

head, declared against him. Henry called a council, laid formal charges against the king, and threatened to appeal to Rome. In the midst of this crisis Matilda and her half-brother, Robert of Gloucester, landed in the south of England, and a civil war began. From this time forward, for fourteen dismal years, the land knew no peace. It is needless to go into details. Neither party was strong enough to deal a final blow at the other. The nobility changed sides as they pleased, fighting generally for their own interests or for plunder; bands of freebooters wandered up and down the country; upwards of a thousand castles, each of which was a den of robbers, were erected; the church found threats and persuasion equally ineffective to restore peace and order. "Men said openly," we are told by the chronicler, "that Christ and His saints slept." At the battle of Lincoln in 1141 Stephen was taken prisoner. After this Matilda was elected queen, but she soon forfeited the allegiance of her supporters. The Londoners revolted, the empress fled to Oxford, and the earl of Gloucester was taken prisoner. He was exchanged for Stephen, and matters went on as before. About 1147 there came a change. Matilda left the country, and her son Henry took the lead. His predominance was further secured by the death of Robert of Gloucester in 1148. Three years later Henry became count of Anjou on the death of his father, while his marriage with Eleanor of Aquitaine made him one of the most powerful princes in Europe. This great accession of strength enabled him to meet Stephen on more than equal terms, and Stephen on the death of his son Eustace was more inclined to peace. In November 1153 the treaty of Wallingford brought the long struggle to an end. It was agreed that Stephen should reign till his death, and that Henry should succeed him. A scheme of reform was drawn up, which Stephen endeavoured, during the short remainder of his reign, to carry out. He died on October 25, 1154. A brave man, a good soldier, merciful and generous, but devoid of moral strength and political insight, he was utterly incapable to discharge a task which demanded all the skill and energy of his great successor. His nominal reign was a period of anarchy in English history, important only as a full justification for the tyrannies of Henry I. and Henry II.

Authorities.—Ordericus Vitalis, ed. Le Prévost; William of Malmesbury, ed. Hamilton (Rolls Series); *Gesta Stephani*, ed. Sewell (Engl. Hist. Soc.); Gervase of Canterbury, ed. Stubbs (Rolls Series); Henry of Huntingdon, ed. Arnold (Rolls Series); *English Chronicle*, ed. Thorpe (Rolls Series); Freeman, *Norman Conquest*, vol. v.; Lappenberg, *Gesch. Englands*, vol. iii. (G. W. P.)

STEPHEN, SIR JAMES (1789–1859), historian, was the son of James Stephen, master in chancery, author of *The Slavery of the West India Colonies* and other works, and was born in London 3d January 1789. He was educated at Trinity Hall, Cambridge, graduating B.A. in 1812, after which he studied for the bar and was called at Lincoln's Inn. He obtained an extensive practice as a chancery barrister, being ultimately counsel to the colonial department and counsel to the Board of Trade. In 1834 he became assistant under-secretary for the colonies, and shortly afterwards permanent under-secretary. On his retirement in 1847 he was made a knight commander of the Bath. In 1849 he was appointed regius professor of modern history in the university of Cambridge, having already distinguished himself by his brilliant studies in ecclesiastical biography contributed to the *Edinburgh Review*, which were published that year under the title *Essays in Ecclesiastical Biography and Other Subjects*; a 4th edition, with a short memoir, appeared in 1860. He was also the author of *Lectures on the History of France*, 2 vols., 1851, 3d ed. 1857, and *Desultory and Systematic Reading*, a lecture, 1853. He died at Coblenz on the 15th of September 1859.

STEPHENS, the incorrect English form of the name of *Estienne*, the distinguished French family of scholars and printers.

The founder of the race was HENRI ESTIENNE (d. 1520), the scion of a noble family of Provence, who came to Paris in 1502, and soon afterwards set up a printing establishment at the top of the Rue St Jean de Beauvais, on the hill of Sainte-Geneviève opposite the law school. He died in 1520, and his three sons being minors, the business was carried on by his foreman Simon de Colines, who in 1521 married his widow.

ROBERT ESTIENNE (1503–1559) was Henri's second son. After his father's death he acted as assistant to his stepfather, and in this capacity superintended the printing of a Latin edition of the New Testament in 16mo (1523). Some slight alterations which he had introduced into the text brought upon him the censures of the faculty of theology. It was the first of a long series of disputes between him and that body. It appears that he had intimate relations with the new Evangelical preachers almost from the beginning of the movement, and that soon after this time he definitely joined the Reformed Church. In 1526 he entered into possession of his father's printing establishment, and adopted as his device the celebrated olive-tree (a reminiscence doubtless of his grandmother's family of Montolivet), with the motto from the epistle to the Romans (xi. 20), *Noli altum sapere*, sometimes with the addition *sed time*. In 1528 he married Perrette, a daughter of the scholar and printer Josse Bade (Jodocus Badius), and in the same year he published his first Latin Bible, an edition in folio, upon which he had been at work for the last four years. In 1532 appeared his *Thesaurus Linguae Latinae*, a dictionary of Latin words and phrases, upon which for two years he had toiled incessantly, with no other assistance than that of Thierry of Beauvais. A second edition, greatly enlarged and improved, appeared in 1536, and a third, still further improved, in 3 vols. folio, in 1543. Though the *Thesaurus* is now superseded, its merits must not be forgotten. It was vastly superior to anything of the kind that had appeared before; it formed the basis of future labours, and even as late as 1734 was considered worthy of being re-edited. In 1539 Robert was appointed king's printer for Hebrew and Latin, an office to which, after the death of Conrad Neobar in 1540, he united that of king's printer for Greek. In 1541 he was entrusted by Francis I. with the task of procuring from Claude Garamond, the engraver and type-founder, three sets of Greek type for the royal press. The middle size were the first ready, and with these Robert printed the *editio princeps* of the *Ecclesiastica Historiæ* of Eusebius and others (1544). The smallest size were first used for the 16mo edition of the New Testament known as the *O mirificam* (1546), while with the largest size was printed the magnificent folio of 1550. This edition involved the printer in fresh disputes with the faculty of theology, and towards the end of the following year he left his native town for ever, and took refuge at Geneva, where he published in 1552 a caustic and effective answer to his persecutors, under the title *Ad Censuram Theologorum Parisiensium, quibus Biblia a R. Stephano Typographo Regio, excusa calumniose notarunt, eiusdem R. S. Responsio*. A French translation, which is remarkable for the excellence of its style, was published by him in the same year (printed in Rénouard's *Annales de l'Imprimerie des Estienne*). At Geneva Robert proved himself an ardent partisan of Calvin, several of whose works he published. He died there September 7, 1559.

It is by his work in connexion with the Bible, and especially as an editor of the New Testament, that he is on the whole best known. The text of his New Testament of 1550, either in its original form or in such slightly modified form as it assumed in the Elzevir text of 1634, remains to this day the traditional text. But, as modern

scholars have pointed out, this is due rather to its typographical beauty than to any critical merit. The readings of the fifteen MSS. which Robert's son Henri had collated for the purpose were merely introduced into the margin. The text was still almost exactly that of Erasmus. It was, however, the first edition ever published with a critical apparatus of any sort. Of the whole Bible Robert printed eleven editions,—eight in Latin, two in Hebrew, and one in French; while of the New Testament alone he printed twelve,—five in Greek, five in Latin, and two in French. In the Greek New Testament of 1551 (printed at Geneva) the present division into verses was introduced for the first time. The *editiones principes* which issued from Robert's press were eight in number, viz., *Eusebius*, including the *Præparatio Evangelica* and the *Demonstratio Evangelica* as well as the *Historia Ecclesiastica* already mentioned (1544–46), *Moschopolus* (1545), *Dionysius of Halicarnassus* (February 1547), *Alexander Trallianus* (January 1548), *Dio Cassius* (January 1548), *Justin Martyr* (1551), *Xiphilinus* (1551), *Appian* (1551), the last being completed, after Robert's departure from Paris, by his brother Charles, and appearing under his name. These editions, all in folio, except the *Moschopolus*, which is in 4to, are unrivalled for beauty. Robert also printed numerous editions of Latin classics, of which perhaps the folio *Virgil* of 1532 is the most noteworthy, and a large quantity of Latin grammars and other educational works (many of them written by his friend Maturin Cordier) in the interests of that cause of which he proved himself so stout a champion,—the new learning.

CHARLES ESTIENNE (1504 or 1505–1564), the third son of Henri, was, like his brother Robert, a man of considerable learning. After the usual humanistic training he studied medicine, and became a doctor of that faculty in the university of Paris. In 1540 he accompanied the French ambassador Lazare Baif to Italy in the capacity of tutor to his natural son Antoine, the future poet. In 1551, when Robert Estienne left Paris for Geneva, Charles, who had remained a Catholic, took charge of his printing establishment, and in the same year was appointed king's printer. He died in 1564, according to some accounts in prison, having been thrown there for debt.

His principal works are *Prædium Rusticum*, a collection of tracts which he had compiled from ancient writers on various branches of agriculture, and which continued to be a favourite book down to the end of the 17th century; *Dictionarium Historicum ac Poeticum* (1553), the first French encyclopædia; *Thesaurus Ciceronianus*; and *Paradoxes*, a free version of the *Paradossi* of Ortensio Landi, with the omission of a few of the paradoxes and of the impious and indecent passages (Paris, 1553; Poitiers, 1553). He was also the author of a treatise on anatomy and of several small educational works.

HENRI ESTIENNE (1528–1598), sometimes called "Henri II.," was the eldest son of Robert. In the preface to his edition of Aulus Gellius (1585), addressed to his son Paul, he gives an interesting account of his father's household, in which, owing to the various nationalities of those who were employed on the press, Latin was used as a common language, being understood and spoken more or less by every member of it, down to the maid-servants. Henri thus picked up Latin as a child, but at his special request he was allowed to learn Greek as a serious study before Latin. At the age of fifteen he became a pupil of Pierre Danès, at that time the first Greek scholar in France. Two years later he began to attend the lectures of Jacques Toussain, one of the royal professors of Greek, and in the same year (1545) was employed by his father to collate a MS. of Dionysius of Halicarnassus. In 1547, after attending for a time the lectures of Turnèbe, Toussain's successor, he went to Italy, where he spent two years in hunting for and collating MSS. and in intercourse with learned men. In 1550 he was in England, where he was favourably received by Edward VI. Thence he went to Flanders, where he learnt Spanish. In 1551 he joined his father at Geneva, which henceforth became his home. In 1554 he gave to the world, as the firstfruits of his researches, two first editions, viz., a tract of Dionysius of Halicarnassus and *Anacreon*, both printed by his uncle Charles. In 1556 Henri was again in Italy, where he discovered at Rome ten new books (xi.–xx.) of Diodorus Siculus. In 1557 he issued

from the press which in the previous year he had set up on his own account at Geneva three first editions, viz., *Athenagoras*, *Maximus Tyrius*, and some fragments of Greek historians, including Appian's *Ἀντιβασιλική* and *Ἰβηρική*, and an edition of Æschylus, in which for the first time the *Agamemnon* was printed in entirety and as a separate play. In 1558 he was appointed printer to Huldreich Fugger, one of the celebrated family of Augsburg bankers, a post which he held for ten years. In 1559 he printed a Latin translation from his own pen of Sextus Empiricus, and an edition of Diodorus Siculus with the new books. In 1566 he published his best known French work, the *Apologie pour Hérodote*, or, as he himself called it, *L'Introduction au Traité de la Conformité des Merveilles Anciennes avec les Modernes ou Traité préparatif à l'Apologie pour Hérodote*. Some passages in the original edition being considered objectionable by the Geneva consistory, he was compelled to cancel the pages containing them. The book became highly popular. Within sixteen years twelve editions were printed. In 1572 Henri published the great work upon which he had been labouring for many years, the *Theaurus Græcæ Linguae*, in 5 vols. folio. The publisher in 1578 of his *Dialogues du nouveau François Italien* brought him into a fresh dispute with the consistory. To avoid their censure he went to Paris, and resided at the French court for the whole of 1579. On his return to Geneva in the spring of 1580 he was summoned before the consistory, and, proving contumacious, was imprisoned for a week. From this time his life became more and more of a nomad one. He is to be found at Basel, Heidelberg, Vienna, Pesth, everywhere but at Geneva, these journeys being undertaken partly in the hope of procuring patrons and purchasers for his books (for the large sums which he had spent on such publications as the *Thesaurus* and the *Plato* of 1578 had almost ruined him), partly from the increasing restlessness of his disposition. But the result of these long absences was that his press stood nearly at a standstill. A few editions of classical authors were brought out, but each successive one showed a falling off. Such value as the later ones had was chiefly due to the notes furnished by Casaubon, who in 1586 had married Henri's daughter Florence. Henri's last years were marked by ever-increasing infirmity of mind and temper. In 1597 he left Geneva for the last time. After visiting Montpellier, where Casaubon was now professor, he made for Paris, but was seized with sudden illness at Lyons, and died there in his seventieth year, at the end of January 1598.

Few men have ever served the cause of learning more devotedly. For over thirty years the amount which he produced, whether as printer, editor, or original writer, was enormous. The productions of his press, though printed with the same beautiful type as his father's books, are, owing to the poorness of the paper and ink, inferior to them in general beauty. The best, perhaps, from a typographical point of view, are the *Poetæ Græci Principes* (folio, 1566), the *Plutarch* (13 vols. 8vo, 1572), and the *Plato* (3 vols. folio, 1573). It was rather Henri Estienne's scholarship which gave value to his editions. He was not only his own press-corrector but his own editor. Though by the latter half of the 16th century nearly all the important Greek and Latin authors that we now possess had been published, his untiring activity still found some gleanings. Eighteen first editions of Greek authors and one of a Latin author are due to his press. The most important have been already mentioned. Henri's reputation as a scholar and editor has increased of late years. His familiarity with the Greek language has always been admitted to have been quite exceptional; but he has been accused of want of taste and judgment, of carelessness and rashness. Special censure has been passed on his *Plutarch*, in which he is said to have introduced conjectures of his own into the text, while pretending to have derived them from MS. authority. But a recent editor, Sintenis, has shown that, though like all the other editors of his day he did not give references to his authorities, every one of his supposed conjectures can be traced to some MS. Whatever may be said as to his taste or his judgment, it seems that he was both careful and scrupulous, and that he only resorted to conjecture when authority failed him. And, whatever the merit of his conjectures,

he was at any rate the first to show what conjecture could do towards restoring a hopelessly corrupt passage. The work, however, on which his fame as a scholar is most surely based is the *Thesaurus Græcæ Linguae*. After making due allowance for the fact that considerable materials for the work had been already collected by his father, and that he received considerable assistance from the German scholar Sylburg, he is still entitled to the very highest praise as the producer of a work which was of the greatest service to scholarship and which in those early days of Greek learning could have been produced by no one but a giant. Two editions of the *Thesaurus* have been published in this century—at London by Valpy (1815-25) and at Paris by Didot (1831-63). It was one of Henri Estienne's great merits that, unlike nearly all the French scholars who preceded him, he did not neglect his own language. While Budé wrote French with difficulty and considered it hardly a fit language for a scholar to use, Henri Estienne was loud in its praises and gave practical proof of its capabilities. Of his French writings three were devoted to this theme:—(1) *Conformité du Langage François avec le Grec* (published in 1575, but without date, ed. L. Feugère, 1850), in which French is shown to have, among modern languages, the most affinity with Greek, the first of all languages; (2) *Deux Dialogues du nouveau François Italienisé* (Geneva, 1578; reprinted, 2 vols., 1883), directed against the fashion prevailing in the court of Catherine de' Medici of using Italian words and forms; (3) *Project du Livre Intitulé de la Précellence du Langage François* (Paris, 1579; ed. Feugère, 1853), which treats of the superiority of French to Italian. An interesting feature of this tract is the account of French proverbs, and, Henry III. having expressed some doubts as to the genuineness of some of them, Henri Estienne published, in 1594, (4) *Les Premices ou le I. livre des Proverbes Epigrammatisez* (never reprinted and very rare). Finally, there remains (5) the *Apologie pour Hérodote*, the work by virtue of which Henri Estienne belongs to literature. The ostensible object of the book is to show that the strange stories in Herodotus may be paralleled by equally strange ones of modern times. Virtually it is a bitter satire on the writer's age, especially on the Roman Church. Put together without any method, its extreme desultoriness makes it difficult to read continuously, but the numerous stories, collected partly from various literary sources, notably from the preachers Menot and Maillard, partly from the writer's own multifarious experience, with which it is packed, make it an interesting commentary on the manners and fashions of the time. But satire, to be effective, should be either humorous or righteously indignant, and, while such humour as there is in the *Apologie* is decidedly heavy, the writer's indignation is generally forgotten in his evident relish for scandal. The style is, after all, its chief merit. Though it bears evident traces of hurry, it is, like that of all Henri Estienne's French writings, clear, easy, and vigorous, uniting the directness and sensuousness of the older writers with a suppleness and logical precision which at this time were almost new elements in French prose. An edition of the *Apologie* has recently been published by Liseux (ed. Ristelhuber, 2 vols., 1879), after one of the only two copies of the original uncancelled edition that are known to exist. The very remarkable political pamphlet entitled *Discours Merveilleux de la Vie et des Déportements de Catherine de Médicis*, which appeared in 1574, has been ascribed to Henri Estienne, but the evidence both internal and external is conclusive against his being the author of it. Of his Latin writings the most worthy of notice are the *De Latinitate falso suspecta* (1576), the *Pseudo-Cicero* (1577), and the *Nicoliodidascalus* (1578), all three written against the Ciceronians, and the *Francofordiense Emporium* (1574), a panegyric on the Frankfurt fair (reprinted with a French translation by Liseux, 1875). He also wrote a large quantity of indifferent Latin verses, including a long poem entitled *Musa Monitrix Principum* (Basel, 1590).

The primary authorities for an account of the Estiennes are their own works. In the garrulous and egotistical prefaces which Henri was in the habit of prefixing to his editions will be found many scattered biographical details. Twenty-seven letters from Henri to John of Crafoth (Crafo) (ed. F. Passow, 1830) have been printed, and there is one of Robert's in Herminjard's *Correspondance des Réformateurs dans les Pays de Langue Française* (7 vols. published), while a few other contemporary references to him will be found in the same work. The secondary authorities are Janssen van Almeloveen, *De Vitis Stephanorum* (Amst., 1633); Maittaire, *Stephanorum Historia* (Lond., 1709); A. A. Rénouard, *Annales de l'Imprimerie des Estienne* (2d ed., Paris, 1843); the article on Estienne by A. F. Didot in the *Nouv. Biog. Gén.*; and an article by Mark Pattison in the *Quart. Rev.* for April 1865. There is a good account of Henri's *Thesaurus* in the *Quart. Rev.* for January 1820, written by Bishop Blomfield.

STEPHENS, ALEXANDER HAMILTON (1812-1883), American statesman, was born in Georgia, February 11, 1812. In spite of many difficulties imposed by poverty and ill-health, he became a lawyer and politician of great reputation and popularity. He was one of the Whig leaders of his State until about 1850, and then drifted into the Democratic party through the rising discussions of slavery, serving in Congress from 1843 until 1859. In 1860 he opposed secession warmly; but when his State

had seceded he "followed his State," and was elected vice-president of the Confederate States. Whatever there was of opposition to the despotic tendencies of Jefferson Davis gathered around Stephens as a centre; and the vice-president was never an influential member of the Confederate administration. His popularity in Georgia was unbounded, and he was elected representative in Congress in 1877-82, and governor, 1882-83, dying in office. In person he was small and extremely emaciated, seldom weighing more than 90 pounds, and always in delicate health; but his powers as an orator were remarkable.

Cleveland's *A. H. Stephens in Public and Private* and Johnston and Browne's *Life of A. H. Stephens* are the main authorities for Stephens's life. His political opinions are fully given in his work, *The War between the States*.

STEPHENS, JOHN LLOYD (1805-1852), traveller, was born 28th November 1805, at Shrewsbury, N.J., United States. Having been admitted to the bar, he practised his profession for about eight years in New York city. In 1834, the state of his health rendering it advisable that he should travel, he visited Europe, and for two years made a tour through many countries of that continent, extending his travels to Egypt and Syria. On his return to New York he published (under the name of "George" Stephens) in 1837 *Incidents of Travel in Egypt, Arabia Petraea, and the Holy Land*. This work was followed next year by the publication, also in two volumes, of *Incidents of Travel in Greece, Turkey, Russia, and Poland*. In 1839 Stephens arranged with Frederick Catherwood of London, who had accompanied him on some of his travels, and illustrated the above-mentioned publications, that they should make an exploration together in Central America, with a view to discovering and examining ancient art said to exist in the dense forests of that tropical region. Stephens, meantime, was appointed United States minister to Central America. The joint travels of Stephens and F. Catherwood occupied some eight months in 1839 and 1840. As the result of these researches Stephens published in 1841 *Incidents of Travels in Central America, Chiapas, and Yucatan*. In the autumn of 1841 the two travellers made a second exploration of Yucatan, the fruits of which were gathered up in a work published by Stephens in 1843,—*Incidents of Travel in Yucatan*. This work describes the most extensive travels executed till that date by a stranger in the peninsula, and, as the author claims, "contains account of visits to forty-four ruined cities or places in which remains or vestiges of ancient populations were found." It fixed the sites of many prehistoric cities and supplied correct delineations of their existing monuments. This publication enjoyed a wide popularity, and made such an impression on Prescott the historian that he urged Stephens to prosecute his researches of American antiquities in Peru. Stephens was, however, disinclined to so distant an expedition. He became a director of the newly-formed American Ocean Steam Navigation Company, which established the first American line of trans-Atlantic steamships. He visited Panama to reconnoitre the ground with a view to the construction of a railway across the isthmus, and, first as vice-president and then as president of the Panama Railway Company, spent the greater part of two years in superintending the project. His health was, however, entirely undermined by his long and incautious exposure to the deadly climate of Central America, and he died at New York on the 10th October 1852.

Stephens made no pretensions to the title of a scientific traveller. He had, however, a natural curiosity after all kinds of human knowledge, shrewd and accurate powers of observation, and a more than common measure of perseverance, tact, and resource.

STEPHENSON, GEORGE (1781-1848), perfecter of the locomotive, was the son of Robert Stephenson, fireman of a colliery engine at Wylam, near Newcastle, where he was born 9th June 1781. In boyhood he was employed as a cowherd, and occupied his leisure in erecting clay engines and similar mechanical amusements. Afterwards he drove the gin-horse at a colliery, and in his fourteenth year became assistant to his father in firing the engine at a shilling a day. He set himself diligently to qualify himself for higher duties, and in his seventeenth year was appointed engineman or plugman. As yet he was unable to read, but, stimulated by the desire to obtain fuller information regarding the wonderful inventions of Boulton and Watt, he began in his eighteenth year to attend a night school, and soon made remarkably rapid progress. In 1801 he obtained the situation of brakesman, and in 1812 was appointed engine-wright at Killingworth high pit at a salary of £100 a year. Meantime he had been employing his leisure in watch and clock cleaning, in studying mechanics, and in various experiments with a view of solving the difficulties connected with the construction of a satisfactory locomotive. Having obtained permission from Lord Ravensworth, the principal partner of the Killingworth colliery to incur the outlay for constructing a "travelling engine" for the tramroads between the colliery and the shipping port nine miles distant, he made a successful trial with the engine, which he named "My Lord," 25th July 1814. Setting himself diligently to improve his invention, he thoroughly satisfied himself that for the proper success of the locomotive a railway as near as possible level was an essential condition. In 1822 he succeeded in impressing with the importance of his invention the projectors of the Stockton and Darlington Railway, who had contemplated using horses for their waggons, and was appointed engineer of the railway, with liberty to carry out his own plans, the result being the opening, 27th September 1825, of the first railway over which passengers and goods were carried by a locomotive. The success of the Stockton and Darlington Railway led to the employment of Stephenson in the construction of the Liverpool and Manchester Railway, which, notwithstanding prognostications of failure by the most eminent engineers of the day, he carried successfully through Chat Moss. He also succeeded in persuading the directors to give the locomotive a trial, and, as his improved invention, the "Rocket," during her trial trip made 29 miles an hour, his suggestion met with complete approval; with the opening of the line, 15th September 1830, the modern era of railways may be said to have been definitely inaugurated. While his experiments in connexion with locomotives were in progress, the construction of a safety lamp for use in mines occupied much of his attention. There can be no doubt regarding the justice of his claims to be considered the first inventor of the tube safety lamp, notwithstanding that the name of Sir Humphry Davy has been chiefly associated with the discovery. In recognition of the "valuable service he had thus rendered to mankind," subscriptions were in 1815 collected in behalf of Stephenson which amounted to £1000, a sum which he found of great convenience in connexion with his locomotive experiments. Stephenson was closely connected with the more important of the railway projects which the success of the Liverpool and Manchester line called into existence, but he strongly disapproved of the railway mania which ensued, and predicted that only ruin could result from the prevalent disposition towards railway speculation. He was frequently consulted in regard to the construction of foreign railways, and in this connexion visited Belgium and Spain in 1845. Towards the close of his life he retired from active duties, and at his residence at Tupton House,

Chesterfield, interested himself chiefly in farming and horticultural pursuits. He died 12th August 1848.

See *Story of the Life of George Stephenson*, by Samuel Smiles, 1857, new ed. 1873; and Smiles's *Lives of British Engineers*, vol. iii.

STEPHENSON, ROBERT (1803-1859), engineer, son of the preceding by his first wife Fanny Henderson, was born at Wellington Quay, 16th October 1803. Remembering his own early difficulties owing to deficient instruction, his father bestowed special care on his education, sending him in his twelfth year to attend Mr Bruce's school in Percy Street, Newcastle, where he remained about four years. In 1819 he was apprenticed to a coalviewer at Killingworth to learn the business of the colliery, after which, to perfect his training in technical science, he was sent in 1822 to attend the science classes at the university of Edinburgh. On his return he assisted his father in the survey of various railway lines, but in 1824 he accepted an engagement to take charge of the engineering operations of the Columbian Mining Association of London. On account of the harassing difficulties of the situation he resigned it in 1827, and after his return to England undertook the management of his father's factory in Newcastle, greatly aiding him in the improvement of his locomotives, the result being the construction of the "Rocket," which firmly established the practicability of steam locomotion on railways. Subsequently his services were in great request as a railway engineer, and after the retirement of his father he was regarded as the chief authority on the subject. In this connexion his most remarkable achievements were his railway viaducts on the tubular system, constructed with the aid of the practical knowledge of Sir William Fairbairn, and justly characterized as "the greatest discovery in construction in our day." Among his more notable bridges are the Royal Border bridge at Berwick-on-Tweed, the high-level bridge at Newcastle-on-Tyne, the Britannia tubular bridge over the Menai Straits, the Conway tubular bridge, and the Victoria tubular bridge over the St Lawrence, Canada. In 1847 he entered the House of Commons as member for Whitby. He was frequently consulted in the construction of foreign railways, and was decorated for his services by the king of Belgium, the king of Sweden, and the emperor of the French. In 1855 he was elected president of the Institute of Civil Engineers. He died 12th October 1859, and was buried in Westminster Abbey.

See *The Story of the Life of George Stephenson, including a Memoir of his Son Robert Stephenson*, by Samuel Smiles, 1857, new ed. 1873; Jeaffreson, *Life of Robert Stephenson*, 2 vols., 1864; and Smiles's *Lives of British Engineers*, vol. iii.

STEREOCHROMY. See SILICA.

STEREOSCOPE is an optical instrument for representing in apparent relief and solidity all natural objects by uniting into one image two representations of these objects as seen by each eye separately. That the two eyes form different images of any objects which are near enough to have dissimilar perspective projections has been long known, and may be readily tested by any one. Euclid proved it geometrically with reference to a sphere (26th, 27th, and 28th theorems of his *Treatise on Optics*); Galen showed how the demonstration might be made.¹ PORTA (*g.v.*), in his work on *Refraction*, also writes on the subject, and Leonardo da Vinci adduced the want of correspondence between the parts of the background intercepted by a near object seen by the two eyes singly "as the reason why no painting can show a *rilievo* equal to that of natural objects seen by both eyes within a moderate distance."² In 1613 Aguilonius, a Jesuit, in his work on *Optics*, attributed the union of the two unlike pictures into

¹ *De Usu Partium Corporis Humani*, Lyons, 1550, p. 593.

² *Trattato della Pittura, Scultura, ed Architettura*, Milan, 1584.