*Noils.*—The noils resulting from the dressing operations are some­times combed, the comb used being similar to those used in the cotton trade. The resulting sliver is used by silk spinners who make a speciality of spinning short fibres, and the exhaust noils are bought by those who spin them up into “ noil yarns ” on the same principle as wool. The yarns are chiefly used by manufacturers of powder bags. The noils are also in great demand for mixing with wool to make fancy effects in wool cloths for the dress goods trade.

*Drafts.*—The drafts from the dressing frame are valued in accord­ance with their length of fibre, the longest being known as A or 1st drafts and so on :—

1st 2nd 3rd 4th 5th 6th Drafts. Drafts. Drafts. Drafts. Drafts. Drafts.

or as quality A B C D Shorts.

Each draft may be worked into a quality of its own, and by such means the most level yarns are obtained. But occasionally one or more drafts are mixed together, when price is the determining factor.

*Processes peculiar to Silk Spinning Industry.—*The foregoing pro­cesses are all peculiar to the silk waste trade, no other fibre having to go through such processes, nor needing such machinery. In the first stages of the spun-silk industry, the silk was dressed before boiling the gum out; the resulting drafts were cut into lengths of one or two inches. The silk was then boiled and afterwards beaten, scutched, carded, drawn, spun, folded, &c., in exactly the same way as fine cotton. Short fibre silks are still put through cards and treated like cotton; but the value of silk is in its lustre, elasticity and strength, which characteristics are obtained by keeping fibres as long as possible. Therefore, when gill drawing machinery was invented, the cutting of silk into short fibres ceased, and long silks are now prepared for spinning on what is known as ” long spinning process.” Following the process of dressing, the drafts have to go through a series of machines known as preparing machines: the object being to piece up the lengths of fibre, and to prepare the silk for spinning.

*Preparing or Drawing Machinery.—*A faller or gill drawing machine consists of a long feeding sheet which conveys silk to a pair of rollers (back rollers). These rollers present the silk to a set of fallers (steel bars into which are fixed fine steel pins), which carry forward the silk to another pair of rollers, which draw the silk through the pins of the fallers and present it to the rollers in a continuous way, thus forming a ribbon of silkcalled a “ sliver.” The fallers are travelled forwards by means of screws, and when at the end of the screw are dropped automatically into the thread of a receiving screw fixed below, which carries the fallers back to their starting point to be risen by cams into the top pair of screws thus to repeat their journey.

*Silk Spreader.—*This is the first of the series of drawing machines. The drafts from the dressing frame are made into little parcels of a few ounces in weight, and given to the spreader, who opens out the silk and spreads it thinly and evenly on to the feeding sheet, placing a small portion of the silk only on the sheet. Another portion is opened out and placed tail end to the first portion; and these opera­tions are repeated until the requisite weight is spread. During this time the silk has been conveyed through the fallers and into a large receiving drum about 3 ft. in diameter, the silk being wrapped thinly and evenly all round the circumference of the drum. When the agreed-on weight is on the drum, the silk is drawn across the face of the drum parallel with its axle, and pulled off in form of a sheet, and is called a lap. This lap is thin, but presents the fibres of silk now joined and overlapped in a continuous form, the length measured by the circumference of the drum. This lap is sometimes re-spread to make it more even, and at other times taken to a drawing machine which delivers in a sliver form. This sliver is taken through a series of four other drawing machines called “ four head drawing box.” Eight or more slivers are put behind the first drawing head, con­veyed through the fallers and made into one sliver in front of the machine. This sliver is put up behind the second drawing; eight or more ends together run through the second head again into one sliver; and so on through the third and fourth heads of drawing. All these doublings of the sliver and re-drawing are for the purpose of getting each fibre to lie parallel and to make the sliver of an equal weight over every yard of its length. From the last head of drawing the sliver is taken to a machine known as a gill rover. This is a drawing machine fitted with fallers through which the sliver is drawn, but the end from the front roller is wound on to a bobbin. The machine is fitted with 20 to 40 of these bobbins placed side by side, and its product is known as "slubbing roving,” it being now a soft, thick thread of silk, measuring usually either 840 or 1260 yds. to 1 lb weight. Hitherto all the drawing has been by rollers and fallers, but in the next machine the drawing is done by rollers only.

*Dandy Roving Frame.—*This is a frame built with forty or more spindles. Two or three slubbing rovings are put up behind the machine opposite each spindle; each end is guided separately into back rollers and thence between smaller rollers, known as carrier rollers, to the front rollers. The back rollers revolve slowly, the front rollers quickly, thus drawing the rovings out into a thinner size or count. The product is wound on to the bobbin by means of flyer and spindle, and is known as dandied or fine roving, and is then ready for the spinning frame.

*Spinning.—*The spinning is done by exactly the same methods as cotton or worsted, viz. either mules, ring frames, cap or flyer frames, the choice of machine being determined by the size or count of yarn intended to be produced.

*Twisting and Doubling.—*If a 2-fold or 3-fold yarn is needed, then two or more ends of the spun thread are wound together and after­wards conveyed to the twisting frame for the purpose of putting the needed twist in the yarn necessary for weaving or other require­ments. This process is exactly the same as in the cotton or worsted industry, ring or flyer frames being used as desired.

*Weft Yarns.—*These are taken straight from the spinning frame, wound on to a long paper tube and so delivered to the manufacturer ready to place in the loom shuttle.

*Folded Yarns* are hairy after being spun and folded, and in addition sometimes contain nibs and rough places. The fibre and nibs have to be cleaned off by means of a gassing machine so constructed that the end of silk (silk yarn) is frictioned to throw off the nibs, and at the same time is run very rapidly through a gas flame a sufficient number of times to burn off the hairy and fibrous matter without injuring the main thread. The yarn is now ready for reeling into skeins or for warping, both of which operations are common to all the textile yarns. It may be washed or dyed just as required, either in hank or in warp.

*Growth of Industry and Uses of Spun Silk.—*As will have been gathered, spun silk is pure silk just as much as that used by the throwster. The spinning industry has not decreased in England. The number of mills has decreased, but machinery now runs so much more quickly than formerly that more yarn is being spun on fewer spindles. The American spinning industry shows little signs of expansion in spite of a protective tariff of some 35%. The conti­nental spinners have largely increased, but are developing into huge syndicates, all working on the schappe principle. The three chief syndicates, one each in Italy, France and Switzerland, work very much together, practically ruling the prices for yarns and raw materials.

Spun silks are used largely for silk linings, hosieries, sewing threads, elastic webbing, lace, plush and many other purposes, such as mufflers, dress goods and blouse silks; also for mixing with other fibres in form of stripes in the weaving of various fabrics, or to be used in what are known as mixed goods, *i.e.* a warp of silk and weft of some other fibre or weft of silk and a warp of cotton or other fibre. The article known as tussur spun is prepared in exactly the same manner as other spun silks, but its chief use is to make an imitation of sealskin known commercially as silk seal. (A. Mel.)

**SILL, EDWARD ROWLAND** (1841-1887), American poet and educationist, was born at Windsor, Connecticut, on the 29th of April 1841. He graduated at Yale in 1861, as class poet; engaged in business in California; entered the Harvard Divinity School in 1867, but soon left it for a position on the staff of the New York *Evening Mail;* and after teaching at Wadsworth and Cuyahoga Falls, Ohio (1868-1871), became principal of the Oak­land High School, California. He was professor of English literature at the university of California in 1874-1882. His health was failing, and he returned to Cuyahoga Falls in 1883. He devoted himself to literary work, abundant and largely anonymous, until his death in Cleveland, Ohio, on the 27th of February 1887. Much of his poetry was contributed to the *Atlantic Monthly,* the *Century Magazine,* and the *Overland Monthly.* Many of his graceful prose essays appeared in “ The Contributors’ Club,” and others appeared in the main body of the *Atlantic.* Among his works are a translation of Rau’s *Mozart* (1868); *The Hermitage and Other Poems* (1868); *The Venus of Milo and Other Poems* (1883), a farewell tribute to his California friends; *Poems* (1887); *The Hermitage and Later Poems* (1889); *Hermione and Other Poems* (1900); *The Prose of Edward Rowland Sill* ( 1900) ; *Poems* ( 1902). He was a modest and charming man, a graceful essayist, a sure critic. His contribu­tion to American poetry is small but of fine quality. His best poems, such as *The Venus of Milo, The Fool's Prayer* and *Opportunity,* gave him a high place among the minor poets of America, which might have been higher but for his early death.

See *A Memorial* volume privately printed by his friends in 1887; and "Biographical Sketch ” in *The Poetical Works of Edward Rowland Sill* (Boston, 1906), edited by William Belmont Parker with Mrs Sill’s assistance.

**SILL** (O.Eng. *syl,* Mid. E. *sylle,* selle; the word appears in Icel. *syll, svill,* Swed. *syll,* and Dan. *syld,* and in German, as *Schwelle;* Skeat refers to the Teutonic root *swal-,* swell, the word meaning the rise or swell formed by a beam at a threshold ; the Lat. *solea,* from which comes Fr. *seuil,* gives Eng. “ sole,” also sometimes used for “ sill ”), the horizontal base of a door or window-frame. A technical distinction is made between the inner or wooden base