royal decree (Dec. 10, 1865), Tisza once more represented Debreczen and formed, with Kálmán Ghyczy (1808-1888), the Left-centre party. From 1867 onwards his influence con­tinued to increase, despite the rupture of his party, which he reconstructed at the conference of Nagyvárad (March 17, 1868), when the famous *Bihari pontok,* or articles of Bihar, were subscribed. The *Bihari pontok* started from the assumption that Hungary was a free and independent state. They bound the Tisza party to repeal all laws or institutions contrary to, and to promote all measures necessary for, the national inde­pendence. Thus the delegation system and the common minis­tries were marked out for attack, while every effort was to be made to procure for Hungary a separate army, a separate diplomacy and a separate financial system. It was chiefly owing to the efforts of Tisza and his party that Austria remained neutral during the Franco-German War. His speech on the 3rd of March 1875 led to the resignation of Istoan Bittó’s administration and the welding of Deák’s followers and the Left­centre into a new party, the *Szabadelvü párt* or Free Principles Party, which took office under Bela Wenckheim (1811-1879), whom (Oct. 2) Tisza succeeded as prime minister, a post he held, with a few interruptions, for the next fifteen years (1875- 1890). In 1877 he resigned on the discussion of the question of the Composition (Ausgleich), but he returned to office on his own terms. The same thing happened the following year, when his brief resignation compelled the Magyar Diet to agree to the occupation of Bosnia. In 1879 he materially contributed to the formation of the Austro-German alliance. Not till 1888, when the national army bill was introduced, did he encounter any serious opposition, but thenceforth his position became precarious. On the 13th of March 1890, on the occasion of the revision of the Indigenat Act, he resigned office, but continued, as deputy for Nagyvárad to place his vast political experience at the disposal of the house. It is no exaggeration to say that Hungary owes to Klámán Tisza a consolidated government, the formation of a parliamentary majority, a healthy public spirit, public credit, the reform of the Upper House, an admirable educational system, economical, and particularly railway, development, and administrative and judicial reconstruction on modem lines. His opponents have accused him of unscrupu­lousness and party spirit, but not one of them can deny that he reshaped Hungary and made her the leading partner of the dual monarchy. As to his personal integrity and disinterested­ness there has never been the slightest doubt. It is an open secret that, on the retirement of Andrassy, he was offered the chancellorship. He refused it because, to use his own expression, “ I am as wholly and solely Hungarian as the river (Theiss, Hung. *Tisza)* whose name I bear. ”

See Imre Visi, *Kálmán Tisza, a political appreciation* (Hung.; Budapest, 1885); Kornel Abrányi, *Kátmán Tisza Life and Political Career* (Hung.; Budapest, 1878); G. Gratz, *Kálmán Tisza (Modern Magyar Statesmen,* I.) (Hung.; Budapest, 1902); P. Busbach, *The Last Five Years* (Hung.; Budapest, 1895).

His youngest son, Count Stephen Tisza (1861- ), was

born on the 22nd of April 1861. After being educated at Berlin, Heidelberg and Budapest, he entered the ministry of the interior for the purpose of studying technical and economical questions at the fountain-head, and soon became a specialist in agrarian matters. His *Magyar agrárpolitik* (Budapest, 1897), authoritative on its subject, was translated into German the same year (Leipzig). In 1886 Tisza began his parliamentary career, speedily becoming a leading member of the principal committees on economical and educational questions. On the resignation of Kálmán Szell (June 17, 1903) he was entrusted with the formation of a ministry of pacification, but abandoned the attempt on finding it impossible to secure a majority. On the 27th of October, however, with the assistance of the Free Principles Party, he succeeded in composing a cabinet, in which he was minister of the interior as well as premier. From the first the ministry was exposed to the most unscrupulous opposi­tion, exacerbated by the new and stringent rules of procedure which Tisza felt it his duty to introduce if any business were

to be done. The motion for their introduction was made by the deputy Gábor Daniel, supported by the premier, and after scenes of unheard-of obstruction and violence (Nov. 16-18) the speaker, in the midst of an car-splitting tumult, declared that the new regulations had been adopted by the house, and produced a royal message suspending the session. But the Andrassy group, immediately afterwards, separated from the Free Principles Party, and during the rest of the year the Opposition made legislation impossible. By January 1905 the situation had become *ex lex* or anarchical. Tisza stoutly stood by his rules, on the ground that this was a case in which the form must be sacrificed to the substance of parliamentary government. But his appeal to the country at the beginning of 1905 was unsuccessful, and his opponents triumphed by a large majority. Tisza thereupon resigned and retired from public life. (R. N. B.)

**TITANIUM** [symbol Ti, atomic weight 48·1 (O = 16)], a metallic chemical element. Its discovery as an element was due to William Gregor in 1789 who found in the mineral ilmenite or menachinite a new earth, which was regarded as the oxide of a new metal, menachin. Independently of him Klaproth in 1793 discovered a new metal in rutile, and called it titanium; he subsequently found that it was identical with Gregor’s element. Klaproth, however, was unable to prepare the pure oxide, which was first accomplished in 1821 by Rose. The isolation of the pure metal is of much later date. Titanium, although pretty widely diffused throughout the mineral king­dom, is not found in abundance. The commonest titanium mineral is rutile or titanium dioxide, TiO2; anatase and brookite are crystalline allotropes. Titanium is most frequently found associated with iron; ilmenite (Ger. *Titan-eisen)* is FeTiO2, perofskite (Ca,Fe)TiO3, and the metal occurs in most magnetic iron ores. The titanates are well marked in the mineral king­dom. Ilmenite is isomorphous with geikielite, MgTiO3, and pyrophanite, MnTiO3 many of the “rare minerals ”—aeschy- nite, euxenite, polycrase, &c.—contain titanates (and also niobates). Silicates also occur; sphene or titanite, CaTiSiO5, is the commonest; keilhauite is rarer.

The isolation of metallic titanium is very difficult since it readily combines with nitrogen (thus resembling boron and magnesium) and carbon. In 1822 Wollaston examined a speci­men of those beautiful copper-like crystals which are occasionally met with in iron-furnace slags, and declared them to be metallic titanium. This view had currency until 1849, when Wöhler showed that the crystals are a compound, Ti(CN)2∙3Ti3N2, of a cyanide and a nitride of the metal. An impure titanium was made by Wöhler and Sainte-Claire Deville in 1857 by heating to redness fluotitanate of potassium (see below) in the vapour of sodium in an atmosphere of dry hydrogen, and extracting the alkaline fluoride formed by water. The metal thus pro­duced formed a dark brown amorphous powder resembling iron as obtained by the reduction of its oxide in hydrogen. In 1887 Nilson and Petersson *(Zeit. phys. Chem.* 1, p. 25) obtained a purer product by heating the chloride with sodium in a steel cylinder; it then formed yellow scales with a bluish surface colour. H. Moissan *(Compt. rend.,* 1895, 120, p. 290) obtained a still purer metal by igniting the oxide with carbon in the electric furnace. The product has a brilliant white fracture, a specific gravity of 4∙87, very friable, but harder than quartz or steel. Moissan (ibid., 1906, 142, p. 673) has distilled this metal in a very intense electric furnace. When heated in air it bums brilliantly with the formation of the oxide. It combines directly with the halogens, and dissolves in cold dilute sulphuric acid, in hot strong hydrochloric acid and in aqua regia, but less readily in nitric acid. Its most curious property is the readiness with which it unites with nitrogen. Several nitrides have been de­scribed. Ti3N4 is a copper-coloured powder obtained by heating the ammonio-chloride TiCl4∙4NH3 in ammonia. TiN2 is a dark blue powder obtained when the oxide is ignited in an atmosphere of ammonia; while TiN is obtained as a bronze yellow mass as hard as the diamond by heating the oxide in an atmosphere of nitrogen in the electric furnace.