

the limit  $\log 2 = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} \dots$ . As a second example, consider the series  $1 + z + z^2 \dots$ , which for values of  $z$  between the limits  $\pm 1$  (both limits excluded)  $= \frac{1}{1-z}$ . For  $z = +1$ , the series is divergent and has no sum; but for  $z = 1 - \epsilon$  as  $\epsilon$  diminishes to zero we have  $\frac{1}{\epsilon}$  and  $1 + (1 - \epsilon) + (1 - \epsilon)^2 \dots$ , each positive and increasing without limit; for  $z = -1$  the series is divergent and has no sum; the equation  $\frac{1}{2 - \epsilon} = 1 - (1 - \epsilon) + (1 - \epsilon)^2 \dots$  is true for any positive value of  $\epsilon$  however small, but not for the value  $\epsilon = 0$ .

The following memoirs and works may be consulted:—Cauchy, *Cours d'Analyse de l'École Polytechnique*—part i., *Analyse Algébrique*, 8vo, Paris, 1821; Abel, "Untersuchungen über die Reihe  $1 + \frac{m}{1}x + \frac{m(m-1)}{1 \cdot 2}x^2 \dots$ ," in *Crelle's Journ. de Math.*, vol. i. (1826) pp. 211-239, and *Œuvres* (French trans.), vol. i.; De Morgan, *Treatise on the Differential and Integral Calculus*, 8vo, London, 1842; Id., "On Divergent Series and various Points of Analysis connected with them" (1844), in *Camb. Phil. Trans.*, vol. viii. (1849), and other memoirs in *Camb. Phil. Trans.*; Bertrand, "Règles sur la Convergence des Séries," in *Liouv. Journ. de Math.*, vol. vii. (1842) pp. 35-54; Cayley, "On the Inverse Elliptic Functions," *Camb. Math. Journ.*, vol. iv. (1845) pp. 257-277, and "Mémoire sur les Fonctions doublement périodiques," in *Liouv. Journ. de Math.*, vol. x. (1845) pp. 385-420 (as to the boundary for a doubly infinite series); Riemann, "Ueber die Darstellbarkeit einer Function durch eine trigonometrische Reihe," in *Gott. Abh.*, vol. xiii. (1854), and *Werke*, Leipzig, 1876, pp. 213-253 (contains an account of preceding researches by Euler, D'Alembert, Fourier, Lejeune-Dirichlet, &c.); Catalan, *Traité Élémentaire des Séries*, 8vo, Paris, 1860; Boole, *Treatise on the Calculus of Finite Differences*, 2d ed. by Moulton, 8vo, London, 1872. (A. C.)

SERINGAPATAM, formerly the capital of Mysore, India, is situated on an island of the same name in the Kaveri (Cauvery) river in  $12^{\circ} 25' 33''$  N. lat. and  $76^{\circ} 43' 8''$  E. long. It is chiefly noted for its fortress, which figured so prominently in Indian history at the close of the 18th century. This formidable stronghold of Tipu Sultan thrice sustained a siege from the British, but it was finally stormed in 1799; and after its capture the island was ceded to the British. The island of Seringapatam is about 3 miles in length from east to west and 1 in breadth, and yields valuable crops of rice and sugar-cane. The fort occupies the western side of the island, immediately overhanging the river. Seringapatam is said to have been founded in 1454 by a descendant of one of the local officers appointed by Rámánuja, the Vishnuite apostle, who named it the city of Sri Ranga or Vishnu. At the eastern or lower end of the island is the Lal Bagh or "red garden," containing the mausoleum built by Tipu Sultan for his father Hyder Ali, in which Tipu himself also lies. In 1881 the population of the town of Seringapatam was 11,734 (males 5579, females 6155).

SERJEANT-AT-LAW is the name given to one who holds an ancient and honourable rank at the English or Irish bar. The word is a corruption of *serviens ad legem*, as distinguished from *apprenticius ad legem*, or utter barrister, who probably originally obtained his knowledge of law by serving a kind of apprenticeship to a serjeant. When the order of serjeants was instituted is unknown, but it certainly dates from a very remote period. The authority of serjeant counters or counters (*i.e.*, pleaders, those who frame counts in pleading) is treated in the *Mirror of Justices*, and they are named in 3 Edw. I. c. 29. They may possibly have been the representatives of the *conteurs* mentioned in the great customary of Normandy. The position of the serjeant had become assured when Chaucer wrote. One of the characters in the *Canterbury Tales* is

"A serjeant of the law, wary and wise,  
That often had y-been at the parvis."<sup>1</sup>

Serjeants (except king's serjeants) were created by writ of summons under the great seal, and wore a special and distinctive dress, the chief feature of which was the coif, a white lawn or silk skull-cap, now represented by a round piece of black silk at the top of the wig. They enjoyed a social precedence after knights bachelors and before companions of the Bath and other orders. In this they differed from queen's counsel, who have simply professional as distinguished from social rank. Socially the serjeant had precedence, professionally the queen's counsel, unless indeed, as was often the case, a patent of precedence was granted to the former. Till past the middle of the 19th century, a limited number of the serjeants were called "king's (queen's) serjeants." They were appointed by patent and summoned to parliament. Until 1814 the two senior king's serjeants had precedence of even the attorney-general and solicitor-general. It was the custom for serjeants on their appointment to give gold rings with mottoes to their colleagues. Down to 1845 the order enjoyed a very valuable monopoly of practice. The serjeants had the right of exclusive audience as leading counsel in the Court of Common Pleas. In 1834 a royal mandate of William IV. attempted to abolish this privilege, but in 1840 the judicial committee of the privy council declared the mandate informal and invalid. The monopoly was finally abolished in 1845 by Act of Parliament (9 and 10 Vict. c. 54). For at least 600 years the judges of the superior courts of common law were always serjeants. If a judge was appointed who was not a serjeant at the time of his appointment, he was formally created one immediately before his elevation to the bench. By the Judicature Act, 1873, sect. 8, no person appointed a judge of the High Court of Justice or the Court of Appeal is required to take or have taken the degree of serjeant-at-law. The serjeants had their own inn of court down to a very recent date. Serjeants' Inn was formerly in two divisions, one in Fleet Street and one in Chancery Lane. In 1758 the members of the former joined the latter. In 1877 the latter was dissolved, the inn sold to one of the members, and the proceeds divided among the existing serjeants. The extinction of the order is now only a question of time, no serjeant having been created since 1868. It is, however, still within the discretion of the crown to create fresh serjeants if ever it should be deemed advisable to do so. In Ireland the order still exists. The three serjeants at the Irish bar have precedence next after the law officers of the crown.

See *Serviens ad Legem*, by Mr Serjeant Manning; *The Order of the Coif*, by Mr. Serjeant Pulling.

SERJEANTY, a form of tenure. See REAL ESTATE.

SERPENT, a musical instrument. See OPHICLEIDE, vol. xvii. p. 778.

SERPENTINE, a compact crypto-crystalline or fibrous mineral substance, occurring in rock-masses which commonly present dark green colours, variously mottled and fancifully compared to the markings on certain serpents, whence the name "serpentine." For a like reason it is sometimes called "ophite," while Italian sculptors have termed it "ranocchia," in allusion to its resemblance to the skin of a frog. In consequence of its variegated tints, the stone is frequently cut and polished for ornamental purposes, and is hence popularly called a marble. From true marble, however, it differs in chemical composition, being essentially a hydrated silicate of magnesium, usually associated with certain metallic oxides (such as those of iron, nickel, and chromium) which confer upon the stone its characteristic tints. In some localities serpentine is found in

<sup>1</sup> The parvis was the porch of old St Paul's, where each serjeant had his particular pillar at which he held interviews with his clients.

masses which are evidently intrusive among other rocks, while elsewhere it occurs interbedded, usually in lenticular masses, associated with gneiss and crystalline schists. It is noteworthy that the serpentine is frequently crushed and brecciated, exhibiting polished slip-faces which are sometimes striated. The surface of an exposed mass of serpentine is generally barren, whence bosses of the rock are known in the Alps as "monts morts." The origin of serpentine has been a subject of much dispute. It was pointed out by Sandberger and Tschermak that the alteration of olivine may give rise to this product, and pseudomorphs of serpentine after chrysolite are well known to mineralogists. Professor Bonney and many other geologists regard serpentine as being generally an altered eruptive rock, due to the hydration of peridotites, such as lherzolite; probably it may also result from the decomposition of olivine-gabbro and other rocks rich in magnesian silicates. Augite and hornblende may become altered to serpentine. On the contrary, Dr Sterry Hunt and certain other chemical geologists believe that serpentine has generally been formed as an aqueous sediment, probably precipitated by the reaction of sulphate or chloride of magnesium upon the silicate of lime or alkaline silicates derived from the disintegration of crystalline rocks and found in solution in many natural waters. Serpentine is a rock of rather limited occurrence. Its principal localities in England are Cornwall, especially in the Lizard district, where it occupies a considerable area. The famous scenery of Kynance Cove owes much of its beauty to the vivid colours and brilliant surface of the serpentine. The rock is worked into vases, columns, mantelpieces, &c., and of late years has been used to a limited extent for the decoration of shop-fronts in London. The beauty of the Lizard rock is heightened by the white veins of steatite which traverse it, and in some cases by disseminated crystals of bastite, which glisten with metallic lustre. Much of the Lizard serpentine is of rich red and brown colour. Green serpentine is found near Holyhead in Anglesea. A singularly beautiful variety of mottled red and green tints, with veins of steatite, occurs near Portsoy in Banffshire, Scotland. It is also found with chrome iron ore in the Shetland Islands. The green serpentine of Galway occurs in intimate association with crystalline limestone, forming the rock known as "ophicalcite" or "serpentinous marble." Such an association is by no means uncommon; but, though the beauty of the serpentine may thus be enhanced, its durability seems to be impaired. On exposure to the weather the carbonate of calcium decomposes more readily than the silicate of magnesium, and hence the stone soon presents a rough eroded surface. The Galway rock comes into the market under the name of "Irish green" or "Connemara marble." Ophicalcites also occur in Ayrshire, Scotland, and in various parts of the Scottish Highlands; and the green pebbles found in Iona belong to this type of rock.

On the Continent serpentines are largely worked at Zöblitz and at Waldheim in Saxony. The famous rock of Zöblitz, mentioned by Agricola, is known to have been wrought for between three and four centuries, and is still extensively explored by open quarries and by subterranean galleries. The rock usually presents various shades of green and brown, red being very rare; but its most interesting feature is the frequent presence of pyrope, or Bohemian garnet, which occurs scattered through the rock in dark red grains, that decompose on weathering to a green chloritic product. Very little of the Zöblitz serpentine comes to England, but it is common throughout Germany, and a good deal is sent to Russia and even to the United States. It has been used in the construction of the mausoleum of Prince Albert at Frogmore, and for Abraham Lincoln's monument at Springfield, Illinois. The best known

or the Italian serpentines is the "verde Prato," which has been quarried for centuries at Monteferrato, near Prato in Tuscany. According to Capacci this serpentine is probably of Eocene age. It has been largely used as a decorative stone in ecclesiastical architecture in Prato, Pistoia, and Florence. A good deal of serpentine is found near Genoa and Levanto. The "verde di Pegli" is obtained from Pegli, not far from Genoa, while the "verde di Genova" is a brecciated serpentinous limestone from Pietra Lavezzara. Serpentine also occurs at various other points of the Apennines, in Elba, and in Corsica. The term "ophiolite" has been vaguely used to include not only serpentines but many of the rocks associated with the Italian serpentines. In like manner the term "gabbro," derived from a locality near Leghorn, was at one time used as a general name for serpentine and its associates, though now usually restricted to a rock composed essentially of plagioclase and diallage. It is notable that this true gabbro is often found in company with serpentine.

Serpentine is found in numerous localities in the Alps and in France. An elegant variety is quarried at Épinal in the Vosges, and a beautiful ophicalcite is worked at St Véran and Maurins, in the department of Hautes-Alpes. The serpentine of the Ronda Mountains in Spain has been described by Mr J. Macpherson. In North America serpentine is so extensively distributed that only a few localities can be mentioned. It is found at Syracuse in New York; on Manhattan and Staten Islands; at Hoboken in New Jersey; at Newport, Rhode Island; at Newburyport, Massachusetts; at Westchester, Chester county, and at Texas, Lancaster county, in Pennsylvania. It also occurs between Clear Lake and New Idrea in California. A fine ophicalcite has been obtained from near Milford and New Haven in Connecticut, and a beautiful variety has been worked at Port Henry, Essex county, New York (Dana). The Canadian eozone occurs in a serpentinous limestone.

See GEOLOGY, vol. x. pp. 228, 232; MARBLE, vol. xv. p. 528; and MINERALOGY, vol. xvi. p. 414. The literature of the Italian and Saxon serpentines is rather voluminous. Of recent English writings of serpentine reference may be made to Bonney, in *Quart. Journ. Geol. Soc.*, London, xxxiii. p. 884, xxxiv. p. 769, xxxvii. p. 40, xxxix. p. 21, and in *Geol. Mag.*, [2] vi. p. 362, [3] i. p. 406; and to Collins, *Quart. Journ. Geol. Soc.*, xl. p. 458, and *Geol. Mag.*, [3] ii. p. 298. Sterry Hunt has written an elaborate paper in *Proc. Roy. Soc. Canada*, 1883, sect. iv. pp. 165-215. See also Teall, *British Petrography*, 1886, and Becker, in *Amer. Journ. of Science*, May 1886. (F. W. R.)

SERPENTS. See SNAKES.

SERPUKHOFF, a district town of Russia, in the government of Moscow, 61 miles south of the city of Moscow, with which it is connected by rail. Built on high cliffs on both banks of the river Nara, 3 miles above its junction with the Oka, Serpukhoff has of late become an important manufacturing and commercial town. The aggregate production of its manufactories (cotton and woollen stuffs, paper, leather), which employ about 4000 hands, in 1880 was valued at about £300,000. The surrounding district has several large cotton and woollen factories, with a yearly output worth about £1,000,000. Petty trades are also much developed in the neighbourhood,—textile fabrics, furniture, and earthenware and porcelain being produced by the peasantry. The manufactured goods of Serpukhoff are sent—mostly by rail—to the fairs of Nijni-Novgorod and the Ukraine, while large amounts of grain, hemp, and timber, brought from the east on the Oka, are discharged at Serpukhoff and sent on to Moscow and St Petersburg. The goods traffic by rail and river showed in 1880 an aggregate of 5,400,000 cwts. (exclusive of timber floated down the Oka). Notwithstanding its recent prosperity and the sums bequeathed to the municipality by wealthy merchants, Serpukhoff improves but slowly. The cathedral (1380) was rebuilt in the 18th century; of



the old fortress, situated on a promontory formed by a bend of the Nara, a few heaps of stones are the only remains. The population in 1884 was 22,420.

Serpukhoff is one of the oldest towns of the principality of Moscow; it is mentioned in the will of Ivan Daislovich (1328), at which time it was a nearly independent principality under the protectorate of Moscow. Its fortress, protecting Moscow on the south, was often attacked by the Tatars; Toktamish plundered it in 1382, and the Lithuanian prince Svidrigaito in 1410. In 1556 the town was strongly fortified, so that fifteen years later it was able to resist the Mongol invasion. Its commercial importance dates from the 18th century.

**SERTORIUS, QUINTUS.** The life and career of the Roman Sertorius, a man of remarkable genius both as a general and as a statesman, may be said to be comprised between the years 105 and 72 B.C., a period of civil war and revolution in the Roman world, when every man of any mark had to be an adherent either of Sulla or of Marius. Sertorius, who came from a little Sabine village under the Apennines and was a self-made man, attached himself to the party of the latter, and served under him in 102 B.C. at the great battle of Aquæ Sextiæ (Aix), in which the Teutones were decisively defeated. Three years before he had witnessed the rout of a Roman army by the Cimbri on the Rhone. In 97 he was serving in Spain and thus had a good opportunity of making himself acquainted with the country with which his fame is chiefly associated. In 91 he was quaestor in Cisalpine Gaul, and on his return to Rome he met with such a hearty welcome that he would have been elected to the tribuneship but for the decided opposition of Sulla. He now declared himself for Marius and the democratic party, though of Marius himself as a man he had the worst opinion. He must have been a consenting party to those hideous massacres of Marius and Cinna in 87, though he seems to have done what he could to mitigate their horrors by putting a stop to the outrages perpetrated by the scum of Marius's soldiery. On Sulla's return from the East and the war with Mithradates in 83, Sertorius left Rome for Spain, where he represented the Marian or democratic party, but, it would appear, without receiving any definite commission or appointment. Here he passed the remainder of his life, with the exception of some cruises in the Mediterranean in conjunction with Cilician pirates, and of a campaign in Mauritania, in which he defeated one of Sulla's generals and captured Tingis (Tangier). This success recommended him to the Spaniards, more particularly to the Lusitanian tribes in the west, whom Roman generals and governors of Sulla's party had plundered and oppressed. Brave and kindly and gifted with a rough telling eloquence, Sertorius was just the man to impress Spaniards favourably, and the native militia, which he organized, spoke of him as the "new Hannibal." Many Roman refugees and deserters joined him, and with these and his Spanish volunteers he completely defeated one of Sulla's generals and drove Metellus, who had been specially sent against him from Rome, out of Lusitania, or further Spain as the Romans called it. Sertorius owed much of his success to his statesmanlike ability, and it seems that he aspired to be in Spain what the great Agricola afterwards was in Britain. His object was to build up a stable government in the country with the consent and co-operation of the people, whom he wished to civilize after the Latin model. He established a senate of 300 members, drawn from Roman emigrants, with probably a sprinkling of the best Spaniards. For the children of the chief native families he provided a school at Osca (Huesca), where they received a Roman education and even adopted the dress of Roman youths. Strict and severe as he was with his soldiers, he was particularly considerate to the people generally and made their burdens as light as possible. It seems clear that he had a peculiar gift for evoking the

enthusiasm of rude tribes, and we can well understand how the famous white fawn, which was his constant companion, may have promoted his popularity. For six years he may be said to have really ruled Spain. In 77 he was joined by Perpenna, one of the officers of Lepidus, from Rome, with a following of Roman nobles, and in the same year the great Pompey, then quite a young man and merely a knight, was sent by the senate to take the command in Spain and with Metellus to crush Sertorius. The war was waged with varying success, but on the whole Sertorius proved himself more than a match for his adversaries, utterly defeating their united forces on one occasion near Saguntum. Pompey wrote to Rome for reinforcements, without which, he said, he and Metellus would be driven out of Spain. Rome's position was very critical, the more so as Sertorius was in league with the pirates in the Mediterranean, was negotiating with the formidable Mithradates, and was in communication with the insurgent slaves in Italy. But owing to jealousies among the Roman officers who served under him and the Spaniards of higher rank he could not maintain his position, and his influence over the native tribes slipped away from him, though he won victories to the last. In 72 he was assassinated at a banquet, Perpenna, it seems, being the chief instigator of the deed.

What we know of Sertorius is mainly drawn from Plutarch's *Lives*, from Appian, and from the fragments of Sallust. There is a good life of him by G. Long in Smith's *Class. Dict.*

**SERVANT.** See MASTER AND SERVANT.

**SERVETUS, MICHAEL, or MIGUEL SERVETO (1511-1553),** physician and polemic, was born in 1511<sup>1</sup> at Tudela in Navarre (according to his Vienne deposition), his father being Hernando Villanueva, a notary of good family in Aragon. His surname is given by himself as Serveto in his earliest works, "per Michaelem Serueto, alias Reues." Later he Latinized it into Servetus, and even when writing in French (1553) he signs "Michel Seruetus."<sup>2</sup> It is not certain that he was related to his contemporary André Serveto of Anifion, the Bologna jurist; but it is probable that he was of the same family as the Spanish ecclesiastic Marco Antonio Serveto de Reves (d. 1598), born at Villanueva de Sigena in the diocese of Huesca (Latassa, *Biblioteca Nueva*, 1798, i. 609). Servetus, who at Geneva makes "Villeneuve" his birthplace, fixes it in the adjoining diocese of Lerida, in which there are three villages named Vilanova. Having apparently had his early training at the university of Saragossa, he was sent by his father to study law at Toulouse, where he first became acquainted with the Bible (1528). From 1525 he had found a patron in Juan de Quintañá (d. 1534), a Franciscan promoted in 1530 to be confessor to Charles V. In the train of Quintañá he witnessed at Bologna the coronation of Charles in February 1530, visited Augsburg, and perhaps saw Luther at Coburg. The spectacle of the adoration of the pope at Bologna had strongly impressed his mind in an anti-papal direction. He left Quintañá, and, after visiting Lyons and Geneva, repaired to Eccolampadius at Basel, whence he pushed on to Bucer and Capito at Strasburg. A crude, but very original and earnest, theological essay, *De Trinitatis Erroribus*, printed at Hagenau in 1531, attracted considerable attention; Melanchthon writes "Servetum multum lego." It was followed in 1532 by a revised presentation of its argument. We next find Servetus at Lyons, in 1535, as an editor of scientific works for the printing firm of Trechsel, under the name of Michel de Villeneuve or Michael Villanovanus, which he used without interruption till the year

<sup>1</sup> This date rests upon his own testimony as to his age (both at Vienne and Geneva) and that of Calvin. An isolated passage of his Geneva testimony may be adduced in support of 1509.

<sup>2</sup> The form "Servet" first appears in a letter of Eccolampadius to the senate of Basel (1531), and is never used by himself. "Servete" is an imaginary form.

of his death. Here he found a friend in Dr Symphorien Champier (Campegius) (1472-1539), whose profession he resolved to follow. Accordingly he went (1536) to Paris, where he studied medicine under Johann Günther, Jacques Dubois, and Jean Fernel. It was in 1536, when Calvin was on a hurried and final visit to France, that he first met Servetus at Paris, and, as he himself says, proposed to set him right in theological matters.<sup>1</sup> As assistant to Günther, Servetus succeeded the famous anatomist Vesalius; Günther, who pays the highest tribute to his general culture, describes him as specially skilled in dissection and "vix ulli secundus" in knowledge of Galen. He graduated in arts and asserts that he also graduated in medicine, published a set of lectures on syrups (the most popular of his works), lectured on geometry and astrology, and defended by counsel a suit brought against him (March 1538) by the medical faculty on the ground of his astrological lectures. In June 1538 we find him at the university of Louvain (where he was inscribed on the roll of students as Michael Villanova on 14th December 1537), studying theology and Hebrew, explaining to his father (then resident at San Gil) his removal from Paris, early in September 1537, as a consequence of the death (8th August) of his master (el señor mi maestro), and proposing to return to Paris as soon as peace was proclaimed. After this he practised medicine for a short time at Avignon, and for a longer period at Charlieu (where he contemplated marriage, but was deterred by a physical impediment). In September 1540 he entered himself for further study in the medical school at Montpellier. In 1541 he resumed editorial work for the Lyons booksellers, to whose neighbourhood he had returned.

Among the attendants upon his Paris lectures had been a distinguished ecclesiastic, Pierre Paulmier, since 1528 archbishop of Vienne. Paulmier invited Servetus to Vienne as his confidential physician. He acted in this capacity for twelve years (1541-53), and made money. Outwardly he conformed to Roman Catholic worship; in private he pursued his theological speculations. It is probable that in 1541 he had been rebaptized. He opened a correspondence with Calvin, and late in 1545, or very early in 1546, he forwarded to Calvin the manuscript of a revised and enlarged edition of his theological tracts, and expressed a wish to visit him at Geneva. Calvin replied on 23d February 1546, in a letter which is lost, but in which, he says, he expressed himself "plus durement que ma costume ne porte." On the same day he wrote to Guillaume Farel, "si venerit, modo valeat mea autoritas, vivum exire nunquam patiar," and to Pierre Viret in the same terms. Servetus had fair warning that if he went to Geneva it was at his peril. In his letter to Abel Pouppin (in or about 1547), after stating that he had failed to recover his manuscript from Calvin, he says, "mihi ob eam rem moriendum esse certo scio." The volume of the theological tracts, again recast, was declined by a Basel publisher in April 1552, but an edition of 1000 copies was secretly printed at Vienne. It was finished on 3d January 1553; the bulk of the impression was privately consigned to Lyons and Frankfurt, for the Easter market. But on 26th February a letter, enclosing a sheet of the printed book, and revealing the secret of its authorship, was written from Geneva by Guillaume H. C. de Trye, formerly *échevin* of Lyons, to his cousin Antoine Arneys in that city. This letter bears no sign of dictation by Calvin; the history of De Trye shows that it may have been instigated in part by personal ill-feeling towards the Lyons booksellers. But Calvin furnished (reluctantly, according to De Trye) the samples of Servetus's handwriting enclosed in a subsequent letter, for the express purpose of securing his conviction.

<sup>1</sup> Beza incorrectly makes Servetus the challenger and the date 1534.

The inquisitor-general at Lyons, Matthieu Ory, set to work on 2th March; Servetus was interrogated on 16th March and arrested on 4th April. Under examination his defence was that, in correspondence with Calvin, he had assumed the character of Servetus for purposes of discussion. At 4 A.M. on 7th April he escaped from his prison, evidently by connivance. He took the road for Spain, but turned back in fear of arrest. How he spent the next four months is not known; Calvin believed he was wandering in Italy; the idea that he lay concealed in Geneva was first started by Spon. On Saturday 12th August he rode into Louyset, a village on the French side of Geneva. Next morning he walked into Geneva, and ordered a boat, to take him towards Zurich on his way for Naples. He was recognized that day at church and immediately arrested. The process against him lasted from 14th August to 26th October, when sentence "estre bruslé tout vif" was passed, and carried out next day at Champel (27th October 1553). Calvin would have had him beheaded. Meanwhile the civil tribunal at Vienne had ordered (17th June) that he be fined and burned alive; the sentence of the ecclesiastical tribunal at Vienne was delayed till 23d December. Jacques Charmier, a priest in Servetus's confidence, was condemned to three years' imprisonment at Vienne. The life of Servetus is full of puzzles; his writings give the impression not only of quick genius but also of transparent sincerity; they throw, however, little light on the mysterious parts of his story. Don Pedro Gonzalez de Velasco (see his *Miguel Servet*, 1880) has placed a statue of Servetus in the porch of the Instituto Antropologico at Madrid.

The opinions of Servetus, marked by strong individuality, are not easily described in the terms of any current system. His ana-baptism, with his denial of the trinitarianity of the Godhead and of the eternity of the Son, made his views abhorrent to Catholics and Protestants alike; while his intense Biblicism, his passionate devotion to the person of Christ, and the essentially Christocentric character of his view of the universe give him an almost unique place in the history of religious thought. He is sometimes classed with the Arians; but he endorses in his own way the homoousian formula, and speaks contemptuously of Arius as "Christi gloria incapacissimus." He has had many critics, some apologists (e.g., Postel and Lincurius), and few followers. The fifteen condemnatory clauses, introducing the sentence of Servetus at Geneva, set forth in detail that he had been found guilty of heresies, expressed in blasphemous language, against the true foundation of the Christian religion. It is curious that one instance of his injurious language is his employment of the term "trinitaires" to denote "ceux qui croyent en la Trinite." No law, current in Geneva, has ever been adduced as enacting the capital sentence. Claude Rigot, the procureur-général, examined Servetus with a view to show that his legal education must have familiarized him with the provisions of the code of Justinian to this effect; but in 1535 all the old laws on the subject of religion had been set aside at Geneva; the only civil penalty for religion, retained by the edicts of 1543, was banishment. The Swiss churches, while agreeing to condemn Servetus, give no hint of capital punishment in their letters of advice. The extinct law seems to have been arbitrarily revived for the occasion. A valuable controversy followed, on the question of executing heretics, in which Beza (for) Mino Celsi (against), and several caustic anonymous writers took part.

The works of Servetus are not so rare as is often supposed, but the most common are his earliest, in which he approaches nearer to the position afterwards taken by F. Socinus than he does in his more matured publications. The following is an enumeration of them in the order of their appearance. (1) *De Trinitatis Erroribus Libri Septem*, 1531, 16mo. (2) *Dialogorum de Trinitate Libri Duo*, 1532, 16mo; four chapters are added on justification and kindred topics. These two books have been twice reprinted and manuscript copies are common; a Dutch version, by Reynier Telle, was published in 1620. (3) *Claudii Ptolomæi Alexandrini Geographicas Enarrationis Libri Octo: ex Bilibaldi Pirckheymeri translatione, sed ad Græca et prisca exemplaria a Michaeli Villanovano jam primum recogniti. Adjecta insuper ab eodem scholia, &c.*, Lyons, (Melchior & Caspar Trechsel), 1535, fol.; 2d ed., Lyons (Hugo à Porta), 1541, i.c., 1542; printed by Caspar Trechsel at Vienne, fol.; on this work Tollin founds his high estimate of Servetus as a comparative geographer; the passage incriminated on his trial as attacking the authority of Moses is an extract from Lorenz Friese.



(4) *Brevissima Apologia pro Symphoriano Campegio in Leonardum Fuchsium*, 1536, 12mo; no extant copy is known; Tollin has reprinted an extract from it. (5) *Syruporum Universa Ratio*, &c., Paris, 1537, 16mo; there were four subsequent editions, the last being Venice, 1548 (six lectures on digestion, the composition and use of syrups being treated in the fifth lecture). (6) *In quendam Medicum Apologetica Disceptatio pro Astrologia*, Paris, 1538, 16mo; reprinted, Berlin, 1880; the medicus is Jean Tagault, who had interrupted the lectures of Servetus on astronomy, under which he included meteorology. (7) *Biblia Sacra ex Santis Pagnini Translatione . . . recognita, et scholiis illustrata*, &c., Lyons (Hugo à Porta), 1542, fol., remarkable for its theory of prophecy, explained in the preface and illustrated in the notes. (8) D'Artigny says that Servetus "fit les argumens" to a Spanish version of the *Summa* of Aquinas; but nothing is known of this or of the "divers traités de grammaire" which he translated from Latin into Spanish. (9) *Christianismi Restitutio*, &c., 1553, 8vo (perfect copies in Vienna and Paris, an imperfect copy in Edinburgh), partly reprinted, London, 1723; 4to (copies in London and Paris), reprinted 1790; 8vo, by Rau at Nuremberg for De Murr, from the Vienna copy; manuscript copies are rare; the Paris library has a manuscript copy of an earlier recension of several books, including the often-quoted description of the pulmonary circulation. This work is often called anonymous, but the initials M. S. V. are given at the end and the full name at p. 199; the volume is not a single treatise but an assemblage of theological tracts written in a nervous and epigrammatic style and with great command of very various learning; the *Apologia* addressed to Melanchthon, with which it concludes, is in the writer's best manner. Two treatises, *Desiderius* (ante 1542) and *De Tribus Impostoribus* (1598), have been erroneously assigned to Servetus. Of his few remaining letters most will be found in Mosheim.

The literature relating to Servetus is very large, but the following are some of the most important pieces. Calvin's *Defensio Orthodoxæ Fidei*, &c., 1554, 4to (also in French, *Déclaration pour maintenir*, &c., 16mo, same date), is the source of many prevalent misconceptions respecting the opinions of Servetus and his attitude on his trial. De la Roche's *Historical Account*, &c., in *Mem. of Lit.*, 1711-12 (reproduced in French, *Biblioth. Angl.*, Amsterdam, 1717, 18mo), was followed by *An Impartial History*, &c., 1724, 8vo (said to be by Nathaniel Hodges, a Baptist minister, afterwards knighted). Allwoerden's *Historia*, &c., 1728, 4to (materials furnished by Mosheim), is superseded by Mosheim's *Anderswärtiger Versuch*, &c., 1748, 4to, with its appendix, *Neue Nachrichten*, 1750, 4to, issued after the publication of the records of the Vienna trial by D'Artigny, in *Nouveaux Mémoires d'Hist.*, &c., vol. ii., 1749, 12mo. Chaufoe's valuable article in *Nov. Dict. Historique*, vol. iv., 1756, fol. (translated separately by Rev. James Yair, 1771, 8vo), makes no use of Mosheim's later researches. Trechsel, in *Die prot. Antitrinitarier vor F. Socin*, &c., Bk. 1., 1839, 8vo, uses all available materials up to date. Since then the investigations of H. Tollin (published in a series of some forty separate articles in various journals from 1874 to 1885) have thrown light on every portion of the subject. The records of the Geneva trial, first published by De la Roche, and reproduced in *Bulletin de Relation*, &c., 1844, 8vo, and elsewhere, are best given in vol. viii. (1870) of the edition of Calvin's works by Baum, Cunitz, and Reuss; Roget, in *Hist. du Peuple de Genève*, vol. iv., 1877, has a good account of both trials. The passage describing the pulmonary circulation is first noticed by W. Wotton, in *Reflections upon Ancient and Mod. Learning*, 1694, and has given rise to a literature of its own—see especially Tollin's *Entdeckung des Blutkreislaufs*, &c., 1876, Huxley, in *Fortnightly Rev.*, February 1878; and Tollin's *Kritische Bemerkungen über Harvey und seine Vorgänger*, 1882. Other physiological speculations of Servetus are noted by Sigmond (*The Unnoticed Theories of Servetus*, 1826); but it has escaped Sigmond that Servetus had an idea of the composition of water and of air. As a thinker, Servetus is claimed on superficial grounds by Unitarians (see Wallace, *Antitrin. Biog.*, 1850, i. 420), who have written several accounts of him, of which R. Wright's *Apology*, &c., 1807, 8vo, is the worst, and J. S. Porter's *Servetus and Calvin*, &c., 1854, 8vo, perhaps the best. Saisset, in *Rev. des Deux Mondes*, 1848, treats Servetus as a pantheist; he is followed by Willis, in his *Servetus and Calvin*, 1877, 8vo, a most unsatisfactory book (comp. *Theol. Rev.*, April and July 1878). Tollin's *Das Lehrsystem Michael Servet's*, 3 vols., 1876-78, 8vo, and Pünjer's compendious *De Michaelis Serveti Doctrina*, &c., 1876, 8vo, are valuable digests of his opinions from different points of view. Of Servetus's personal character the best vindication is Tollin's *Charakterbild Michael Servet's*, 1878, 8vo (in French with additions by Dardier, *Portrait Caractère*, 1879, 8vo). His story has been dramatized by Max Ring, *Die Genfer* (1850), by José Echegaray, *La Muerte en los Labios* (1880), and by Albert Hamann, *Servet* (1881). The recent discovery at the Record Office, London, (U. 140) and the British Museum (Cotton MSS., Galba B. x.) of intercepted letters from Servetus at Louvain in 1538 adds considerably to our information about his family and early friends, but introduces new problems as to the details of his fitful career. (A. GO)

SERVIA, a kingdom belonging to the Balkan peninsula of Europe, lying between Bosnia on the west and Bulgaria and Roumania on the east, and between the Turkish province of Albania on the south and the Austrian Military Frontier on the north. From Bosnia it is separated by the Drina, from Austrian and Roumanian territory by the Danube and the Save, and from Bulgaria partly by the Timok. Some parts of the southern frontier are indicated by mountains, but elsewhere there are no natural boundaries. In shape Servia is an irregular trapezium, situated between about 42° 30' and 45° N. lat. and 19° and 22° 30' E. long. The area is about 18,760 square miles, and the population (1,667,159 in 1874) was estimated at the end of 1884 to be 1,902,419, thus giving a density of about

100 to the square mile. This low density, only about one-third of that of the United Kingdom, is explained by the nature of the surface, the inland position, the defective communications with the exterior, and the absence of manufacturing industries.

The surface is for the most part mountainous or hilly, although there are no well-defined mountain ranges of any extent. The highest summits lie near the middle of the southern frontier, where Mount Kopaonik attains the height of nearly 7000 feet. Towards the Bosnian frontier the mountains are pretty closely massed together, and some of the summits approach 4000 feet; this height is exceeded on the eastern side of the country, where the mountains, forming a continuation of the Carpathians, are in many places more rugged and precipitous than anywhere else in the kingdom. The Rudnik Mountains, which begin immediately to the north of the Servian Morava, have their highest parts in the south and gradually sink towards the north from nearly 3000 to less than 2000 feet. Still lower are the elevations in the provinces in the extreme south acquired in 1878 under the treaty of Berlin. As a general rule the Servian highlands consist of detached groups of mountains and conical hills with gentle slopes rising from verdant valleys, and they are mostly covered to the top with forests, chiefly of oak and beech, the higher summits in the south also with conifers. But the plains, though numerous, are of no great extent, and occur chiefly along the banks of the rivers. Apart from frontier rivers, the most important stream is the Morava, which, rising on the western slopes of the Kara Dag, a little beyond the Servian frontier, enters the country with a north-easterly course near the extreme south-east, and then turns north-north-west and flows almost in a straight line through the heart of the kingdom to the Danube. In the upper part of its course it is known as the Bulgarian Morava, and only after receiving the Servian Morava on the left is it known as the Morava simply or as the Great Morava. The only other important tributary is the Nishava, which it receives from the right at Nish. The valleys of all these rivers, especially those of the Bulgarian and the Great Morava, and of the Nishava, contain considerable areas of level or low-lying country well suited for the growth of corn, and the low grounds along the Save and the Danube from the Drina to the Morava are also well adapted for agriculture, though for the most part devoted only to pasture. Altogether no more than one-sixth of the surface is estimated to be occupied by cultivated fields and vineyards, while one-fifth is estimated to form pasture land and about an equal area woodland. Nearly one-half of the entire area is believed to be unproductive.

Besides the frontier streams on the north and west, the only river of any importance for navigation is the Morava, which is navigable for steamers of light draught as high as Tiupriia about 60 miles from its mouth, but its valley is important as the main highway of the country, and all the more since the introduction of railways. Railways both to Constantinople and to Salonica are now (1886) in course of construction under a convention concluded with Austria in 1881. The section common to the two systems, that from Belgrade to Nish, 152 miles in length, was opened for traffic in September 1884, and the line (76 miles) from Nish to Vranja was completed in March 1886, but the connexion with the Turkish railway from Salonica remains to be completed. At present, in consequence of the unsatisfactory communication with the south, only about 7 or 8 per cent. of the Servian imports enter by the southern frontier, 85 per cent. coming through Austria-Hungary. In the beginning of 1886 work had been begun on only one-half of the line from Nish to Pirot, on the other system.

The geological structure of Servia is varied. In the south and west the sedimentary rocks most largely developed are of ancient, pre-Carboniferous date, interrupted by considerable patches of granite, serpentine, and other crystalline rocks. Beyond this belt there appear in the north-west Mesozoic limestones, such as occupy so extensive an area in the north-west of the Balkan peninsula generally, and the valleys opening in that quarter to the Drina have the same desolate aspect as belongs to these rocks in the rest of that region. In the extreme north-east the crystalline schists of the Carpathians extend to the south side of the Danube, and stretch parallel to the Morava in a band along its right bank. Elsewhere east of the Morava the prevailing rocks belong to the Cretaceous series, which enters Servia from Bulgaria. The heart of the country—the Shumadia, as it is called—is mainly occupied by rocks of Tertiary age, with intervening patches of older strata; and the Rudnik Mountains are traversed by metalliferous veins of syenite. The mineral wealth of Servia is considerable and varied, though far from being adequately developed. Gold, silver, iron, and lead are said to have been worked in the time of the Romans. Heaps of ancient slag from lead mines still exist in the neighbourhood of Belgrade, and other old lead mines occur in the valley of the Toplitza. Gold dust is washed down by heavy rains in the valley of the Timok, where it is gathered by the peasants. In the syenite veins of the Rudnik Mountains ores of lead, zinc, copper, sulphur, and arsenic are present, but are not worked, and from the mines of Krupani in the north-west argentiferous lead, antimony, and other ores have been obtained. The principal mining centre east of the Morava is Maidanpek in the north, where there is a large iron-smelting establishment in the hands of an English company. Coal or lignite is met with in many places, including a number of points on the Servian railway. The largest deposit lies round Tiupriia, and measures about 19 miles in length by 7½ in breadth. All the minerals belong to the state, but permission to work them can be obtained on payment of a moderate royalty.

The climate of Servia is on the whole mild, though subject to the extremes characteristic of inland Eastern countries. In summer the temperature may rise as high as 106° Fahr., while in winter it often sinks to 13° or even sometimes 20° below zero. The high-lying valleys in the south are colder than the rest of the country, not only on account of their greater elevation but also because of their being exposed to the cold winds from the north and north-east. Accordingly, the chief products of the soil are such as thrive under a warm summer and are unaffected by a cold winter. Both maize and wine are grown, but the olive is excluded by the severity of the cold season.

Maize is the principal object of agriculture, the average annual crop being estimated at upwards of 5,000,000 bushels, wheat coming next with an average crop of less than 4,000,000 bushels. Besides cereals, flax, hemp, and tobacco are grown, but the attempts made to cultivate cotton have proved unsuccessful. The chief wine-growing locality is in the north-east round Negotin. Inefficient as are the implements and backward the methods of agriculture, grain makes up a considerable portion of the exports, owing to the scantiness of the population and the deficiency of other industries, and it is expected that this export will be greatly increased on the completion of the railway system to the southern seaports. The grain chiefly exported is wheat,—maize supplying, as among all the Slavs of the Balkan peninsula, the chief food of the people. Hitherto live-stock has formed the largest item in the exports, sometimes amounting to over one-half. Among these pigs, which are fed in immense numbers on the mast of the forests, take the first place. Of late years their number has greatly declined, largely in consequence of American competition; but relatively to population Servia still maintains a much greater number than any other country of Europe; and the same is true of sheep, which are here relatively more than twice as numerous

as in Spain. Cattle also are numerous, but are reared solely as beasts of draught and for export. Bees are very generally kept,—the honey being consumed in the country, the wax exported. The rearing of silkworms is spreading, especially since cocoons and eggs have begun to be exported to Italy. Orchards are very extensive, and all kinds of fruit belonging to central Europe are grown in abundance,—above all, the plum, from which is distilled the favourite national spirit, *slivovitz*. The average annual value of the exports is a little over £1 per head of population. After live animals and grain come hides and prunes. Among the imports the chief items are sugar, salt (wholly absent in Servia), cotton goods, and other textiles. Import duties being high, a considerable amount must always be allowed for smuggled goods. Though the great bulk of the imports enter the country by the Austrian frontier, an increasingly large proportion comes originally from beyond Austria-Hungary. Thus in 1879, of the total quantity of exports across the Austrian frontier, 76 per cent. were of Austrian-Hungarian origin, in 1880 73 per cent., in 1881 65 per cent., leaving 24, 27, and 35 per cent. respectively for countries beyond. Among the latter Germany comes next after Austria-Hungary and then England. Colonial wares (sugar, coffee, &c.) are now imported cheaper by way of Hamburg than by way of Trieste.

The natural increase of population in Servia is pretty rapid, the annual birth-rate being among the highest in Europe, while the death-rate, though high, is exceeded in several other countries. During the years 1879-84 the average annual number of births was 76,962, of deaths 47,181, the excess of births over deaths 29,781, which figures compared with a total population intermediate between that at the end of 1874 and that at the end of 1884 give a birth-rate of upwards of 43 per thousand, a death-rate of less than 27 per thousand, and an annual excess of births over deaths of nearly 17 per thousand. The average proportion of male to female births is 106:100. The people are mainly Serbs, though the proportions have been modified by the increase of territory under the treaty of Berlin. This territory, at one time occupied by Servians, had been to a large extent deserted by them in consequence of the oppressive Turkish yoke, and their place had been taken by Mohammedan Albanians west of the Morava and by Bulgarians in the valley of the Nishava. Most of the Albanians, however, quitted their homes at the time of annexation, and Servians are now returning to their former seats. Previous to the treaty of Berlin the principal element of the population next after the Servians consisted of Roumanians, of whom there were about 130,000. The Servian Church forms a branch of the Oriental Greek Church with a perfectly independent administration. The highest ecclesiastical authority is exercised by the national synod. Elementary education is in a very backward state, but recently a law has been passed to remedy this defect, by making education obligatory on all children between six and thirteen and laying the duty of providing accommodation, books, and teachers upon school districts. At Belgrade there is a high school or university with faculties of philosophy, law, and technics.

The agricultural population are scattered among a great number of villages, most of which consist of single isolated homesteads. Each homestead is occupied by a group of families connected by blood and acknowledging one head, the *stareschina*, who is usually the patriarch of the community, but is often chosen by the rest of the members on account of his prudence and ability. He regulates the work and distributes the proceeds of the labour of the entire homestead, and his ruling is followed without question. The land cultivated by a family or group of families is always their own property. The buildings belonging to the homesteads are enclosed within an immense palisade, inside which a large expanse of fields is mostly planted with plum, damson, and other fruit-trees, surrounding the houses of the occupiers. In the midst of these is the house of the *stareschina*, which contains the common kitchen, eating hall, and family hall of the entire homestead. In this last all the members assemble in the evening for conversation and amusement, the women spinning, while the children play. The people take delight in listening to the recitation of the poetical rhapsodies in which the Servian literature is remarkably rich. The houses are mostly very small wooden structures, serving for little else but sleeping places. But that of the *stareschina* is often of brick, and is invariably of better construction than the rest.

Since 6th March 1882 the government has been a constitutional monarchy. The legislative body is called the *skupshchina*, and in 1884 consisted of 178 members, three-fourths of whom are elected by the people, the remainder being nominated by the king. A new *skupshchina* is elected every three years. For the settlement of special questions of great moment an extraordinary *skupshchina* or great national assembly is elected, in which there are four times as many members, all elected, as in the ordinary *skupshchina*. There is also a permanent council of state of 15 members, who have the task of drawing up proposals for legislation, hearing complaints regarding the decisions of ministers, and performing other functions. For administrative purposes the kingdom is divided into twenty-two circles, besides the city of Belgrade. In the budget for 1883-84 the revenue and expenditure were each estimated at nearly