alkali-works. The population of the urban sanitary district (area 2694 acres) in 1871 was 5259, and in 1881 it was 5493.

SAND-BLAST. The erosive influence of driven sand is turned to useful account for several industrial purposes by means of an apparatus devised, about 1870, by Mr B. C. Tilghman of Philadelphia. Tilgliman’s sand-blast con­sists of a contrivance for impelling, with graduated degrees of velocity, a jet or column of sand, by means of com­pressed air or steam, against the object or surface to be acted on. The apparatus is principally adapted for obscuring, engraving, and ornamenting glass, but accord­ing to the velocity with which the sand is impelled it may be used to carve deep patterns in granite, marble, and other hard stones, to bite into steel, &c., and even to cut and perforate holes through these and other most refrac­tory materials. Sheets of glass 4 feet wide are obscured at the rate of 3 feet per minute, with a blast of air having a pressure of 1 lb) per inch. With the aid of tough elastic stencils, patterns and letters are engraved on flashed glass, globes for lamps and gaslights are ornamented, druggists’ bottles are lettered, &c. @@1 Driven with moderate velocity against a metal surface, the sand produces by its impact a fine uniform pitted appearance without removing the metal; and in this way it is used for “frosting” plated goods. A strong blast is largely used for sharpen­ing files, which, as they leave the cutter, have always a slight backward curve or “ burr ” on their cutting edges which blunts their biting effect. By directing a blast of very fine sand, mixed with water into a thin mud, with steam pressure of 70 ft), at an angle against the back of the teeth, this burr is ground off, the shape of the teeth is improved, and the file is rendered very keen. While the use of steam for impelling the sand-blast is most simple and economical, many practical difficulties have hitherto been found in the way of its employment, and conse­quently for obtaining high pressure of air costly apparatus was required, thus limiting the applications of the agency. In 1884 Mr Mathewson patented an apparatus in which, by an ingenious exhaust arrangement, the impelling steam is swept away, leaving only cool, dry sand to strike against the object acted on; and the success of this device has already opened up a wider field for the employment of the sand-blast.

SANDBY, Paul (1725-1809), founder of the English school of water-colour painting, was descended from a branch of the Sandbys of Babworth, and was born at Nottingham in 1725. After commencing his artistic studies in London, in 1746 he was appointed by the duke of Cumberland draughtsman to the survey of the Highlands. In 1752 he quitted this post, and retired to Windsor, where he occupied himself with the production of water­colour drawings of scenery and picturesque architecture, which brought him under the notice of Sir Joseph Banks, who gave him his patronage, and subsequently commis­sioned him to bring out in aquatinta (a method of engrav­ing then peculiar to Sandby) forty-eight plates drawn during a tour in Wales. Sandby displayed considerable power as a caricaturist in his attempt to ridicule the opposition of Hogarth to the plan for creating a public academy for the arts. He was chosen a foundation- member of the Royal Academy in 1768, and the same year was appointed chief drawing-master to the Royal Military Academy at Woolwich. He held this situation till 1799, and during that time he trained many artists

who afterwards gained a name in their profession. Sandby will be best remembered, however, by his water-colour paintings. They are topographical in character, and, while they want the richness and brilliancy of modern water­colour, he nevertheless impressed upon them the originality of his mind. In his later pieces, in particular, decided progress is observable in richness and in harmony of tinting, and they also show a measure of poetic feeling, due, in great part, to the influence of Cozens. His etchings, such as the *Cries of London* and the illustrations to Ramsay’s *Gentle Shepherd,* and his plates, such as those to Tasso’s *Jerusalem Delivered,* are both numerous and carefully executed. He died in London on the 9th November 1809.

SANDEAU, Leonard Sylvain Jules (1811-1882), a French novelist of much grace and not a little power, was born at Aubusson (Creuse) on February 9, 1811. He made acquaintance as an art student with Madame Dudevant (George Sand), who had just taken to an unrestrained literary life at Paris. The intimacy did not last long, but it produced *Rose et Blanche* (1831), a novel written in common, and from it George Sand took the idea of the famous *nom de guerre* by which she is and always will be known. Sandeau’s subsequent work showed that he could run alone, and for nearly fifty years he continued to produce novels and to collaborate in plays. His best works are *Marianna* (1839), *Le Docteur Herbeau* (1841), *Catherine* (1845), *Mademoiselle de la Seiglière* and *Made­leine* (1848), *La Chasse au Roman* (1849), *Sacs et Parchemins* (1851), *La Maison de Penarvan* (1858), *La Roche aux Mouettes* (1871). The famous play of *Le Gendre de M. Poirier* is only one of several which he wrote with Emile Angier,—the novelist usually contributing the story and the dramatist the theatrical working up. Meanwhile Sandeau, who had accepted the empire, but who never took any active part in politics, had been made conservateur of the Mazarin library in 1853, elected to the Academy in 1858, and next year appointed librarian of St Cloud. At the suppression of this latter office, after the fall of the empire, he was pensioned. He died on the 24th of April 1882. He was never a very popular novelist, judging by the sale of his works; and the peculiar quiet grace of his style, as well as his abstinence from sensational incident, and his refusal to pander to the French taste in fictitious morals, may be thought to have disqualified him for popularity. But his literary ability has always been recognized by competent judges. His skill in construc­tion was very great; his character-drawing, though pure, is eminently free from feebleness and commonplace; and of one particular situation—the tragical clashing of aristo­cratic feeling with modern tendencies—he had an extra­ordinary mastery, which he showed without any mere repetition, but in many different studies.

SANDEC. See Neu-Sandec.

SAND-EEL or Sand-Launce. The fishes known under these names form a small isolated group *(Ammodytina),* distantly related to the cod-fishes. Their body is of an elongate-cylindrical shape, with the head terminat­ing in a long conical snout, the projecting lower jaw form­ing the pointed end. A low long dorsal fin, in which no distinction between spines and rays can be observed, occupies nearly the whole length of the back, and a long anal, composed of similar short and delicate rays, com­mences immediately behind the vent, which is placed about midway between the head and caudal fin. The caudal is forked and the pectorals are short. The total absence of ventral fins indicates the burrowing habits of these fishes. The scales, when present, are very small; but generally the development of scales has only proceeded to the formation of oblique folds of the integuments.

@@@1 In 1875 inscriptions were cut by means of the blast on 150,000 tombstones of soldiers killed in the American Civil War. Cast-iron letters were fastened by shellac on the marble, the sand was driven by steam pressure of 90 lb, and the stone was cut, in four minutes, to a depth of a quarter of an inch, leaving the letters in relief.