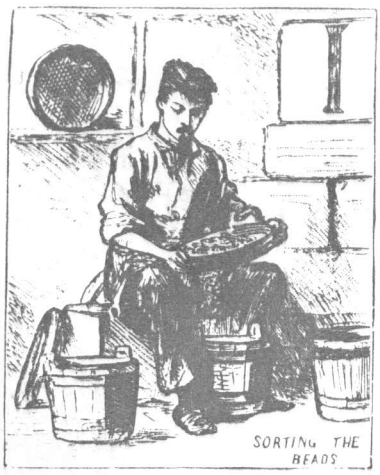
HOW BEADS ARE MADE.


SORTING THE BEADS.

It sounds almost incredible, but is nevertheless a fact, that it would take a dozen locomotive engines to transport the weight of glass beads annually purchased by the fair sex.

The best customers of all are the French, and next to them come the Spaniards of Europe and America; while among the German nations it would seem, according to the testimony of Herr Gampe, that the purer the race, the less the fondness for beads. Thus he Yankees show how mixed their blood is, by buying almost as many beads as the French and the Spaniards; the English are not such good customers, but they imported 2,204,241 lbs. in the year 1871; while the Germans stand third on the list, and the Scandinavians last. The latter are, perhaps, too sober-minded, and grave to care for such frivolous vanities.

Of the Turks and Hungarians, only the upper classes wear beads at all, as they would be quite out of keeping with the national costumes of the people.

As a rule, the civilised European, no matter what her nationality, buys only the cheaper kinds of glass-beads, and leaves the best and most expensive for the barbarous and semi-barbarous natives of India and Africa. Strings of beads adorn the throat, neck, hair, arms, and ankles of the Hindu and Malay, and often enough form the sole costume of the Ethiopian, and in the interior of Africa they frequently take the place of money as a medium of exchange.

Among the Mongolians, says the writer of this article in *Cassell's Family Magazine*, the Japanese are the only customers, but they are rather good ones, while the Chinese ladies apparently despise beads of all sorts.

Although the Italians do not share the love of beads manifested by the other Latin races, it is from Venice that the whole world, civilised, semi-civilised, and uncivilised, is mainly supplied; the Bohemian manufacturers, energetic as they are, have only just begun to turn their attention to this branch of industry, while the few smaller factories in the Levant are hardly of sufficient importance to require notice.

The largest of the seven large glass-bead factories in Venice and the neighbouring island of Murano belong to a German, named Weberbeck, who employs 500 men and women. In all, some 6,000 persons earn their living by the various processes incidental to bead-making, and a very poor living it is, for the value of the beads made amounts only to some 300,000*l.* yearly, which, equally divided among the "hands," would give them but 50*l.* apiece and leave nothing for the masters.

The process of bead-making is for the most part remarkably simple, the chief essential being that the glass, which is manipulated in a semi-fluid state, should be so tough and ductile as to allow of its being drawn out like resin or sealing-wax, only to a much greater degree of tenuity.

The glass is coloured before it leaves the furnace by chemicals, of which arsenic, saltpetre, antimony, and lead are the principal. It is then ready to be drawn out into tubes. One of the glass-blowers dips his iron rod into the viscous mass, and taking up a lump about the size of a small melon, first rolls it on an iron plate to round it, and then with a simple tool makes a hollow in it, much like that at the bottom of a wine bottle. Another workman has meantime done the same thing with another lump; the two then press the edges of these glass balls together until they adhere, and the fusion is so complete that the air within cannot escape. They then take up their rods again and walk quickly away in opposite directions to a distance of about a hundred yards, keeping step the while as exactly as if they were marching with a regiment; the red hot glass spins itself off from the two balls as long as any remains, or until it becomes too cool to spin any further; and as the enclosed air spins itself out at the same time, a hollow tube is produced instead of a solid rod of glass, as would otherwise have been the case, and the future bead has received its necessary hole.

These glass tubes are of various sizes, and range from the diameter of a lead-pencil to that of the finest knitting-needle. Those which are to be made into variegated beads are formed in the same way, only that the lumps of glass on being taken from the furnace are dipped into liquid glass of other colours in succession, so that they are encased in skins like those of an onion, and the spinning off of the several coats proceeds with wonderful regularity, without any further assistance from the workman's hand. Often, too, the glass balls have merely little knobs of glass of different colours put upon them, and these appear as fine lines or stripes on the tubes. The sorting of the tubes, which are broken into lengths of about three feet, is a very general home industry in Venice, where the women and girls are constantly to be seen sitting before large baskets full of glass pipes, which look like the quills of a porcupine.

With outspread fingers they feel and weigh these until all are accurately sorted according to their size; they are then made up into bundles and taken back to the factories, where they are put into machines exactly like straw-cutting machines, and are chopped up into the size required.

The next process is to remove all sharp angles, and to accomplish this the beads are first mixed with fine sand, which fills the holes and prevents their closing up again, and they are then very carefully heated in cylinders, which are kept revolving in the furnace until the beads are sufficiently smooth and round.

As far as shape goes, the beads are now ready; they are sorted according to their size by being passed through sieves, and then those which are to receive an extra fine polish are put in bags of bran and shaken.

Stringing the beads in skeins is another home industry. The Venetian women, whose occupation it is, hold as many as a dozen steel needles a foot in length, and often as fine as a silk thread, between the fingers of their two hands; and with these they dive into the heap, picking up as many as they can, haphazard.

Herr Gampe reckons that a skilful pair of hands will thread as many as three millions a day.

The manufacture of the beads in which the Indians and Africans take delight is a much more complicated process than that described above, as they are made only at the blow-pipe. Great mechanical skill is required to produce the tasteful spirals and arabesques which they exhibit, and the effects of colour are often wonderfully beautiful and quite in accordance with the fabulous ideas of splendour usually associated with those lands for which they are especially destined; but the process is as little to be described as that of modelling or chasing. In the interior of Africa these beads are often used in making payments in the place of money, and the cunning Arab, who has the trade of the country entirely in his own hands, is quick to take advantage of the pleasure they afford to the simple negress. A string of handsome beads is far more effective and ornamental than a sober silver florin.

Contrary to what we might perhaps have expected, these black, woolly-headed children of nature show a marked dislike to shiny beads—a great proof of good taste, for there is always an unpleasant glare about a shiny surface—and the Venetians are obliged to subject the beads intended for them to a dulling process, to do away with the glitter natural to all glass on cooling.

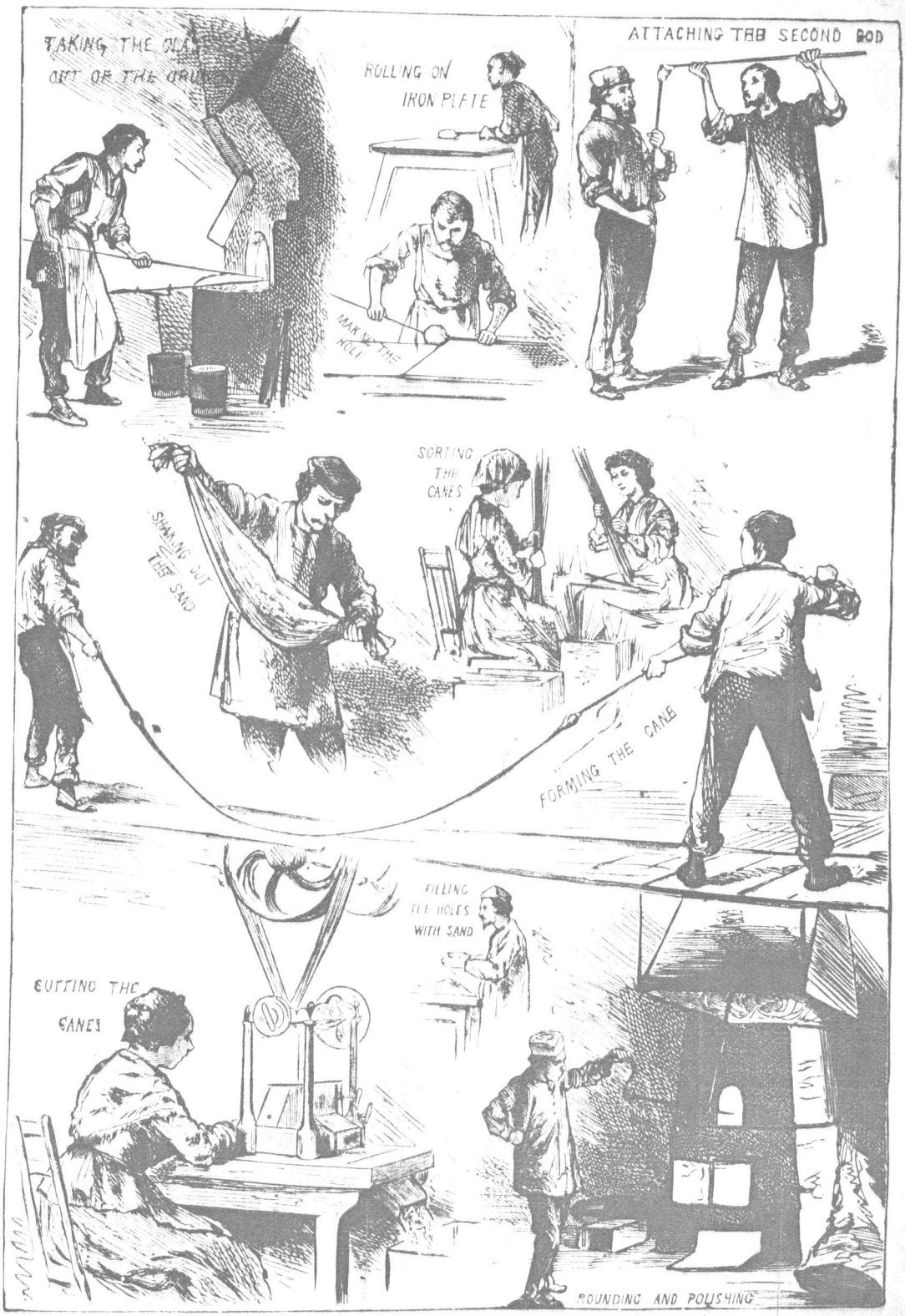
As before mentioned, the pay of the workpeople employed in this manufacture is miserable. Only the most skilful get even fair wages; and as for the women, they earn barely half a paper-franc a day, and are obliged to live on food of the most coarse

and scanty description, even the *polenta*, the frugal national dish of Italy, being beyond their means, except on Sundays. During the week they subsist on field-turnips, carrots, &c., which are to be seen in the bye-streets of Venice, cooking in vast heaps at the open fire, and are consumed on the spot by the needy purchasers.

While upon the subject of bead-making we may say a few words about the imitation pearl beads, in the manufacture of which the French excel.

These are chiefly made in the department of the Seine, but a cheap and inferior quality, known as German fish-pearls, are manufactured in Saxony.

The practice of making hollow glass-beads and filling them with pearly varnish was in vogue at an early period among the artists of Murano, but was prohibited by the Venetian Government, because it was considered either fraudulent or dangerous to health on account of the quicksilver used. The art was, however, revived and improved by a French bead-maker named



By permission of the VENICE AND MURANO GLASS Co.

Jaquin, who used the scales of the small fresh-water bleak for making a pearly powder, which had all the lustre of the most beautiful pearls, and was named by him *Essence d'Orient*. He first made his beads of gypsum and covered them with the pearl-powder, but this did not answer, for the powder rubbed off the beads and adhered to the skin of the wearer. After this the beads were made of glass, covered inside with a solution of isinglass and the pearl-essence and filled with wax, which was bored through with a needle; but various improvements have been made in the manufacture since then. In 1834 a French artisan invented an opaline glass of a pearly colour, very heavy and easily fusible, which gave the beads all the different weights and forms found among real pearls. They are now filled with gum instead of wax, by which means a highly transparent effect is produced, and the surface being deadened by the vapour of hydrofluoric acid, their appearance hardly differs from that of real pearls.

Pearl beads are not made by drawing the glass out into tubes as described above, but are blown separately; one workmen being able to blow as many as 6,000 of the commoner quality in a day. But if they are required to be very beautiful he can produce only 1,200 or 1,500, which he makes round, pear-shaped, olive-shaped, or flat on one side, as may be desired.

The bleak, whose scales are employed to make the pearl powder, is but four inches long; 4,000 fish yield a pound of scales, and these do not produce four ounces of the essence, which is preserved for use in a solution of sal-ammoniac. This is mixed with dissolved isinglass, and blown into each globule by means of a fine glass pipe, the pearls becoming more beautiful and more valuable the larger the quantity of essence used. Some of the best imitations fetch really good prices.

ON THE DRYING OF CERAMIC PRODUCTS.

THE rapidity with which we can dry a piece of pottery depends on the time required for the moisture at the centre to get to the surface, and on the resistance or rather the cohesion of the moulded article.

The more rapidly this transmission is made, the less the difference in power of retaining moisture is betwixt the centre and the exterior surfaces.

If we could make this transmission so rapid as to be instantaneous, the entire piece of pottery during the whole process of drying would preserve a uniform degree of humidity. The result would be that the withdrawal of moisture would be the same in every portion of the object. There would consequently be no breakage or distortion, however rapidly the process of drying might be conducted.

Now the speed of the transmission of the water from interior of the clayey mass depends essentially on the nature of the clay.

We are not able to give any theoretical explanation of this process, which is, of course, connected with the molecular constitution of the mass. It is the same also in regard to the plasticity of the clay, as to which we are equally ignorant of the cause. Of course, it may be said that the transmission of the water is caused by "capillary attraction," but that is really no explanation at all, because while a series of phenomena testified

Nothing therefore remains as a resource but that we should modify the composition and nature of the paste itself.

Regarding this point of view, all practical men know that the transmission of the humidity is more slow, as the clay is more plastic and more compact. It is hastened therefore by making the clay more penetrable by the atmosphere around. As the less solid clay requires less water in its modelling it is natural that it should dry all the quicker. These two processes go on simultaneously, and it is therefore difficult to attribute its own proper share in the process to either of them.

Thus two bricks, one of which was made of pure clay, and the other with a part of the same clay mixed with two parts of perfectly dry sand, have given in drying the following results:—

	Pure clay.	$\frac{1}{3}$ clay, $\frac{2}{3}$ sand.
Half of the water was evaporated at the end of	46 hours.	30 hours.
Three quarters of the water was evaporated at the end of ...	78 „	52 „
Completely dried	164 „	120 „

It is true that the first brick contained 22·7 per cent. of its weight of water, and the second 13·8 per cent.

The influence of the weakening of the clay was particularly observable at the end of the drying. The last traces of humidity are the most difficult to get out of clays that are very compact and plastic.

If we consider that the clays employed in this industry are mixtures of clay properly so called, or silicate of alumina with some sand and carbonate of chalk, a description which is sufficiently precise from the point of view of the process we are at present concerned with, it will be seen that the clay and the carbonate of chalk retard the transmission of water, and the sand hastens it.

The carbonate of chalk it is true acts in a way to lighten the compactness of the clay, but as it itself absorbs a notable proportion of water it follows that it does not facilitate drying. It even appears that its action was objectionable from this point of view, as is perceived in certain very calcareous plastic glazes which are extremely difficult to dry.

Thus the only means which we possess of hastening the drying of a clay is to weaken it with sand, but it is necessary to state at once that this process cannot be universally applied.

Beyond the necessity for preserving a sufficient plasticity for the moulding, and which varies with the nature and the quality of the articles we wish to produce, we are at once faced with another difficulty, viz., the lack of resistance and of cohesion in the moulded article.

If we mould the clay into the shape of bricks, and then attempt to pull them we know that the resistance rapidly diminishes in proportion as more and more sand is added to the clayey paste.

Now, it is well known that in drying every piece of clay there are produced interior tensions which it is absolutely requisite that the piece must be able to resist without breaking. Therefore, while by weakening the clay too much we hasten its drying, we provoke for a manifest reason the ruptures we are particularly anxious to avoid. This fact explains the difficulty we meet with likewise in the drying of clay that is too thin.

In a piece of clay there will therefore be a degree of work-