to perform a greater variety of experiments on binocular vision than can be carried out easily with the more common form.

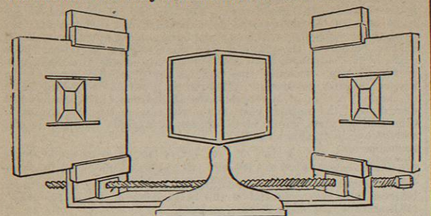


Fig. 3.—Wheatstone's Reflecting Stereoscope.

Wheatstone also invented a form of stereoscope in which the pictures were brought on corresponding points of the retina by refraction instead of by reflexion. This had a form very like the ordinary stereoscope, but, instead of lenses in the apertures to which the eyes are directed, it had "a pair of glass prisms having their faces inclined 15° and their refractive angles turned towards each other. . . . A pair of plate-glass prisms, their faces making with each other an angle of 12°, will bring two pictures, the corresponding points of which are 2¼ inches apart, to coincide at a distance of 12 inches, and a pair with an angle of 15° will occasion coincidence at 8 inches."[1]

The form of stereoscope generally used is that invented by Sir David Brewster, and is known as the refracting stereoscope. The arrangement is shown diagrammatically in fig. 4. Let the left eye be at A and the right at B; let a and b be the corresponding pictures for each eye, and p_1, p_2, two prisms of glass. A prism refracts rays of light so that the object seen through the prism appears to be nearer to the refracting edge; the prism p_1 therefore refracts the ray ap_1 in the direction p_1A, as if it proceeded from c. The prism p_2 refracts the ray bp_2 so that to the eye at B it also appears to proceed from c. The effect of this is that the object really appears to be at c.

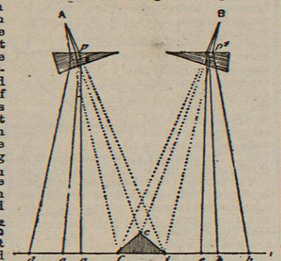


Fig. 4.—Diagram of the Refracting Stereoscope.

And as the points a and b combine to form the point c, so d and e unite to form the point f, and g and h to form the point i (Weinhold). This stereoscope consists of a pyramidal box blackened inside and having a lid for the admission of light (fig. 5). At the narrow end of the box are two tubes carrying the lenses. The tubes move up and down to suit eyes of different focal lengths, and sometimes convex or concave lenses are inserted over the prisms to meet the wants of long-sighted or short-sighted persons. Fig. 6 shows the upper end of the stereoscope, with the lenses in position.

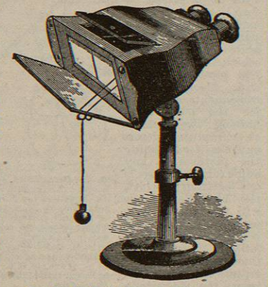


Fig. 5.—Sir David Brewster's Stereoscope.

A. Stroh (without knowing that H. Grubb had described the essentials of the apparatus in 1879) has recently invented a new form of stereoscope based on the well-known effects of the persistence of vision. Two stereoscopic pictures are simultaneously projected by two lanterns on a screen so as to overlap, and disks having suitable slits are rotated in front of the lanterns and also in front of the eyes of the observer, in such a way that only one picture is thrown on the screen at a time, and also that the view of the picture is seen with the right and left eyes alternately. Further, the connexion between the disks is so arranged that the time of obscuring the view of the observer's right eye or left eye coincides with the time when the light is shut off from the right or left lantern, and thus the left eye sees the picture of the left lantern and the right eye that of the right lantern. The two eyes never see at the same time, and each eye views its picture after the other, but the impressions come so fast as to be fused in consciousness, and the result is, the image stands out "in solid relief" (*Proc. Roy. Soc.*, No. 244, vol. xl., April 1, 1886).

Fig. 6.—Lenses in Refracting Stereoscope.

During his researches into the physiology of vision, Wheatstone was led to study what he termed conversions of relief. Sometimes when we look at a geometrical figure such as a cube or rhomboid it may be imagined to represent one of two dissimilar figures. In fig. 7 the rhomboid AX is drawn so that the solid angle A should be seen nearest, and solid angle X farthest, and face ABCD foremost, while XDC is behind. Look steadily and the position will change: X will appear nearest, solid angle A farthest; face ACDB will recede behind XDC.[2] The effects are most obvious when seen with one eye, and "no illusion of this kind can take place when an object of three dimensions is seen with both eyes while the optic axes make a sensible angle with each other, because the appearance of two dissimilar figures, one to each eye, prevents the possibility of mistake" (Wheatstone). The conversion of a cameo into an intaglio and of an intaglio into a cameo is a well-known instance of this illusion. Wheatstone observed the conversion of relief exhibited by binocular pictures in the stereoscope when they are transposed, reflected, or inverted, and this led him to the invention of the *Pseudoscope*, an instrument which conveys to the mind false perceptions of all external objects. "Two rectangular prisms of flint glass, the faces of which are 1·2 inch square, are placed in a frame with their hypothenuses parallel and 2·1 inches from each other; each prism has a motion on an axis corresponding with the angle nearest the eyes, that they may be adjusted so that their bases may have any inclination towards each other" (Wheatstone's *Scientific Papers*, p. 275). In fig. 8 there is a diagram of the instrument. If a spherical surface be examined with this instrument, it will appear hollow; whilst a hollow surface will appear convex. It is remarkable, however, that the converting powers of this instrument are greatest where the new forms can be conceived without effort. Thus a cameo and an intaglio, a plaster cast in relief and its mould, or any object similar in its opposite reliefs is at once changed by the pseudoscope into the converse form. As pointed out by Dr Carpenter, by gazing we can reverse the interior of a mask so as to see the countenance stand out in relief; it is more difficult to throw the features of a bust into the shape of a mould; whilst it is impossible to effect any conversion upon the features of the living face. "The optical change is identically the same in its nature in every one of these cases; and there is nothing in the form of the features which refuses to present a converse, this converted shape being presented by the mask; but the mind, which will admit the conception of the converted form when suggested by the inanimate mask or bust, is steeled by its previous experience against the notion that actual flesh and blood can undergo such a metamorphosis" (Carpenter, *Edinburgh Review*, 1858, p. 460).

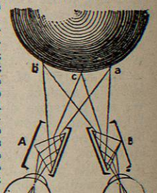


Fig. 7.

Fig. 8.—Diagram of Wheatstone's Pseudoscope. A, B, tubes containing prisms. a_1, b_1, and α, β, corresponding points; a, b, c, position of points in visual field.

A little consideration will show that the pictures of objects placed at a great distance from the eye are practically if not wholly identical.

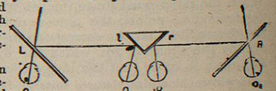


Fig. 9.—Diagram of Von Helmholtz's Telestereoscope.

Here there is scarcely any stereoscopic

1 Wheatstone's *Scientific Papers*, p. 267.

2 Necker, *Phil. Mag.*, 3d series, vol. i. p. 367.

effect, and the landscape may appear to be flat, as in a picture. To obtain a stereoscopic view of a landscape Von Helmholtz invented the *Telestereoscope*, an instrument which places as it were the point of view of both eyes wide apart. It consists of two mirrors L and R, each of which projects its image upon l and r, to which the eyes O and o are directed. The eyes O and o are placed as it were at O_1 and o_1, according to the distance between L and R: consequently two dissimilar pictures are obtained; these are mentally combined, with the result that the landscape is seen like a stereoscopic view.

The principle of the stereoscope was successfully applied by Wenham in 1854 to the construction of the binocular microscope. See Microscope (vol. xvi. p. 272), and also two papers in the *Jour. Roy. Micr. Soc.*, 1884:—(1) "On the Mode of Vision with Objectives of Wide Aperture," by Prof. E. Abbe, p. 20; and (2) "On the Physiology of Binocular Vision with the Microscope," by Dr Carpenter, p. 486. Prof. Abbe shows, however, that "oblique vision in the microscope is entirely different from that in ordinary vision, inasmuch as there is no perspective, so that we have no longer the dissimilarity which is the basis of the ordinary stereoscopic effect, but an essentially different mode of dissimilarity between the two pictures." In the microscope there is no perspective foreshortening. "There is no difference in the outline of an object viewed under the microscope by an axial or by an oblique pencil. There is simply a lateral displacement of the image—an entirely different phenomenon to that which occurs in non-microscopic vision. Thus, whilst the mode of formation of dissimilar pictures in the binocular microscope is different from the production of ordinary stereoscopic pictures, the brain mechanism by which they are so fused as to give rise to sensations of solidity, depth, and perspective is the same. (J. G. M.)

STEREOTYPE. See Typography.

STERLING, a city of the United States, in Whiteside county, Illinois, on Rock River (a tributary of the Mississippi), 110 miles west of Chicago. Mainly on account of the abundant water-power produced by the natural rapids of the river and a dam 1100 feet long, it has become the seat of the most varied manufacturing industry. An artesian well 1000 feet deep, discharging 18,000 gallons per hour, contributes to the water-supply of the town. The population was 5312 in 1870 and 5087 in 1880. Sterling was laid out in 1836 and incorporated in 1857.

STERLING, John (1806–1844), author, was descended from a family of Scottish origin which had settled in Ireland about the Cromwellian period. His father, Edward Sterling, born at Waterford 27th February 1773, had been called to the Irish bar, but, having fought as a militia captain at Vinegar Hill, afterwards volunteered with his company into the line. On the breaking up of his regiment he went to Scotland, and took to farming at Kames Castle in Bute, where John, the second son, was born 20th July 1806. In 1810 the family removed to Llanblethian, Glamorganshire, and during his residence there Edward Sterling, under the signature of "Vetus," contributed a number of letters to the *Times*, which were reprinted in 1812, and a second series in 1814. In the latter year he removed to Paris, but, the escape of Napoleon from Elba in 1815 compelling him to return to England, he took up his permanent residence in London, obtaining a connexion with the *Times* newspaper, and ultimately being promoted editor. Carlyle, who allows him the dubious credit of being one of the best of newspaper editors, represents him as manifesting "a thoroughly Irish form of character, fire and fervour, vitality of all kinds in genial abundance, but in a much more loquacious, ostentatious, much *louder* style than is freely patronized on this side of the Channel." His fiery, emphatic, and oracular mode of writing conferred those characteristics on the *Times* which were recognized in the sobriquet of the "Thunderer." The frequent changes of the family residence during the early years of young Sterling rendered his education somewhat desultory, but on the settlement in London it became more systematic. After studying for one year at the university of Glasgow, he in 1824 entered Trinity College, Cambridge, where he had for tutor Julius Charles Hare. At Cambridge he did not distinguish himself except in the debates of the union, where, "none," it was related, "ever came near him except the late Charles Buller." He removed to Trinity Hall with the intention of graduating in law, but left the university without taking a degree. During the next four years he resided chiefly in London, employing himself actively in literature. Along with Frederick Maurice he purchased the *Athenæum* from J. Silk Buckingham, but the enterprise was not a pecuniary success. Through Maurice he became an "assiduous pilgrim" to the shrine of Coleridge at Hampstead. He also formed an intimacy with the Spanish revolutionist General Torrijos, in whose unfortunate expedition he took an active interest. Shortly after his marriage in 1830, symptoms of pulmonary disease induced him to take up his residence in the island of St Vincent, where he had inherited some property, but after fifteen months he returned to England. After spending some time on the Continent he found his health so much re-established that in June 1834 he accepted a curacy at Hurstmonceaux, where his old tutor Julius Hare was vicar. Acting on the advice of his physician he resigned his clerical duties in the following February, but according to Carlyle ill-health was only the external occasion of his resignation, the primary cause being a partly unconscious divergence from the opinions of the church. Be this as it may, the threatening progress of the insidious disease under which he laboured soon rendered "public life in any professional form" quite impossible. There remained to him the "resource of the pen," but, having to "live all the rest of his days as in continual flight for his very existence," his literary achievements were necessarily fragmentary, and cannot be regarded as a criterion of his capabilities. He published in 1833 *Arthur Coningsby*, a novel, which attracted little attention, and his *Poems* (1839), the *Election, a Poem* (1841), and *Strafford*, a tragedy, were not more successful. He had, however, established a connexion with *Blackwood's Magazine*, to which he contributed a variety of papers and several tales, which gave promise that under more favourable conditions he might have "achieved greatness." He died at Ventnor 18th September 1844. His father survived him till 1847.

Sterling's papers were entrusted to the joint care of Thomas Carlyle and Archdeacon Hare, and it was agreed that the selection of his writings for publication and the preparation of a memoir should be undertaken by the latter. *Essays and Tales*, by John Sterling, collected and edited, with a memoir of his life, by Julius Charles Hare, appeared therefore in 1848 in two volumes. So dissatisfied was Carlyle with the memoir, chiefly because it unduly magnified the ecclesiastical side of Sterling's life, that he resolved to give his own "testimony" about his friend, and "record clearly" what his "knowledge of him was." His vivid portraiture of Sterling in the *Life* which appeared in 1851 has perpetuated the memory of Sterling after his writings have ceased to be of interest on their own account.

STERNBERG, a manufacturing town in Moravia, Austria, is situated 9 miles to the north of Olmütz and 47 miles to the north-east of Brünn. It is the chief seat of the Moravian cotton industry, and it also carries on the manufacture of linen, stockings, liqueurs, sugar, and bricks. Its six suburbs and the surrounding districts are also engaged in the textile industry. Fruit, especially cherries, and tobacco are grown in the neighbourhood. The population in 1880 was 14,243. Sternberg is said to have grown up under the shelter of a castle founded by Yaroslaff of Sternberg on the site of his victory over the Mongols in 1241.

STERNE, Laurence (1713–1768); one of the greatest of English humorists, was the son of an English officer, and great-grandson of an archbishop of York. Nearly all our information about the first forty-six years of his life before he became famous as the author of *Tristram Shandy* is derived from a short memoir jotted down by

himself for the use of his daughter. It gives nothing but the barest facts, excepting three anecdotes about his infancy, his school-days, and his marriage. The date of his birth coincides with the close of the Marlborough wars. He was born at Clonmel, Ireland, on November 24, 1713, a few days after the arrival of his father's regiment from Dunkirk. The regiment was then disbanded, but very soon after re-established, and for ten years the boy and his mother moved from place to place after the regiment, from England to Ireland, and from one part of Ireland to another. The familiarity thus acquired with military life and character stood Sterne in good stead when he drew the portraits of Uncle Toby and Corporal Trim, and the influence of the excitements, shifts, and hardships of this life of vagabond gentility may also be traced in his own character. To its hardening effect we may fairly refer some part of his later reckless defiance of clerical proprieties and comical persistence in self-conscious eccentricity. After ten years of wandering, he was fixed for eight or nine years at a school near Halifax in Yorkshire. His father died when he was in his eighteenth year, and he was indebted for his university education to one of the members of his father's family. His great-grandfather the archbishop had been master of Jesus College, Cambridge, and to Jesus College he was sent in 1732. He was admitted to a sizarship in July 1733, and took his B.A. degree in 1736. One of his uncles was a prominent church dignitary in Yorkshire. Young Sterne took orders, and through his influence obtained in 1738 the living of Sutton, some 8 miles north of York. On his marriage three years afterwards he was presented to the neighbouring living of Stillington, and did duty at both places. He was also a prebendary of York.

Sutton was Sterne's residence for twenty uneventful years—years at least concerning which his biography is silent. The only ascertained fact of consequence is that he kept up an intimacy which had begun at Cambridge with John Hall Stevenson, a witty and accomplished epicurean, owner of Skelton Castle in the Cleveland district of Yorkshire. Skelton Castle is nearly 40 miles from Sutton, but Sterne, in spite of his double duties, seems to have been a frequent visitor there, and to have found in his not too strait-laced friend a highly congenial companion. Stevenson's various occasional sallies in verse and prose—his *Fables for Grown Gentlemen*, his *Crazy Tales*, and his numerous skits at the political opponents of Wilkes, among whose "macaronies" he numbered himself,—were collected after his death, and it is impossible to read them without being struck with their close family resemblance in spirit and turn of thought to Sterne's work, inferior as they are in literary genius. Without Stevenson Sterne would probably have been a more decorous parish priest, but he would probably never have written *Tristram Shandy* or left any other memorial of his singular genius. The two friends began to publish late in life and in the same year. The first two volumes of *Tristram Shandy* were issued on the 1st of January 1760, and at once made a sensation. York was scandalized at its clergyman's indecency and indignant at his caricature of a local physician; London was charmed with his audacity, wit, and graphic unconventional power. He went to London early in the year to enjoy his triumph, and found himself at once a personage in society,—was called upon and invited out by lion-hunters, was taken to Windsor by Lord Rockingham, and had the honour of supping with the duke of York.

For the last eight years of his life after this sudden leap out of obscurity we have a faithful record of Sterne's feelings and movements in letters to various persons, published after his death by his daughter. At the end of the famous Sermon on Conscience in vol. ii. of *Tristram* he had intimated that, if this sample of Yorick's pulpit eloquence was liked, "there are now in the possession of the Shandy family as many as will make a handsome volume at the world's service—and much good may they do it." Accordingly, when a second edition of the first instalment of *Tristram* was called for in three months, two volumes of *Sermons* by Yorick were announced. Although they had little or none of the eccentricity of the history, they proved almost as popular. Sterne's clerical character was far from being universally injured by his indecorous freaks as a humorist: Lord Faulconberg presented the author of *Tristram Shandy* with the living of Coxwold. To this new residence he went in high spirits with his success, "fully determined to write as hard as could be," seeing no reason why he should not give the public two volumes of Shandyism every year and why this should not go on for forty years. By the beginning of August he had another volume written, and was "so delighted with Uncle Toby's imaginary character that he was become an enthusiast." The author's delight in this wonderful creation was not misleading; it has been fully shared by every generation of readers since. For two years in succession Sterne kept his bargain with himself to produce two volumes a year. Vols. iii. and iv. appeared in December 1760; vols. v. and vi. in January 1762. But his sanguine hopes of continuing at this rate were frustrated by ill-health. He was ordered to the south of France; it was two years and a half before he returned; and he came back with very little accession of strength. His reception by literary circles in France was very flattering. He was overjoyed with it. "'Tis *comme à Londres*," he wrote to Garrick from Paris; "I have just now a fortnight's dinners and suppers upon my hands." And again, "Be it known I Shandy it away fifty times more than I was ever wont—talk more nonsense than ever you heard me talk in your days, and to all sorts of people." Through all his pleasant experiences of French society, and through the fits of dangerous illness by which they were diversified, he continued to build up his history of the Shandy family, but the work did not progress as rapidly as it had done. Not till January 1765 was he ready with the fourth instalment of two volumes; and one of them, vol. vii., leaving the Shandy family for a time, gave a lively sketch of the writer's own travels to the south of France in search of health. This was a digression of a new kind, if anything can be called a digression in a work the plan of which is to fly off at a tangent whenever and wherever the writer's whim tempts him. In the first volume, anticipating an obvious complaint, he had protested against digressions that left the main work to stand still, and had boasted—not without justice in a Shandean sense—that he had reconciled digressive motion with progressive. But in vol. vii. the work is allowed to stand still while the writer is being transported from Shandy Hall to Languedoc. The only progress we make is in the illustration of the buoyant and joyous temper of Tristram himself, who, after all, is a member of the Shandy family, and was due a volume for the elucidation of his character. Vol. viii. begins the long-promised story of Uncle Toby's amours with the widow Wadman. After seeing to the publication of this instalment of *Tristram* and of another set of sermons,—more pronouncedly Shandean in their eccentricity,—he quitted England again in the summer of 1765, and travelled in Italy as far as Naples. The ninth and last and shortest volume of *Tristram*, concluding the episode of Toby Shandy's amours, appeared in 1767. This despatched, Sterne turned to a new project, which had probably been suggested by the ease and freedom with which he had moved through the travelling volume in *Tristram*. The *Sentimental Journey through France and Italy* was intended to be a long work: the plan admitted of any length that the author chose, but, after seeing the first two volumes through the press in the early months of 1768, Sterne's strength failed him, and he died in his London lodgings on the 18th of March, three weeks after the publication. The loneliness of his end has often been commented on; it was probably due to its unexpectedness. He had pulled through so many sharp attacks of his "vile influenza" and other lung disorders that he began to be seriously alarmed only three days before his death.

Sterne's character defies analysis in brief space. It is too subtle and individual to be conveyed in general terms. For comments upon him from points of view more or less diverse the reader may be referred to Thackeray's *Humorists*, Prof. Masson's *Novelists*, and Mr H. D. Traill's sketch in the "English Men of Letters" series. The fullest biography is Mr Percy Fitzgerald's. But the reader who cares to have an opinion about Sterne should hesitate till he has read and re-read in various moods considerable portions of Sterne's own writing. This writing is so singularly frank and unconventional that its drift is not at once apparent to the literary student. The indefensible indecency and overstrained sentimentality are on the surface; but after a time every repellent defect is forgotten in the enjoyment of the exquisite literary art. In the delineation of character by graphically significant speech and action, introduced at unexpected turns, left with happy audacity to point their own meaning, and pointing it with a force that the dullest cannot but understand, he takes rank with the very greatest masters. In Toby Shandy he has drawn a character universally lovable and admirable; but Walter Shandy is almost greater as an artistic triumph, considering the difficulty of the achievement. Dr Ferriar, in his *Illustrations of Sterne* (published in 1812), pointed out several unacknowledged plagiarisms from Rabelais, Burton, and others; but it is only fair to the critic to say that he was fully aware that they were only plagiarisms of material, and do not detract in the slightest from Sterne's reputation as one of the greatest of literary artists. (W. M.)

STESICHORUS of Himera, a very famous lyric poet, lived between 630 and 550 B.C. His name was originally Tisias, if we may trust Suidas, but it was changed to Stesichorus on account of his eminence in choral poetry. He was famed in antiquity for the richness and splendour of his imagination and his style, although Quintilian censures his redundancy and Hermogenes remarks on the excessive sweetness that results from his abundant use of epithets. We are told that he warned his fellow-citizens against Phalaris, whom they had chosen as their general, by relating to them the well-known fable of the horse and the stag. The story that he was struck blind for slandering Helen in a poem, and afterwards recovered his sight when he had sung a recantation, is told first by Plato, and afterwards, with many additions, by Pausanias and others. We possess some fragments of the former poem, censuring the daughters of Tyndareus, who "wed two, nay three husbands, and leave their lords" (Fr. 26), and three lines from the palinode, "This is no true tale, nor yet wentest thou in the strong benched ships, or camest to the tower of Troy" (Fr. 32). It seems probable that Stesichorus did really write his recantation in consequence of a dream which he had soon after composing his poem on Helen; and his is not the only case in literature where an apparently miraculous cure is said to have followed some such act of atonement. We possess about thirty fragments of his poems, not counting single words, preserved in Athenæus and elsewhere. None of them is longer than six lines. They are written in the Doric dialect, with epic licences and occasional Æolisms; the metre is dactylico-trochaic. Brief as they are, they show us what Longinus meant by calling Stesichorus "most like Homer"; they are full of epic grandeur, and have a stately sublimity that reminds us of Pindar. Stesichorus indeed made a new departure by using lyric poetry to celebrate gods and heroes rather than human feelings and passions; this is what Quintilian means by saying that he "sustained the burden of epic poetry with the lyre." Several of his poems sung of the adventures of Heracles; one dealt with the siege of Thebes, another with the sack of Troy. The last—to which the *Tabula Iliaca* (see Otto Jahn's *Griechische Bilderchroniken*, ed. A. Michaelis) is a sort of commentary—possesses an interest for us as the first poem in which occurred that form of the story of Æneas's flight to which Virgil afterwards gave currency in his *Æneid*. Stesichorus also completed the choral ode by adding to the strophe and antistrophe the epode; and not to know "Stesichorus's three" passed into a proverbial expression for unpardonable ignorance.

Bergk, *Poetæ Lyrici Græci*, vol. iii. pp. 205–234, Leipsic, 1882.

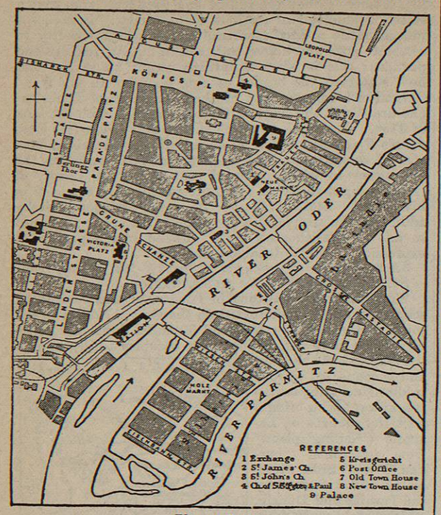
STETHOSCOPE. See AUSCULTATION.

STETTIN, the chief town of Pomerania, and the leading seaport in Prussia, is situated on the Oder, 17 miles to the south of the Stettiner Haff and 30 miles from the Baltic Sea. The main part of the town occupies a hilly site on the left bank of the river, and is connected by four bridges (including a massive railway swing-bridge) with the suburbs of Lastadie ("lading place," from *lastadium*, "burden,") and Silberwiese, on an island formed by the Parnitz and Dunzig, which here diverge from the Oder to Dammsche-See. Until 1874 Stettin was closely girdled by very extensive and strong fortifications, which prevented the expansion of the town proper, but the steady growth of its commerce and manufactures encouraged the foundation of numerous industrial suburbs beyond the line of defence. Some of these are themselves "towns," as Grabow, with 13,672 inhabitants in 1880, and Bredow with 11,255 inhabitants; but all combine with Stettin to form one industrial and commercial centre. Since the removal of the fortifications their site has begun to be built upon. Apart from its commerce, Stettin is a comparatively uninteresting city. The church of Sts Peter and Paul, originally founded in 1124 and restored in 1816–17, was the earliest Christian church in Pomerania. St James's church, dating from the 13th and the two following centuries, is remarkable, like several other Pomeranian churches, for its size. The old palace, now occupied by Government offices, is a large unattractive edifice, scarcely justifying the boast of an old writer that it did not yield in magnificence even to the palaces of Italy. Among the more modern structures are the theatre and the new town-house, superseding an earlier one of 1245. Statues of Frederick the Great and of Frederick William III. adorn one of the five open squares of the old town. As a prosperous commercial town Stettin has numerous educational, benevolent, and scientific institutions.

Environs of Stettin.

The manufactures are very important; many of the largest factories are in the neighbouring villages, beyond Stettin proper. The shipbuilding yards (among which

that of the Vulcan Company deserves mention) have comparatively recently attained some reputation for their iron-clads and war-vessels. Machinery, cement, chemicals, and soap are produced in large quantities, and there are also



Plan of Stettin.

large sugar-refineries, besides a vast miscellany of other smaller industrial establishments. The trade of Stettin is very flourishing. More than any other harbour it may be regarded as the port of Berlin, from which it is 93 miles north-east by railway; and a larger number of vessels enter and clear at Stettin than at any other German port except Hamburg and Bremerhaven. Swinemünde (*q.v.*) serves as its fore-port. The forest and river scenery of the neighbourhood of Stettin is picturesque, but the low level and swampy nature of the soil render the climate bleak and unhealthy. In 1885 the population was 99,475; in 1880 it was 91,756, of whom 85,727 were Protestants, 3112 Roman Catholics, and 2388 Jews.

In 1885 3809 ocean vessels (2207 steamers) and 1965 coasting and river craft, besides 10,039 Oder barges, entered the port. In 1885 Stettin possessed (besides a large number of river craft) a fleet of 127 sea-going ships, with a burden of 47,066 tons, of which 26,754 tons were distributed in 59 steamers. The chief exports are grain, spirits, and wood; the chief imports petroleum, train-oil, wine, and herrings. The annual value of the former is about £7,500,000 and of the latter about £6,000,000.

Stettin is said to have existed as a Wendish fishing-village as early as 830 A.D., and it appears as Stedyn in the time of the Saxon emperors. From the 12th century it was the seat of the dukes of Pomerania, who became extinct in 1637. Passing then to Sweden, it remained united with that kingdom for eighty-three years, with one brief interval, but in 1720 it was ceded to Prussia. Gustavus Adolphus undertook to improve its fortifications in 1630, but Frederick the Great was the first to convert it into a strong modern fortress. From 1806 till 1813 it was held by the French, to whom it was surrendered without a blow. Known even in the 12th century as the leading trading-town on the Oder, Stettin entered the Hanseatic League in 1360. The development of its trade in modern times dates chiefly from the deepening and protection of the Swine in the former half of last century. See Oder.

Stettin, Sir James Denham (1712–1780), Bart., author of *An Inquiry into the Principles of Political Economy* (see Political Economy, vol. xix. p. 365), was the only son of Sir James Steuart, solicitor-general for Scotland under Queen Anne and George I., and was born at Edinburgh on October 21, 1712. After passing through the university of Edinburgh he was admitted to the Scottish bar at the age of twenty-four. He then spent some years on the Continent, and while in Rome entered into relations with the Pretender. He was in Edinburgh in 1745, and so compromised himself that after the battle of Culloden he found it necessary to return to the Continent, where he remained until 1763. It was not indeed until 1771 he was fully pardoned for any complicity he may have had in the rebellion. He died at his family seat, Coltness, in Lanarkshire, on November 26, 1780.

The Works, Political, Metaphysical, and Chronological, of the late Sir James Steuart of Coltness, Bart., now first collected, with Anecdotes of the Author, by his Son, General Sir James Denham Steuart, were published in 6 vols. 8vo in 1805. Besides the *Inquiry* (originally published in 2 vols. 4to in 1767), they include—*A Dissertation upon the Doctrines and Principles of Money applied to the German Coin* (1758), *Apologie du Sentiment de M. le Chevalier Newton sur l'Ancienne Chronologie des Grecs* (4to, Frankfort-on-the-Main, 1757), *The Principles of Money applied to the Present State of Bengal*, published at the request of the East India Company (4to, 1772), *A Dissertation on the Policy of Grain* (1783), *Plan for Introducing Uniformity in Weights and Measures within the Limits of the British Empire* (1790), *Observations* on Beattie's *Essay on Truth*, *A Dissertation concerning the Motive of Obedience to the Law of God*, and other treatises.

Steubenville, a city of the United States, county seat of Jefferson county, Ohio, lies 43 miles west of Pittsburgh, on the west bank of the Ohio river, here a third of a mile wide and crossed by a railway bridge. Built above a productive coalfield, and with an abundant supply of natural gas for fuel purposes, Steubenville has naturally become a manufacturing centre (foundries, rolling-mills, nail and glass factories, potteries, machine-shops, flour-mills, &c.), and as the surrounding district is a good farming, wool-growing, and stock-raising country it is the seat of considerable commercial activity. The court-house is a particularly fine building. In 1870 the population was 8107, in 1880 12,093. Steubenville, so called after Baron Steuben, one of Washington's generals, grew up round a fort erected in 1787. It became a city in 1851.

Stevens, Alfred. See Sculpture, vol. xxi. p. 561.

Stevens, Thaddeus (1792–1868), was born at Peacham, Vermont, U.S., April 4, 1792, graduated at Dartmouth College in 1814, and then settled in Pennsylvania. He soon became a leading lawyer of Lancaster, Pa., so far interested in politics as to be elected by the Whig party to the State legislature for several terms and to the federal house of representatives 1849–63. When the mass of the Northern Whig party went into the new Republican party he went with it, and returned to Washington as a Republican representative in 1859, just before the outbreak of the Civil War. This position he retained until his death, just outlasting the Civil War and reconstruction. During this period of American history he was one of the leading characters. The methods on which he proposed to conduct the war were always drastic: the wholesale confiscation of lands in the seceding States, the disfranchisement of insurgent citizens, the emancipation and enfranchisement of the negroes, all found in him their earliest and warmest advocate. While other parties and leaders were continually shifting their ground, changing their theories of the relations of the Union to the seceding States as the struggle grew more intense, Stevens was consistent from beginning to end. The almost universal theory was that the war was prosecuted only to enforce the constitution; it was therefore incumbent on those who prosecuted it to obey the constitution punctiliously, however puzzling might be the difficulties into which it led them. Stevens, on the contrary, insisted that armed resistance to the constitution had the effect of suspending the constitution within the area of the resistance; that the success of the resistance would show whether the suspension was to be temporary or permanent; and that, in the meantime, those who resisted the constitution were entitled to no rights under it,—in fact, to no rights except those reserved under the laws of war. This was too radical even for the war party; but, at the end of the war, Stevens's pronounced ability gave him the leadership of the house committee on reconstruction. Even in this position, he never obtained a formal endorsement of his theory; but the practical management of reconstruction shows its strong influence in many features otherwise inexplicable. He lived to take a leading part in the unsuccessful impeachment of President Johnson, and to see the admission of the first instalment of reconstructed States, and died at Washington, August 11, 1868.

Stevens's life has been written from a friendly and from a hostile point of view,—the former in the volume entitled *Thaddeus Stevens, Commoner*, the latter in Harris's *Political Conflict in America*.

Stevenson, Robert (1772–1850), civil engineer, was the only son of Alan Stevenson, partner in a West Indian house in Glasgow, and was born in that city 8th June 1772. Having lost his father in infancy, he removed with his mother to Edinburgh. In his youth he assisted his step-father, Thomas Smith, in his lighthouse schemes, and at the early age of nineteen was sent to superintend the erection of a lighthouse on the island of Little Cumbrae. During successive winters he attended classes at Anderson's College, Glasgow, and at Edinburgh university. He succeeded his stepfather, whose daughter he married in 1799, as engineer to the Board of Northern Lighthouses, and at the same time began general practice as a civil engineer. During his period of office from 1797 to 1843, he designed and executed no fewer than eighteen lighthouses, the most important being that on the Bell Rock, begun in 1807 and completed in 1810, in which he improved considerably on the designs of Smeaton for the Eddystone lighthouse (see Lighthouse, vol. xiv. p. 616). For its illumination he introduced an improved apparatus; he was also the author of various other valuable inventions in connexion with lighting, including the intermittent and flashing lights, and the mast lantern for ships. In his general practice as a civil engineer he was employed in the construction of many county roads, in various important improvements in connexion with the approaches to Edinburgh, including that by the Calton Hill, in the erection of slips at ferries, in the construction of harbours, docks, and breakwaters, in the improvement of river and canal navigation, and in the construction of several important bridges. It was he that brought into notice the superiority of malleable iron rods for railways over the old cast iron, and he was the inventor of the movable jib and balance cranes. It was chiefly through his interposition that an Admiralty survey was established, from which the Admiralty sailing directions for the coasts of Great Britain and Ireland have been prepared. Stevenson was elected a fellow of the Royal Society of Edinburgh in 1815, and afterwards became a member of the Geological and Astronomical Societies of London and the Wernerian and Antiquarian Societies of Scotland. He published an account of the Bell Rock lighthouse in 1824, and, besides contributing important articles on engineering subjects to Brewster's *Edinburgh Encyclopædia* and the *Encyclopædia Britannica*, was the author of various papers read before the societies he was connected with. He died at Edinburgh 12th July 1850.

A *Life of Robert Stevenson*, by his son David Stevenson, appeared in 1878. David Stevenson (1815–86), who along with his brother Alan succeeded to his father's business, was the author of a *Sketch of the Civil Engineering of North America* (1838, republished in "Weale's Series," 1859), *Marine Surveying* (1842), *Canal and River Engineering* (1858; 2d ed. enlarged, 1872; 3d ed. 1886), and of various papers read before learned societies.

Stevinus, Simon (1548–1620). This great mathematician was born in 1548 at Bruges (where the Place Simon Stevin contains his statue by Eugen Simonis) and died in 1620 at The Hague or in Leyden. Of the circumstances of his life very little is recorded; the exact day of his birth and the day and place of his death are alike uncertain. It is known that he left a widow with two children; and one or two hints scattered throughout his works inform us that he began life as a merchant's clerk in Antwerp, that he travelled in Poland, Denmark, and other parts of northern Europe, and that he was intimate with Prince Maurice of Orange, who asked his advice on many occasions, and made him a public officer,—at first director of the so-called "waterstaet," and afterwards quartermaster-general. The question whether Stevinus, like most of the rest of the prince's followers, belonged to the Protestant creed hardly admits of a categorical answer. A Catholic, it may be said, would never in those times have risen to so high a position. A Catholic would perhaps not have been so ready as Stevinus to deny the value of all authority, whether of an Aristotle, of an Euclid, or of a Vitruvius. A Catholic could not well have boasted, as Stevinus in a political pamphlet did, that he had always been in harmony with the executive power. But against these considerations it might be urged that a Protestant had no occasion to boast of a harmony most natural to him, while his further remark, in the same pamphlet, to the effect that a state church is indispensable, and that those who cannot belong to it on conscientious grounds ought to leave the country rather than show any opposition to its rites, seems rather to indicate the crypto-Catholic, who wishes for reasons of his own to remain in the Netherlands. The same conclusion is supported by the ascertained fact that Stevinus, a year before his death, bequeathed a pious legacy to the church of Westkerke in Flanders, out of the revenues of which masses were to be said. But, however it may be answered, the question is fortunately of little importance to us, as Stevinus was neither a political personage nor did he engage in religious controversy. He was mainly, as already said, a great mathematician, and it is chiefly in this quality that we must try to get acquainted with him. His claims to fame are most varied. Some of them appealed strongly to the men of his time, but many were such as could not well be understood by most of his contemporaries, and have found due acknowledgment only in later times.

His contemporaries were most struck by his invention of a carriage with sails, a little model of which was preserved at Scheveningen till 1802. The carriage itself had been lost long before; but we know that about the year 1600 Stevinus, with Prince Maurice of Orange and twenty-six others, made use of it on the sea-shore between Scheveningen and Petten, that it was propelled solely by the force of the wind, and that it acquired a speed which exceeded that of horses. Another idea of Stevinus, for which even Grotius gave him great credit, was his notion of a bygone age of wisdom. Mankind once knew everything knowable, but gradually forgot most of it, till a time came when little by little the forgotten knowledge was reacquired; the goal to be aimed at is the bringing about of a second age of wisdom, in which mankind shall have recovered all its early knowledge. The fellow-countrymen of Stevinus were proud that he wrote in their own dialect, which he thought fitted for a universal language, as no other abounded like Dutch in monosyllabic radical words.

History has been much less enthusiastic than his con-