected by Werner von Bolton in 1905, who fused the compressed product obtained in the Berzelius process in the electric furnace, air being excluded. An alternative method consisted in passing an electric current through a filament of the tetroxide in a vacuum. The metal is manufactured, for use as filaments in electric lamps, by the action of sodium on sodium tantalofluoride.

The pure metal is silver-white in colour, is very ductile, and becomes remarkably hard when hammered, a diamond drill making little impression upon it. Its tensile strength is higher than that of steel. It melts between 2250° and 2300°, its specific heat is 0∙0365, coefficient of expansion 0∙0000079, and specific gravity 16·64. When heated in air the metal burns if in the form of thin wire, and is superficially oxidized if more compact. At a red heat it absorbs large volumes of hydrogen and nitrogen, the last traces of which can only be removed by fusion in the electric furnace. These substances, and also carbon, sulphur, selenium and tellurium, render the metal very brittle. Tantalum is not affected by alkaline solutions, but is disintegrated when fused with potash. Hydrofluoric acid is the only acid which attacks it. It alloys with iron, molybdenum and tungsten, but not with silver or mercury.

In its chemical relationships tantalum is associated with vanadium, columbium and didymium in a sub-group of the periodic classification. In general it is pentavalent, but divalent compounds are known.

*Tantalum tetroxide,* Ta2O4, is a porous dark grey mass harder than glass, and is obtained by reducing the pentoxide with magnesium. It is unaffected by any acid or mixture of acids, but burns to the pentoxide when heated.

*Tantalum pentoxide,* Ta2O5, is a white amorphous infusible powder, or it may be crystallized by strongly heating, or by fusing with boron trioxιde or microcosmic salt. It is insoluble in all acids. It is obtained from potassium tantalofluoride by heating with sulphuric acid to 400º, boiling out with water, and decom­posing the residual compound of the oxide and sulphuric acid by ignition, preferably with the addition of ammonium carbonate.

*Tantalic acid,* HTaO3, is a gelatinous mass obtained by mixing the chloride with water. It gives rise to salts, termed the tanta- lates. The normal salts are all insoluble in water; the complex acid, hexatantalic acid, H6Ta6O19 (which does not exist in the free state), forms soluble salts with the alkaline metals. *Perlantalic acid,* HTaO4, is obtained in the hydrated form as a white precipitate by adding sulphuric acid to potassium pertantalate, K5TaO8∙ ½H2O, which is formed when hydrogen peroxide is added to a solution of potassium hexatantalate.

*Tantalum pentafluoride,* TaF5, for a long time only known in solution, may be obtained by passing fluorine over an alloy of tantalum and aluminium, and purifying by distillation in a vacuum. It forms colourless, very hygroscopic prisms, which attack glass, slowly at ordinary temperatures, more rapidly when heated *{Ber.,* 1909, 42, p. 492). Its double salts with the alkaline fluorides are very important, and serve for the separation of the metal from columbium and titanium. *Tantalum pentachloride,* TaCls, is ob­tained as light yellow needles by heating a mixture of the pent­oxide and carbon in a current of chlorine. By heating with sodium amalgam and separating with hydrochloric acid, the dichloride, TaCl2∙2H2O, is obtained as emerald green hexagonal crystals. The pentabromide exists, but tantalum and iodine apparently do not combine. Tantalum forms a sulphide, TaS2, and two nitrides, TaN2 and Ta2N5, have been described.

Marignac determined the atomic weight to be 181, but Henrichscn and N. Sahlbom (*Ber.,* 1906, 39, p. 2600) obtained 179∙8 (H=1) by converting the metal into pentoxide at a dull red heat.

**TANTALUS,** in Greek legend, son of Zeus (or Tmolus) and Pluto (Wealth), daughter of Himantes, the father of Pelops and Niobe. He was the traditional king of Sipylus in Lydia (or of Phrygia), and was the intimate friend of Zeus and the other gods, to whose table he was admitted. But be abused the divine favour by revealing to mankind the secrets he had learned in heaven (Diod. Sic. iv. 74), or by killing his son Pelops *{q.v.)* and serving him up to the gods at table, in order to test their powers of observation (Ovid, *Metam.* vi. 401). Another story was that he stole nectar and ambrosia from heaven and gave them to men (Pindar, *Ol.* i. 60). According to others, Pan- dareus stole a golden dog which guarded the temple of Zeus in Crete, and gave it to Tantalus to take care of. But, when Pandareus demanded the dog back, Tantalus denied that he had received it. Therefore Zeus turned Pandareus into a stone, and flung down Tantalus with Mount Sipylus on the top of him (Antoninus Liberalis, 36). The punishment of Tantalus in the lower world was famous. He stood up to his neck in water, which flowed from him when he tried to drink of it; and over his head hung fruits which the wind wafted away whenever he tried to grasp them (*Odyssey,* xi. 582). This myth is the origin of the English word “ tantalize,” and also of the common name tantalus” for a set of spirit decanters kept under lock and key. Another story is that a rock hung over his head ready to fall and crush him (Euripides, *Orestes,* 5). The sins of Tantalus were visited upon his descendants, the Pelopidae. Ancient historical reminiscences and natural phenomena, especially volcanic catastrophes, are at the bottom of the legend. The tomb of Tantalus on Mount Sipylus was pointed out in antiquity, and has been in modern times identified by C. F. Texier with the great cairn beneath Old Magnesia; but Sir W. Μ. Ramsay inclines to a remarkable rock-cut tomb beside Magnesia.

The story of Tantalus is an echo of a semi-Greek kingdom, which had its seat at Sipylus, the oldest and holiest city of Lydia, the remains of which are still visible. There was a tradition in antiquity that the city of Tantalus had been swallowed up in a lake on the mountain ; but the legend may, as Ramsay thinks, have been suggested by the vast ravine which yawns beneath the acropolis. According to S. Reinach (*Revue archéologique,* 1903), Tantalus was represented in a picture standing in a lake and clinging to the branches of a tree, which gave rise to the idea that he was endeavouring to pluck its fruit. The punishment of the overhanging rock refers to the dangerous position of the town of Tantalis below the summit of Mount Sipylus.

See Pelops, Phrygia; Sir W. Μ. Ramsay in *Journal of Hellenic Studies,* iii. ; Frazer's *Pausanias,* iii. p. 555, v., p. 392; J. Hylén, *De Tantalo* (Upsala, 1896), who considers the story of the thirst of Tantalus in the underworld to be due to the Orphic interpolator in the Nekviα of the *Odyssey,* and the Pandareus story to be an innovation of the Alexandrine poets. The essay contains a copious list of authorities and a history of the legend. According to V. Henry *{Revue des Études grecques,* 1892), Tantalus is the sun: the fruits which elude his grasp are the stars suspended on the tree of heaven, which disappear at the rising of the sun; the water into which the sun descends without drinking, is the sea. Tantalus’s betrayal of the secrets of the gods refers to the sun unveiling the secrets of heaven; the slaying of Pelops denotes the going-down of the sun, Pelops meaning the “ gray one,” an epithet of the gloomy sky in which the last rays of the sun are extinguished.

**TANTIA TOPI (***c.* 1819-1859), rebel leader during the Indian Mutiny, was a Mahratta Brahman in the service of Nana Sahib. He instigated the massacre of Cawnpore, and commanded at the battle of Bithur, where he was defeated by General Havelock. With the aid of the Gwalior contingent he pressed General Windham hard at Cawnpore on the 27th and 28th of November 1857, but was defeated by Sir Colin Campbell on the 6th of December. Together with the Rani of Jhansi he was besieged by Sir Hugh Rose in the Jhansi fort, but escaped and collected a force of 20,000 men which Sir Hugh defeated without relaxing