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GILT WIRE AND TINSEL INDUSTRY

BY

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NOTE

The Government of India desire it to be understood that the statements made and the views expressed in this bulletin are those of the author himself.

PREFATORY NOTE

IN preparing this monograph the author has examined the available literature on the subject, especially the monographs written by Messrs Burdon, Nissim, Mallinath Ray, Headaway, Gwynne and De, Messrs. Chadwick and Black's "Indo-French Trade" and Sir George Watt's "Indian Art at Delhi." He has endeavoured to supplement the printed information available on the subject by inquiries made in centres of the industry. A glossary of the technical terms used in the monograph has been added as an appendix.

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Origin of the industry

The title of this monograph "Gilt Wire and Tinsel Industry" is not, perhaps, a happy one, as the idea of camouflaging silver wire to make it appear like gold is alien to the art instinct of the Indian workman. The word 'gilt' conveys the idea of concealing something baser. A better title would be one used by the writers of the monograph on this industry in the first decade of the 20th century, "wire and tinsel industry." But even here the word 'tinsel' is not a good rendering of "*bādā, kalābattū, etc., the cunning products of the masālā banānewālā.*" There is a suggestion of something specious, gaudy and unprecious in the commonly accepted connotation of the word 'tinsel,' which is generally used in distinction to an article made from precious metals. Mr. Headaway writes: "The general idea of tinsel is something more or less impermanent which gives an effect of great gorgeousness and glitter at a small cost, and it is used so extensively on festive occasions that it has come to be in no way a deception, except perhaps to very young children. What may and what may not be included under this head is difficult to determine, but in the present instance, as many tinselly articles

are included under 'wire,' it has been decided to include under 'tinsel' only those articles made up of, or decorated with, coloured metal foil."

The subject is a very wide one, as the title does not necessarily restrict the sphere of investigation to gold and silver wire, but in this monograph the author will confine himself to a treatment of the subject from this narrow point of view, because otherwise the field would be too wide for a monograph of convenient size. No attempt will be made to deal with wire as used in making ornaments, nor with articles like gold, silver or tin foil manufactured from metal wire and coming generally under the name of 'tinsel.'

It would be futile to search for the origin of this industry. The words in common use at present are almost all of Persian or Arabic origin, which lends weight to the popular theory that the industry in its present form owes its inspiration, if not its origin, to the Muhammadan conquerors of India. There can be no doubt that the industry is an extremely ancient one. Sir George Watt states: "There are evidences that the drawing of gold and silver into wire has been practised from time immemorial." He further remarks: "Wire-drawing, at least in its present form, would appear to have been first practised by Muhammadans. It does not, however, follow that the Hindus did not possess a cruder and more laborious process of their own, long anterior to the conquests of the Pathans and the Moghuls. In fact, the references to gold textiles in the most ancient writings of India almost of necessity involve such knowledge. Moreover, there are many oddities, both in wire-drawing and gold-weaving, that suggest their being survivals of former and cruder methods and styles than are at present practised." It is, however, necessary to make one point clear; wire-drawing of precious metals was known definitely in India in pre-Muhammadan times and the resultant wire was cunningly manipulated to beautify silk and cotton cloth.

The author has tried to find references to the use of gold and silver thread in ancient Sanskrit literature: the passages in which mention of these materials is made are reproduced with their translations as an appendix to this bulletin. In passages No. 1 and 3 from the "*Rāmāyan*" and No. 2 from "*Dasa Kumār Charita*" there is clear reference to silver thread being utilized for the weaving.

of rich cloth. The use of the word *tantu* points to the wire being attenuated to the gauge of a thin thread. Sita, at the time of her marriage, was dressed in a rose pink *sari* richly embroidered with gold. Megasthenes mentions the use by the nobility as court dress of cloth in which gold and silver threads were woven. Passage No. 4 is from the 13th chapter of Kautilya's "*Arthashāstra*," the chapter being entitled "Superintendent of gold in the goldsmith's office." The meaning is clear. The reference points to the gold bar being drawn out to the tenuity of a thread, *guna* being the technical word for this product. The whole chapter in the "*Arthashāstra*" is full of references to the precautions taken to prevent the adulteration of the pure metal.

So far as one can see, the art of plating silk or cotton thread with wire of precious metal was a Muhammadan importation into this country. Mr. Headaway has noted in his monograph that the wire-drawers of Madras are called *Saurāstrakārs*, meaning people from Gujrat and Kathiawar, specially the latter. He was told by those immigrants that they left their country under the pressure of Moslem invasion and for the last several centuries had settled down in the Madras Presidency. It is also to be noted that most of the wire-drawers in the initial stage are Hirdus by caste. The word '*guna*,' as used by the author of the "*Arthashāstra*," means a metal wire and there is mention of cloth being worked with metal wire. The author's opinion is that in pre-Muhammadan days workers of cloth of silver and gold knew how to use metal thread in decorating cotton or silk cloth, but the art of making *kaiābattū* was not known to them. Mr. Ray mentions in his Bengal monograph that Muhammadans believe that embroidery with gold and silver thread was the invention of Yusuf, son of Yakub. The novice offers *niaz* (offering) to Yusuf when he begins his apprenticeship, and all engaged in the industry offer *niaz* to his memory on the last Wednesday of the Musalman year. Mr. De's remarks on the subject might be considered. He quotes a passage from Tavernier's description of Burhānpur. "There is another sort of linen which they never dye, with a stripe of gold or silver quite through the piece and at each end from the breadth of 1 inch to 12 or 15 inches, in some more, in some less. They fix tissue of gold, silver and silk intermixed with flower, whereof there is no wrong side." This reference appears to be to the excellent *kāmdani* and

zarbaft work for which Burhānpur is at present so famous. Mr. De seems to conclude that gold and silver wire was used artistically to beautify the clothing worn by warriors, elephant trappings, and horse caparisons, but the system of drawing wire through a draw-plate may be of a later origin. The word '*jantar*' or '*jantri*' (draw-plate) is distinctly of Sanskrit origin, and was probably known in pre-Muhammadan days. Akbar found the industry in Burhānpur as he passed through this entrepôt of trade from Hindustan proper to the Deccan, and he systematized and improved it. The sanad which he granted to one Chunni Lal Chouksee is still in existence. This is merely a mark of recognition of excellence of work and does not point to the introduction of wire-drawing into the Central Provinces by Akbar.

These *Chouksees* or gold testers were attached to the *tanksāls* (mints), and, as will be seen later, *chouksees* are known to have been attached to the *tanksāls* of Delhi, Lahore and Lucknow, and had considerable influence in preserving the purity of the metal which was drawn out for wire.

The conclusion at which one arrives is that wire-drawing was known in India from before the Moslem conquest and that wire tinsel was used to beautify cloth for men and caparisons for horses, but the art of stiffening the wire thread by plating with it a core of yarn was a Musalman importation.

Wire drawing

PREPARATION OF THE METAL BAR

The first stage in the manufacture of the precious wire is the preparation of the metal bar, the *gulli* or *pāsā*. The core metal has always been silver, 80 tolas being usually taken at a time. The silver is heated on a charcoal fire in a crucible along with copper and some *sohāgā* or borax to serve as flux, and the molten metal is poured into a mould. If it is old ornament silver no alloy is usually added; if pure melted silver, it is alloyed with 2 to 4 per cent. of copper, the idea being to increase the ductility of the metal. The bar on cooling is 14 inches long and 2 inches in circumference, and weighs about two tolas less, the balance presumably being lost in melting. The bar is then beaten into a cylindrical shape with tapering ends and for the same purpose it is passed through several holes of the *jantar* plate, until it has the appearance of a torpedo. The bar is filed with a rough file in order to render its surface chemically pure and also to enable the gold plate put on it to bite into the rough surface and become part and parcel of the inner core. The loss in shaping and filing generally amounts to two tolas.

The next stage is to prepare the gold leaf. The artisan that draws the silver bar fashions the gold leaf by beating it to fit the silver bar exactly, except that the edges overlap each other by one-sixteenth of an inch: the tapering end is left uncovered. The leaf having been put on, the artisan rivets it with a hard-pointed chisel, to obviate any possibility of its slipping during the drawing process. The gold plate is thoroughly washed so that it is chemically pure before it is put on.

The above is one of the methods of preparing the gold leaf.

The Punjab method In the Punjab, the gold is mixed with a little sulphate of copper, and the wire receives thereby the requisite hardness and brilliancy. The gold is washed with alum salt and water before use. It is usual to add two and

a half grains of copper to one tola of National Bank gold. The whole is melted and a small rod prepared, and the rod is cut into small pieces, which are beaten into discs. The discs are arranged in a pile, a layer of brick dust being placed between every two discs, and the whole pile is then heated on a fire. It is reported that by heating the discs in this way the weight of the gold is reduced by one *māshā* per *tolā*, or 8 per cent. The discs are then re-melted and converted into a rod which is beaten into a leaf 15 inches long and 2½ inches wide. It is this admixture of copper and the repeated heating in this peculiar manner that impart to the gold its wonderful tenacity.

The weight of silver in the bar varies from 100 to 40 tolas.

The gold of the leaf is denominated as so many *rattis*. It may be as much as 8 tolas of gold for 100 tolas of silver or as little as one tola of gold for 600 tolas of silver. In Madras the proportion is 90 per cent. silver, 7 per cent. copper, and 3 per cent. gold.

The metal 'sandwich' is then placed on charcoal with coal below and above, and the fire is fanned to a bright glow. The hot *gullī* or bar is taken out and rubbed lengthwise with a piece of jade, the process being repeated three times. When the amalgamation of the two metals is complete, the *gullī* is allowed to cool, and, as it is cooling, is smeared with beeswax.

The process of gold plating is by no means an easy one. As Mr. Burdon observes, there is no fixed time during which the *gullī* must remain in the fire; the time required is determined by the workman himself whose sole guide appears to be an instinct born of experience. If the fire is not of the exact temperature required, or if the *gullī* is allowed to remain in the fire for too long or too short a time, or if the heat of the fire is not the same at every point where the *gullī* touches it, the gold leaf will not amalgamate evenly with the silver and will be stripped off when the workman starts to polish with the jade stone. Mr. Gwynne writes that the leaf of gold is placed over the plate of silver, the edges of the silver plate projecting beyond those of the gold leaf which covers it. Fire is then applied to the margins and certain drugs rubbed in. The gold leaf then becomes fused with the silver plate. When the drugs exude, it is a sign that the process is complete.

Gold has never been used by itself for the purpose of drawing into wire for tinsel making. The silver wire is plated with gold, not with the desire of passing off silver as gold, but because this is the only way by which gold tinsel can be produced. The richer the tinsel, the greater is the proportion of *rattis* of gold employed; or, in other words, the percentage of gold gives the *rang*, or colour, to the *gulli*.

Great care was consistently taken by the manufacturers of the *gulli* and the drawers of wire (*kandilā kashas*) to see that the purity of the precious metal was not allowed to be spoilt by an alloy of baser metal. A reference has already been made to the *chouksees* attached to the *tanksāl* at Burhanpur. In Lucknow Dr. Hoey has described the *kandilā kachari*, an institution maintained by the gold and silver lace dealers and presided over by a *daroga* maintained by fees levied on the manufacture. Silver was melted down and cast into *kandilās* of uniform size, which the *kandilākash* took to his shop and pulled. All issues of metal were recorded at the guild-hall and the metal passed out was hall-marked as pure. Mr. Burdon describes in great detail the part played by the Lahore guild, and the vicissitudes through which the guild at Delhi passed before it emerged into its modern shape of municipal supervision. The object was to maintain the purity of the brand.

The importation, however, of gilt wire from Germany and France has altered the situation. The Indian manufacturer has realized that some percentage of the gold used in the manufacture of gold wire is lost in the process of drawing it through innumerable *jantri* holes; he has also realized that, when plating the silk or cotton thread with wire, half of the metal is concealed and so much gold is thus lost to the eye. The result has been that gold *kandilā* is now seldom drawn out into thin wire and, in the majority of cases, it is the silver bar alone that is subjected to the drawing process. The dealers who have been consulted as regards the relative qualities of the gold leaf wire and the gold gilt wire have to agree that the wires coming from Lyons, and in 1920 from Germany, are difficult to beat. By simply gilding the silver wire, however, the manufacturer has only to use as much gold as is required for that operation, and saves two kinds of waste incidental to gold-plate wire

drawing, namely, the loss in the original wire drawing and the loss due to concealment.

There are three other kinds of *kandilās* drawn out. These are
 Other types of metal bars *khota* (false) wire, in which silver and copper are mixed half and half or the preparation is still further varied in favour of copper; the *ekpatri* (single leaf) silver wire and *dopatri* (double leaf) gold wire. In the *ekpatri* wire the core is copper, and only the leaf is of silver; in the latter the core is copper, a leaf of silver is superimposed on the core and on the amalgamation of the two the gold leaf is affixed. The process is the same as in the case of the gold-leaf manufacture of *pāsās* and *gullis*. The only difference is that the wire tarnishes and there is no possibility of its being drawn to the tenuity which is usually associated with the more precious metals. As the metallic content of the *gulli* or *pāsā* is the basis of the future price of the finished product, it is as well to note the fact that the standard of comfort is rising all round, that refinement in the process of democratization has to sacrifice substance for show, and in this transition the dumping of European cheap stuff has precipitated matters to such an extent that the gold-plated silver *pāsās* or *gullis* are rarely to be seen except in Surat, Burhanpur, Poona and Madras, where there still survives a demand for high-priced genuine stuff.

A sort of imitation gold thread is made in Ahmedabad. The
 Imitations usual silver thread is taken and heated on a slow fire of charcoal and cakes of cow dung. Fine flour of turmeric is then poured on the silver thread until it assumes a golden-yellow tinge, when it is wound on cotton or silk thread. Bareilly is chiefly famous for the counterfeit wire, '*naqli tār*.' The process is very simple and is described by Mr. Gwynne as follows :

"A quantity of *bhusā* is lighted from which a thick smoke arises. Over this the fine silver wires are held, the workman taking a bundle of *bādlā* done into a skein. Mr. Charles in his monograph on gold and silver work says that a sieve-like instrument is used and the wire is spread over this. But I did not see any instrument of this description used. The workman with his own hand held the wire over the *bhusā* smoke. After the wire has thus been warmed over the smoke, powdered *haldi* and *roli* are sprinkled over it. *Haldi*, i.e., turmeric is the ordinary yellow-coloured spice used

in curry, and *roli* is *haldi* wetted in lemon juice with borax and alum and then dried. It is then ground up and becomes a deep red powder. After sprinkling the wire with this powder, the artisan draws his hand once or twice sharply over the skein of wire in order to rub the powder well over it, and then holds the wire thus treated again over the *bhusa* smoke. The wire becomes gold-coloured. It is distinguishable from the genuine gold wire, as it is of a much brighter appearance and has the well-known look of imitation gold. It only keeps its freshness for a little while and then quickly tarnishes, but it is widely used for the manufacture of cheaper kinds of *gotā*.”

DRAWING OF THE METAL BAR

The second stage consists of the drawing of the *gulli* or *pāsā* into the *kandilā* by the *kandilā-kash*. The apparatus employed for drawing the *gulli* into *kandilā* is described by Mr. Baden Powell as follows :

“ A small, oblong trough, about three feet long and two feet wide, is dug in the ground and bricked around. Across this a stout roller of wood is laid supported at its axle ends in wooden sockets on either side of the trough ; through the roller pass stout wooden arms or spokes. One is sloping one way, the other the other, like the letter X. A stout chain terminating at one end in a ring and at the other with a pair of pincers or crab is now fixed to it, by simply passing the ring over one end and turning the roller half round. The chain thus secured with a good purchase is now extended towards the opposite side of the trough. Here, just to where the chain reaches, are fixed two very stout poles deeply driven into the ground and having the upper end projecting about two feet above the ground. A stout steel plate is now produced, having a series of holes in it just so large that the *gulli* can not pass through any one in its present stage, though its tapering ends can.”

This steel plate is the *jantar* (a Sanskrit term meaning any mechanism). The Surat *kārigars* informed the author that they used to import it from Nagore, the Central India entrepôt of craftware in the middle ages. The Imperial Gazetteer holds no information on this point, and yet the Nagore *jantar* has been famous. The steel used was really good ‘*faulād*’ (steel), generally a sword plate, the holes were delicately drilled in it and there was a regular gradation of them.

If the metal was not really first class, a few pulls sufficed to increase the size of the holes, and so spoil the plate. A *mistri* at Delhi, reputed to be a nonagenarian, turns out these *jantars* to supply the needs of the Delhi *kandilā kashas*, the number of whom is very large. Prices usually charged are from Rs. 20 to Rs. 35 per *jantar*. No effort has been made to line the holes with diamonds or rubies. If really good steel be used, the *jantar* ought to be good for a considerable period.

Mr. De describes the process of hole-boring in a *taniā's* (wire-drawer's) plate as follows:

"The boring of a hole in a draw-plate is a rather tedious operation. Much of it depends on the skill of the *hole borer*. The hole bored is large or small according to requirements, but in boring a hole, one *chaurasi* (a punch having four facets terminating in a sharp point) and twelve *khutres* (hole borers) are utilized. The steel plate is affixed to a wooden plank with wax and is then rubbed with oil on the surface. A small hole is made with a *chaurasi* and then twelve punches (*khutres*) are successively applied and blows are given with a hammer. A smooth and even hole is thereby obtained. At first the holes are all of the same size, and the workman has to adjust the hole in the draw-plate, which he does by hammering it up close with a small hammer (*thesni*), having one end pointed, and then reopening and making it of the required size by thrusting another punch called *salai*. All the punches can be purchased for Rs. 1-4-0, and the cost of all implements used by the *taniā* is Rs. 10."

"It is obvious to any one that a good deal of time and energy is wasted in thus boring holes by *taniās* themselves. For obvious reasons, the hole to be bored must not be too large nor too small for the wire to be drawn through. But when a wire has to be pulled through forty holes, all bored by the *taniā* himself, who takes particular care not to make them too small in order to prevent the layer of gold being shorn off the silver wire, it is not unlikely that a large number of holes are bored too big for the wire and can easily be dispensed with. Of course, as the *taniās* specialize themselves in this branch of the industry and possess wonderful delicacy of hand and skill attained by long experience, it is probable that they are careful in preventing such waste. Still, it would be a great improvement to have a draw-plate with graduated holes bored through hard gems, such as diamonds, rubies or topaz.

No doubt it would seem a little too costly for the *taniās*, who, as a rule, are very poor, but if once introduced, such draw-plates would find favour with them."

"Continuous drawing is not in vogue in these Provinces and it does not seem worth while introducing it here. For not infrequently the wire breaks, and each time such a wire is drawn through a hole the two pieces have to be knotted together, and, in the case of continuous drawing, this would involve a good deal of trouble and inconvenience. Besides, it would be difficult for these unskilled workmen to regulate the speed of different wheels."

The *gulli* is well coated with beeswax and one of the tapering ends is forced through the largest hole in the *jantar*. The *jantar* is then placed across the two stout posts described above on the far side of the roller, with the tapering end of the *gulli*, which projects through the *jantar*, towards the roller. The projecting point is firmly caught by the chain, and the *taniā*, or drawer, at the other end grasps the spokes fixed on the roller and makes it revolve. In this way the *gulli*, when dragged through the *jantar*, becomes slightly elongated in the process. This is repeated till the *gulli* is drawn out into wire, one tola of which measures twelve yards. Two men are required to do the work, the *taniā* who has to exert a great deal of physical strength in the actual drawing, and a 'feeder,' who keeps the wire heated and well covered with wax. It is this constant annealing that allows of the wire-drawing without any mishap. The 'feeder' has by him a brazier of charcoal and a piece of cloth smeared with bees-wax, and before passing the wire through the *jantar* he makes it run through the wax cloth in his hand, held some nine inches above the hot charcoal in the brazier. In this way the wire becomes very ductile.

Five hours' continuous work will reduce the wire to a gauge at which 10 or 12 yards of it would weigh one tola; the *kandilā* is then complete. The wire is then made up into *guchhli*, or hanks of 10 to 12 yards each, and so leaves the hand of the *kandilā kash*. The work is very slow, and as the pull exercised on the metal is neither continuous nor of the same intensity, there is fear of the wire being rendered incapable of further manipulation.

It is for this part of the work that it is necessary to introduce machinery. From enquiries made it appears that a British firm have put on the market

Use of machinery

a combined draw bench and wire blocks : this machine will take bars of a half-inch diameter and reduce them, first on the draw bench and then on the blocks, to about No. 18 gauge. The wire is next put on a continuous machine, reduced to about 30 gauge and finally finished to the required size, 40 gauge or smaller, on another machine. The latter is fitted with automatic spooling gear for winding the finished wire on spools. The price of the three machines is approximately £700, packed and delivered f.o.b., London. The Gauri Gold and Silver Works Company, Surat, has been the pioneer in this line in Surat. Mr. Dawson, Principal, Victoria Jubilee Technical Institute, Bombay, visited the place in August 1919 and reported as follows : " the slow and cumbersome process of hand-drawing has been replaced entirely by power-driven machinery and they have made some excellent drawing by hand also." Another type of machinery, of German make, is to be found in Cawnpore, and another, of French make, at Perambur, Madras.

REDUCTION OF METAL WIRE TO METAL THREAD

The third stage is that of *tārkashi*. The *guchhli* (hank) of wire is generally boiled in lime water to remove all the impurities, and then, as the work involved is light, it is taken in hand by an older artisan. He sits before a low wooden bench on which are two wooden reels (*charkh*) one of which is larger than the other. The *charkhs* are manufactured in Benares, the *barhais* (carpenters) of which place supply them to many parts of India. The price of the *charkh* is considerable, amounting to as much as Rs. 30. The *tārkash* winds the wire from the larger to the smaller reel, turning the roller by hand but with the help of a small piece of wood or iron lightly applied to it. As the wire is wound from one reel to the other, it passes through the finely perforated *jantar*. In some places brass discs have taken the place of the old fashioned *jantar*; these are known as *bārās*. Midway between the two *charkhs* is fixed a piece of iron, and on this is adjusted a *bārā* through which the wire is drawn. The main difficulty to contend with is the snapping of the wire, as joining it again is no easy matter. The lengths usually drawn are 600 to 800 yards per tola. The wire is round like thread. These *bārās* are generally imported from Surat and Ahmedabad; some have been said to be of German make. Mr. Gwynne describes them as of English make.

Boxes containing a series of them, from No. 1 to 10, are available. The high price of the *bārās* as compared with the *jantar* is due to the holes being lined with hard gems, which prevents their increasing in diameter with the pulling, as is the case with the *jantar*. It would be a convenience to introduce some machinery for making holes of the requisite size in these gemmed brass pieces.

FLATTENING OF THE METAL THREAD

The fourth stage is the conversion of the round wire into flat wire. Up to now the object has been to elongate the wire; henceforth effort is concentrated on its flattening. This is the work of the *chapāriā* or *dabkaiya*. The wires are reeled on to a machine like a small sized *charkh*, which is fixed to a piece of wood; generally there are twelve to sixteen of them attached to a bar at one time. From this several wires are drawn through an upright piece of iron (*chhip*) fixed into the ground, on to a kind of anvil, where they are beaten with a hammer till they are flat. The anvil is a block of wood, convex in shape and crowned by a plate of highly polished iron. The artisan uses a hammer with a small, highly polished head, the surface of which is concave—the complement of the surface of the anvil.

Machinery has been employed for the flattening of the wires:

Use of machinery Mr. Burdon mentions a machine consisting of two small, highly polished steel rollers placed one above the other. The motive power is a large driving wheel turned by hand, connected with the axle of one of the rollers by a leather band. The wire is fed to the rollers from a large reel which is horizontally fixed, and is flattened as it passes between the two rollers. To keep the wire in position it is led over a small tongue of metal, the point of which rests on the lower of the two rollers.

Captain Frankau writes in his monograph:* “The preparation of *bādīā* may be carried out by a simple mechanical arrangement, turned by hand if necessary, having a reeling adjustment similar to a sewing machine, the light hammer used being operated by a cam.” Embroiderers, however, are of opinion that wire flattened by hand has a more artistic finish about it than wire flattened by machinery. Mr. Headaway writes:

* *Journal of Indian Industries and Labour*, Vol. I, pt. 1, p. 52.

“ It is to be regretted that such an important item in the sumptuary arts as gold thread is in India should, in the great majority of cases, be the machine-made article, which is used in the place of the old and much superior hand-made thread. The hand-made thread is not only superior in wearing qualities; the original quality, owing to its slight irregularities, makes a cloth or embroidery in which it is used a much more human and interesting article altogether.” But all admit that for the purpose of *kalābattū* manufacture wire flattened by machinery and elongated in the process of flattening gives the best results. It attains a tenuity impossible for the hand worker.

PREPARATION OF TINSEL

The next step in manufacture is the process of curling, the product being the *salmā*. The apparatus consists of a low bench, on one end of which is fixed a reel of wire, revolving on a horizontal axle. At the other end of the bench there is a driving wheel which drives a smaller wheel from the centre of which a needle about 5 inches long projects. The worker takes the end of the wire on the reel, twists it round the outer end of the needle, and gives two or three forward turns to the driving wheel. This causes the needle to revolve, and the wire is twisted round the whole length of the needle up to the inner end. By a few backward turns the tendril like curl slips down the needle. This process is continued till the whole reel is exhausted.

It is not always the flattened wire that is used for manufacturing *salmā*; round wire is also used when the product is called *kora salmā*. On the size and shape of the needle used depends the kind of *salmā* turned out. If the needle is fairly thick and four-sided, the result is the *khārdār* or *tikoru salmā*; flattened wire drawn to a length of 300 yards per tola is used. *Dabkāhuā salmā* is the normal type of *salmā* made from flattened wire and wound round a fairly thick needle. For *korā salmā* very fine, round wire and a fairly thick needle are used. The wire is wound very close round the needle. For *motiyā*, round wire is twisted very closely on a very fine needle.

Different types of wire are the following:

Divali.—A broad wire, a quarter to half an inch wide, used principally for making bangles to be worn on the wrist. It is prepared

in two thicknesses, one six yards and the other twelve yards to the *māshā* (a twelfth part of a tola).

Gokhrū.—A piece of flattened wire, a yard in length, is folded into two, the two strands being then plaited together and pressed with the finger nail so that points are raised which are supposed to represent the thorny seeds of the *gokhrū* plant, or prickly burr. It is used for making raised flowers in brocade.

Sūtārā.—This is made from round *dicālī* wire. The wire is drawn 16 yards to a tola, and then coiled round a thick iron wire, a sixteenth of an inch in diameter. A number of small rings are cut down from the coil, and collected on a long *silai*. The latter is gently depressed, allowing the rings to fall one by one on to the anvil, where they are flattened by a hammer, resulting in flat rings, one-eighth of an inch in diameter, with a hole in the centre. The anvil is fixed in the ground and the hammer works on an axle supported on two wooden posts.

Tehra tar.—This is a scalloped *bādlā* made from *korā salmā* by beating: it is used in embroidered caps.

Ghizai.—This is a particularly beautiful form of tinsel and the method of preparing it is very ingenious. A fairly thick wire is used, measuring 96 yards per tola. The wire is first flattened and then again passed by the *tārkash* through one of the eyelets in the *jantar*, the object being not to draw the wire finer, but to produce a wire convex on one side and concave on the other. The wire is then twisted into a spiral in the same way as *salmā*, the rounded side of the wire forming the outer side of the spiral. A very close spiral results, and the effect produced is that of a row of small gold or silver beads closely strung together.

The flat wire, *lametta*, bears different names according to its thickness; *kinari kā bādlā* is mid-way between *batun* on one side and *kāmdani kā tār* and *mukaish* on the other.

MANUFACTURE OF *kalābattū*.

The previous paragraphs have dealt with the processes of manufacturing the metal thread, which in its round or flattened form is used as thread for embroidering. We now come to the preparation of this thread for use on a loom, a use which was probably introduced into India by the Muhammadans.

Before the metal thread could be used for weaving, it was necessary to stiffen it in some way and give it rigidity, and the plan was adopted of twisting it round a core of silk or cotton yarns.

Kalābattū or *kalābatūn* is made by twisting *batūn* on orange-coloured silk if gold thread is to be made and on white silk if silver thread is to be made.

The twisting on silk or cotton
The silk thread is suspended from a hook in the ceiling, while the *batūn* is kept by the workman's side, one end of it being attached to the thread. The workman then twists the *batūn* on to the thread by means of a spindle which he revolves, either by a twist of the thumb and finger, or by rubbing it across the calf of his right leg. By delicate manipulation the workman can ensure that the thread is closely covered by the twisting *batūn*, or he can leave infinitesimal gaps between the successive spirals. In the latter case the product is cheaper, as less *batūn* is required to cover it; but naturally it has not the same appearance as that in which the silk is completely covered, and it is very liable to fray. The workers are called *kalābatūn-sāz* or *batāya*.

A machine for plaiting the thread
A carpenter at Surat invented a hand-worked machine which renders the work of plaiting the thread both quick and uniform. The machine is described by Mr. Gwynne as follows:

"The machine is of a tabular form. The lower portion of it consists of several wheels; the upper portion of *phirkis* or spools, springs, and *charkhis* or small reels. These are arranged horizontally above the big wheels, and in three parallel lines. On one side are the spools, in the middle are the springs, and on the other side are the reels. The number of spools and reels is identical, and one reel is exactly opposite each spool. The silk thread is reeled in each spool, and passes from them through the springs in the centre. The lower wheels are connected by strings with the upper portion of the contrivance, that is the reels, springs and spools. Thus, when the reels below are set in motion, the *phirkis*, springs, and *charkhis* all move, and the silk thread passes from the *phirkis* through the springs to the *charkhis*. *Batūn* is laid on at the springs by boys employed for the purpose. The whole contrivance is set in motion by turning a big wheel connected with the other wheels by leather belting."

Pandit Raja Ram Lele of Kath ki Haveli utilizes power for the driving of his machinery and has made a few useful alterations.

The improvements made by him on the Surat type of winding machine consist of an arrangement (now a trade secret) to ensure that in the process of winding neither the precious thread nor the yarn is soiled by the oil used in lubricating the machine. It has been found by experience that any spot of oil prevents proper gilding in the electro-plating baths. Further, there is an automatic arrangement by which the winding of a reel stops whenever either the yarn or the *kalābattū* is snapped.

Weaving of *gotā*

The *gotā* weaver uses flat wire and silk or cotton thread. He takes the *bādlā* (lametta) by weight from the *gotā-wālā* and himself supplies the thread of which the warp is made, the *bādlā* being used as the weft. The *gotā* may be made of gold or silver wire, or of imitation gold or silver wire. If a gold or imitation gold *gotā* is to be made, yellow silk is used; for a silver *gotā*, white silk is used. The ordinary *gotā* is $4\frac{1}{2}$ inches wide and a variety of this, called *dhanuk*, is about one quarter inch wide. *Kināre bādlā* runs from 1 to 6 inches in width. *Anchal* is ribbon and more than 6 inches wide. In the manufacture of *lais*, *kalābatūn* is used as weft with a warp of silk. The author made extensive enquiries about its designs in Bareilly and found that there were 35 firms doing business in *gotā*. No *kalābatūn* work, however, is done in Bareilly, but *bādlā* is flattened out locally. Gold-gilt thread is imported from Lucknow, Agra and Delhi. Workmen are paid on piece wages and the rate for 6 *lachkās* weighing nearly two tolas is Re. 1, and that for *gotā* and *dhanuk*, one pice per yard. The average outturn in Bareilly is worth from 4 to 5 lakhs of rupees. As stated above, Delhi and, to a smaller extent, Lahore are still the centres of *gotā* weaving.

One Pundit Vishnu Moreshwar Gokhale, an ex-student of the Benares Central Weaving Institute, has put together an ingenious machine for weaving *gotā*. It is automatic in action and can weave

A *gotā*-weaving
machine

about a dozen *gotās* at the same time. The machine is worked by a handle which, in its turn, is connected by means of bevel wheels with a crank-shaft of the loom. The shedding plan is controlled by tappets fixed on the bottom shaft of the machine. The taking up device is worked by a countershaft, which is driven from the bottom shaft by means of rope pulleys.

The chief characteristic of the machine is the ingenious method of arranging the picking motion, which is positive throughout in its traverse. This part of the machine is also controlled by tappets fixed on the bottom shaft of the loom which gives reciprocating

motion to the racks holding the shuttle. This machine can put in 60 picks per minute.

The maker after repeated experiments has succeeded in weaving gold thread tape on his machine with satisfactory results. In the author's opinion, the tape manufactured on this machine is in no way inferior to the hand-made article. As, however, the gold thread has to pass over tin rollers and through an iron wire heald eye, it to some extent loses its lustre. If glass rollers and a glass heald eye were substituted, it would certainly be an improvement. Also the bearings of the shaft should be made of gun-metal, and the wooden wheels, tappets and treadle bearings should be made of iron, in order to reduce the friction. The outer framing, too, is light. If these defects were removed, it would increase the speed of the machine and thereby the output.

Mr. Gokhale showed the author some samples of tape which the merchants of Benares wanted him to manufacture, but his present machine is capable of making plain tape only. The samples shown had some fancy effects, and to weave a fabric like these samples on his machine he would have to make some changes in his shedding plan and elsewhere. A government grant has been sanctioned to enable the inventor of the machine to carry out these improvements.

The author is indebted to the Director of Industries, Punjab, for the following note on a Punjab invention for weaving gold lace :

"One Jagyasa Nand of Kahnuwan, district Gurdaspur, has invented a gold lace weaving machine which can work in one or more lines at a time. Its outturn per hour is 225 feet when working in five lines, and 45 feet when working in one line.

"The whole machine is made on the principle of Hattersley's machine. Instead of beams they put on bobbins of gold thread in a creel from which the threads pass through a comb and then through two rollers. The rollers are meant for keeping the threads in a stretched condition. After this these are drawn through two healds and then pass through reeds. The woven lace again passes through two rollers and is then collected on a frame.

"The machine is worked by means of a handle. One end of this handle is attached to a bottom crank by means of a bevel wheel, as in Hattersley's machine. This bottom crank-shaft is connected with the top shaft by two other wheels. The machine has not a picking arrangement by which the shuttle is actuated."

Uses of tinsel

It is necessary at this stage to describe very briefly the three types of artistic work in which the round and flat wire and their modifications chiefly enter. *Kārchobi* or *zardozi*. These are the *kārchobi* or *zardozi* work, the *kāmdani* and the *kamkhwāb* works.

For *kārchobi* or *zardozi* work a rectangular frame-work of four wooden rods is made, the side rods being called 'samsheer', the cross rods 'kārchoob'. On this frame-work is stretched a white cotton cloth, on which the silk, plush or velvet piece is sewn. Figures or patterns are printed on the cloth to be worked, and the workman embroiders the desigus with needle and thread.

The *kāmdani* work is different. Conventional patterns of flowers and stars are stamped on pieces of silk or muslin. The workman uses flat wire, *diwali*, threaded on a needle, and embroiders the pattern with the wire in the same way as with silk. But in threading through the ground fabric, the wire is beaten straight on the reverse side. There is, therefore, no wrong side to *kāmdani* work. *Tanzeb*, *chikan* and *jāmdani* are generally used as ground fabrics.

The *kamkhwāb* or *zarbaft* work is *par excellence* the work which has rendered the looms of Benares and Burhanpur, Surat and Ahmedabad, Yeola and Poona, not to speak of the rich treasures of the southern presidency, famous all over the world. The craftsman, his craft and the artistic output have been described over and over again. It is not possible in a monograph of limited length to touch this fascinating subject. In addition to its use as borders on *saris* and shawls, blouses and petticoats, it is employed to enrich the trappings of state carriages and the saddles of even the humble *ekka* ponies. In short, from the lady's slipper to the *pagri* of the Rajputana chieftain, *kalābattū* is used in ornamenting the

ground fabric, and the fashion is no less prevalent in the temple cities of Madras than in the cosmopolitan bazars of Peshawar.

A short note will not be out of place here descriptive of the places where the manufacture of gold thread is carried on.

| | |
|------------------------------|--|
| <p>Places of manufacture</p> | <p>where the manufacture of gold thread is carried on.</p> |
|------------------------------|--|

In the Madras Presidency Madras, Conjeveram, Pondicherry, Kumbakonam, Tanjore, Trichinopoly, Madura, Coimbatore, Salem, Dindigul and Bangalore are centres of the industry. The articles manufactured are mostly women's garments in which gold thread is worked, trappings of state for princes as well as for the various temple gods. Bangalore is the centre of the trade for the manufacture of *gotā* and *hārs* (garlands). In the Bombay Presidency—Bombay, Poona, Yeola, Ahmedabad, Surat and Nawanager are famous for the manufacture of *kamkhuwāb* embroidery and gold thread. In the Central Provinces, Central and Northern India the industry is carried on at Burhānpur; in Central India, at Jaipur and Chanderi; in the United Provinces, at Benares, Lucknow, Baroilly and Agra; in the Punjab, at Amritsar, Peshawar, Lahore, and Delhi; and at Patna and Calcutta.

In Benares the very thinnest wire and silver lametta are prepared, and although imitation and German-silver wire and lametta of varying thickness are being imported from foreign countries, the Benares *kārigars* have passed a self-denying ordinance and excommunicate any operative who works in cheap, foreign stuff. Benares is justly famous for its *zarbaft* and embroidery work; and *pardānashin* ladies take a leading part in embroidering wearing apparel and elephant *jhuls* with *salmā* and *sitārā*. Lucknow is noted for its *zardozi* work, which does not appear to be equal to that of Benares, though its lace work is really good. Agra, too, is famous for *zardozi* work, but Mr. Gwynne maintains that it has lost its Indian character and both in pattern and conception caters to European taste. *Sitārā* is conspicuous by its absence. The lace work of Agra is famous, as witnesses the name, Kinari Bazar, given to a busy commercial quarter of this city. There is a story told of Nur Jahan who desired to transfer to the dark Jumna the silvery shimmer of the full October moon. It is said that the lace market was emptied of its stocks and the silver *gotā*

stretched on the surface of the water, thus creating the illusion with which the imperial consort wished to amuse herself. Bareilly *gotā* has already been referred to, but the author found it specializing in counterfeit stuff. In the north, cheap wire and lametta are imported in very large quantities for cheap *kalābattū* manufacture.

Influence of foreign imports of lametta and *kalābattū* on local industry

It has already been stated in the section dealing with the preparation of the metal bar that the advent of foreign gilt wire and *kalābattū* had the effect both of disorganizing the trade and causing deterioration in the output. It would be interesting to study the reaction in each province.

The import of French *kalābatūn* in India revolutionized the method of preparing the outer casing of the precious metal. It was found that the silver bar with gold leaf yielded a *kalābatūn* which was more costly, without being more artistic, than the imported product; accordingly, the craftsmen took to gilding silver wire. The story of the capture of the Benares industry by the Lyonnais is too full of historical interest to be left untold. It is said that a Lyonnais happened to visit Benares, the sacred city *par excellence* of the Hindus and the entrepôt of artistic products of the hand-loom. He watched the simple processes of manufacture of *kalābatūn*, ingratiated himself with his guide and wandered round the lanes of Benares, studying all the stages of manufacture, the daily consumption of the metal thread and the profits of the business. He returned to France and sent a few specimens of the Lyonnais *kalābatūn* to his guide and asked him to choose between a commission sale system or fixed pay system for the sale of the produce. The guide could not see far and preferred the latter: more and more of the cheap stuff came in from abroad, and ten years later, when the Frenchman visited Benares, he found his guide a rich man and the local market captured by the Lyonnais manufacture. The hold of France on Benares was so great that during the war the weavers were hard put to it in the absence of the cheap and attractive *kalābatūn* which they used to get from abroad. Some of the public-spirited industrialists of Benares desired to come to the assistance of the hand-loom weavers of Benares. Their anxiety was to secure a cheap supply of gold thread, silk and cotton yarn and dyes for the Benares weavers. The

following paragraph from one of their letters will make the helpless position of the operative at Benares very clear :

“The gold thread has hitherto been mainly imported from France, through agents, by middlemen who sell to the actual consumers in retail. The firms in Lyons who export their manufacture into this country realize their prices through banks by means of bills of exchange payable at 30 days' sight. The goods received by parcel post, we believe, are delivered by banks only after the bills are paid. Even in pre-war days the price of gold thread as originally invoiced had some profits added to it every time the thread changed hands, with the result, perhaps, that the actual consumer had sometimes to pay 50 per cent. over, if not more. During the pendency of war, the difficulty in securing of freight, the customs duties, the increased insurance charges and the middleman's greed to make out of the limited stock he can command as much as possible, have narrowed down the supply to such an extent that the weavers cannot have gold thread at all unless and until they pay for it many times over”.

The proposals were that indents should be sent direct to manufacturers for the supply of gold thread through the Department of Industries, and for that reason the mediation of the Department was sought so as to put the consumer in touch with the manufacturer of gold thread in Lyons. Secondly, the Department would help them in importing into Benares a few cases of silk yarn and a few bales of cotton yarn for distribution among the *kalābatūn* makers. It was necessary also to make some arrangements for the supply of dyes.

Meanwhile Pandit Raja Rama Lele of Katki Have'i, Benares, had been experimenting to find the best method of gilding silver-plated fibre. Mr. A. W. Pim, C.I.E., I.C.S., the Collector of Benares, took up his cause and recommended very strongly to Government that assistance might be rendered to this struggling industry by helping Pandit Raja Rama. The Government of the United Provinces approved of the scheme and granted Rs. 6,000 to Pandit Raja Rama to enable him to buy the necessary machinery to run a winding and plating factory on up-to-date lines. The Principal of the Weaving Institute was asked to inspect the work, and found that the business was being run on sound lines, Pandit Raja Rama being able to undersell imported gold thread by Rs. 5 per 21 tolas. The prices charged by Pandit Raja Rama were for 1,000 yards

Rs. 5-4-0, 1,200 yards Rs. 5-12-0, 1,500 yards Rs. 6-4-0, 1,700 yards. Rs. 7-4-0 per oz. At present he is able to turn out 12,000 oz. per year; his intention is to turn out 90,000, and he is desirous of moving the factory from its present congested site and taking it beyond the city limits where expansion would be facilitated.

Briefly stated, the position is that the *kalābattū* coming from France has captured the market. Raja Rama Lele's factory has not been able to supply more than one-tenth* of the requirements of the city of Benares alone. Benares uses foreign lametta for her embroidery work; *salmā* and *silārā* are made locally, but the greater part of the raw material is foreign. Surat used to supply silver wire with gold leaf, but the foreign gilt wire has displaced it.

Bareilly gets most of its supplies of wire and thread from Lucknow, the material being mostly foreign. The rich embroidery work of Agra is as much dependent on foreign gilt material as on that of Indian manufacture, but the material used is of deep colour and exquisite finish.

The Madras experiments have been equally interesting. The industrial conquest of France was so complete that it was not till the outbreak of the war that the workers of this craft found the source of their *kalābattū* cut off. They then found, to their dismay, that the indigenous manufacture of *kalābattū* had declined to such an extent that it was well nigh impossible to supply the depleted market with hand-made stuff. The Director of Industries was asked to report on the suggestion that the manufacture of gold thread should be taught in the metropolis of the presidency. He stated that a Madura Saurashtra had succeeded in getting a plant from France, but had not been successful and had lost Rs. 60,000 in the venture. He suggested that it would be impossible in India to manufacture the finer qualities of gold thread, but it seemed to him that the coarser variety could be made if due care were exercised in the manufacture and control. According to some persons, however, the Indian climate was ideal for the manufacture of gold thread.

In 1911 Sir Alfred Chatterton visited Lyons, but, hearing that he was from India, the local people, one and all, declined to show him any part of their works or to discuss the question of the manufacture of thread in India. Sir Alfred reported that the trade was

in the hands of an extremely small number of people and was carried on in sections, so that the artisans had no knowledge beyond what was required to carry on the operations in the particular section in which they were working. In France the gold thread consists of a silk core round which a very fine ribbon of silver is wound so as to form a complete sheath or casing. The thread so formed is passed through a gilding bath in which it receives a very fine deposit of pure gold. The core thread should be of fine quality and extremely evenly spun. Sir Alfred considered it doubtful whether silk yarn made in India was of good enough quality, but that if attention were directed to this point, yarn of good quality could be produced. Manufacture of gold thread on modern lines was actually started in Southern India some years ago with the assistance of a man and his wife who came from Lyons, but the industry did not prove a commercial success, though the technical difficulties of manufacture were certainly overcome. Sir Alfred Chatterton reported that labour in France was very cheap, since women were mainly employed in these gold thread factories, and the Frenchman was also satisfied with a smaller return on his capital than the Indian. The overhead charges, too, in India would be heavier, though this would be partly compensated by the import duty on foreign thread. A firm of gold lace manufacturers at Perambur has prepared an estimate for a factory of moderate size on the following lines:

MACHINES TO BE PURCHASED TO SECURE AN OUTTURN OF 2,000 MARCS.

| | Rs. |
|---------------------------------|------------|
| 40 threading machines | } 1,25,000 |
| 20 lametta machines | |
| 10 wiring machines | |
| 4 gilding machines | |
| Raw material | 1,00,000 |
| Building | 25,000 |
| Cash in hand | 75,000 |

For 2,000 marcs gold-gilt-silver thread from 1,000—1,800 yards per oz. of 2½ tolas, the silver wire would cost Rs. 30,000; the silk Rs. 4,500; the gold, Rs. 8,000; labour, Rs. 2,000; total cost Rs. 44,500. The cost per marc works out at Rs. 22-4 while the foreign price is Rs. 28.

The value of the gilt silver thread imported into Madras by sea from various countries for the years 1919-20 and 1920-21 was as follows :

| | 1919-20 | 1920-21 |
|------------------------------------|----------|-----------|
| | Ra. | Ra. |
| From United Kingdom | ... | 12,608 |
| From Ceylon | 58,272 | 25,245 |
| From Straits Settlements | ... | 5,312 |
| From France | 3,38,599 | 36,04,072 |

The industry is carried on in Salem, Coimbatore and Madura. Gold thread used to be manufactured in the districts of Coimbatore and Salem, being subsequently utilized in the manufacture of gold lace cloth. Only imported gold thread is now used in the manufacture of these cloths as well as in embroidery, and the old gold thread trade is defunct. In Coimbatore and Salem gold and silver wire is drawn by machinery worked by hand. There are less than a dozen machines in the two districts, owned by jewellers and goldsmiths, the wire being used in the manufacture of jewellery, such as *aranal* and *addigai*, ladies' belts and necklaces. Each machine, consisting of two wooden rollers and a draw-plate, can be worked by a single man. They are of local manufacture and would cost about Rs. 100 each, the draw-plates being imported from London. The machines can draw wire from one one-hundred and seventy-fifth to one two-hundredth part of an inch in thickness, the length obtained for one sovereign's weight of gold being 80 to 120 feet. There are two wire-drawing machines of foreign manufacture, one in Coimbatore and the other in Salem. Each is worked by a single workman. The former, of German manufacture, draws a square thread varying in thickness from an eighth to a sixtieth of an inch, and wires are subsequently drawn from these strips. Similar machines are made in London and the United States of America.

Gujrat's effort in combating the invasion of France and Germany has considerable interest. The Manager of the Gauri Factory at Surat has stated that he can draw wire up to 27 mm. BWG gauge and is in a position to supply *kalābatūn* as well as other tinsel to different parts of the country. A gold and silver factory worked with power was started in Bombay in 1904, the drawn-out wire being in great requisition by the *sonārs* of Bombay. The company did not proceed beyond the stage of round wire drawing. It was once proposed to float a com-

pany which claimed that it was in possession of the secret of gilding copper wire and able to render the finished product as good as the Lyonnais and Nuremberg *kalābattū*: it would be cheap and yet it would not tarnish. The plant to manufacture 3,200 tolas of *bādlā* per day would cost approximately Rs. 1,81,400, to which must be added the cost of the building and power plant. The *kalābattū* that would be produced would cost Rs. 6 for one *muthā* of 20 tolas. As the market price was Rs. 18, it would pay to sell it at the rate of Rs. 10. As regards *bādlā*, the cost would come to about Rs. 3-8 per lb., while the bazar rate was Rs. 10 per lb. and the Company contemplated selling it at Rs. 6-8 per lb. The Company, however, did not materialize because of the stringency of the money market and of some difference of opinion between the directors as to whether it should be located in Surat or Ahmedabad. A reference has already been made to the plant of the Gauri Gold and Silver Works Company, Surat.

Mr. Mallinath Ray mentions that Kumartooli and Machuabazar in Calcutta were centres of this industry, but Bengal there is no doubt that the invasion of German manufactures has brought about a decline. In 1877 a German manufacturer came to Calcutta and took away samples of each of the products. The following year machine-made articles were imported from Germany, though the finish of the German article was not so good as that of the home-made product. In 1897, however, very fine and well-finished machine-made thread was imported from Germany, but there is no doubt that the cheap German stuff was of base material. A proof of the superiority of the Indian over the European gold and silver wire, as usually manufactured, was afforded at the Dublin Exhibition, during the progress of which the chief exhibitors of the Irish poplins in which gold and silver thread was used had to change their specimens on account of their becoming tarnished; whereas the metal embroidered fabrics of India, shown on the same occasion, retained their colour and lustre throughout.

The Central Provinces and the Punjab have been differently affected by foreign imports. Mr. De, I.C.S., Central Provinces has given figures of the number of gold *pāsās* drawn for the manufacture of gold thread in the Central Provinces. In the sixties of last century the average was 3,500, but the average between 1905 and 1910 had fallen as low as 1,500 *pāsās*. The cause is not so much the displacement of gold thread

for local manufacture of cloth of gold as that articles of gold thread manufactured in the Central Provinces are no longer in requisition abroad. It is still true, however, that *salmā* and *sitārā* are manufactured on indigenous lines within the province.

In the Punjab this sumptuary art-craft has suffered the greatest set-back on account of the import of cheap German articles. The great manufacturing centres of the north were Delhi, Lahore and Amritsar, but these are now concentrating all their attention on the manufacture of *gotā*, and the *kalābatūn* is mostly cheap foreign stuff. In Delhi itself the competition of imported tinsel has made itself felt in two ways. The production of drawn wire has decreased, though a good deal is still made on account of the fact that a demand for the pure Delhi wire still exists ; but of the wire that is made, fully 95 per cent. is used in the weaving of *gotā*. The manufacture of *salmā*, *sitārā*, *ghizai*, etc., is practised on a very small scale indeed, the fact being that the native workman cannot hope to produce these variegated forms of tinsel as cheaply as they are produced in Europe. Throughout the Punjab the tendency appears to be the same. Amritsar still produces a fair quantity of wire annually, but nearly all is used for weaving *gotā* : in Jullundur there is one factory, and there are one or two in Gurdaspur, but here, too, the wire is manufactured for *gotā* and *kalābatūn* and for no other purpose. Multan was at one time an important centre of the industry, but at present there are only some 400 workmen there, and the only article produced is silver *kalābatūn*.

It appears that in the beginning the disintegration of the guilds and the consequent decline of the industry were due solely to internal dissensions among the craftsmen themselves. The real danger, however, threatened when the guilds found that they had to face the competition of foreign manufacturers, and the cause of the present unfortunate condition of the wire-drawing industry lies in the fact that imported wire and tinsel have, to a very large extent, taken the place of the native-made *kandlā*. Gold and silver tinsel of every kind and imitation gold and silver tinsel are imported in large quantities, chiefly from Germany, and are sold so cheap that the locally made articles cannot compete with them. Further, the foreign imitation tinsel has an excellent appearance and, in spite of the fact that it tarnishes readily, it is now largely purchased instead of the tinsel made from the pure metals.

The result is that the production of genuine gold and silver wire in India has decreased, and as it is even more difficult for the *kandilā-kash* to turn out imitation wire at as low a cost as the imported imitation wire than it is for him to produce genuine tinsel which can compete in price with imported genuine tinsel, the entire wire-drawing industry has been affected in a disastrous manner.

Distribution of foreign imports in India

The author has made detailed enquiries to ascertain the different kinds of thread which are now being used in different parts of India.

There are four types of foreign gold thread in vogue in India :

- (i) Real gold thread.
- (ii) German-silver gold thread.
- (iii) Imitation half-fine gold thread.
- (iv) Imitation gold thread.

Real gold thread may be white, yellow or red. It is, of course, made with silver lametta wound round thick cotton or silk thread. The white, *i.e.*, ungilt, silver thread, is not much used by Indian operatives. The yellow quality is either pale or deep. If the thread within is yellow, the gold thread is called pale ; if the thread within is red, the gold thread is called deep. It must be noted that the colour of the thread, round which the *bādlā* is wound, is to a certain extent responsible for bringing out different shades in the colour of the gold thread. All the big gold thread centres below Madras in South India use only real gold thread on silk, varying from 1,200 to 2,000 yards per oz., yellow, deep or extra deep ; while Benares, which is another large consumer of this class, chiefly requires real gold thread on cotton, 1,200 yards per oz., red. The redness is brought about by a slight mixture of copper with the gold solution which is used for gilding.

German-silver gold thread is made with German-silver lametta wound round cotton thread. The shades of colour range from whitish yellow to deep yellow and the length from 1,200 to 2,000 yards per oz. The Punjab is the principal consumer.

Imitation half-fine gold thread is made of gilt copper lametta wound round cotton thread. It may be reddish, whitish, yellowish or pale. This kind of gold thread is imported in much larger quantities than German-silver gold thread.

Imitation gold thread contains gilt iron lametta instead of copper lametta and is the poorest gold thread known, but on account of its cheapness it is imported into India in very large quantities. The length varies from 500 yards to 1,200 yards per oz., and it is mostly used in the Punjab.

It is difficult to put down the relative proportion of the prices, especially as both the length and the nature of fineness differ, but the following approximation will be found useful. Estimating Rs. 50 as the standard price of an 8-oz. *guchhli* (hank) of real gold thread on cotton, we can put down the value of real gold thread on silk at Rs. 68; that of German-silver, Rs. 23; that of imitation half-fine gold thread on cotton at Rs. 20-8; and that of imitation gold thread about Rs. 11.

In Burhanpur the silk yarn is imported from Poona and Murshidabad. The spinning and doubling of the thread is confined to a few workers: the *Dhimars* of the locality twist a thread of eight strands for *kalābatūn* making. One of the great difficulties in manufacture is with regard to the silk and cotton yarn that is used as core. Special efforts can be made to manufacture the silk yarn. As regards the cotton thread, the author consulted an expert in Cawnpore and was informed that the thread is ordinary mercerised cotton of a quality which is imported into this country from England in moderate quantities. It is improbable that any spinner in this country can produce a similar yarn, and therefore the only chance of getting it in this country is by purchase from some importing firm or by importing it direct from either England or France. As regards the dye, experiments have been made in the Government laboratory of the United Provinces and a useful formula for dyeing the yarn ordinarily in use for the manufacture of *kalābatūn* has been discovered.

CONCLUSION

The author's recommendations are as follows:

(1) It is very necessary to start an all-India institute at a central place, such as Surat or Benares, where experiments could be carried on to perfect the existing processes of bar-making, bar-drawing, wire-drawing, wire-flattening, winding and plating. Machinery,

both hand and power driven, must be experimented with, in order to make available for the factory proprietor as well as the cottage worker up-to-date apparatus for carrying on all or some of the processes incidental to wire making.

(2) It is necessary to train artizans.

(3) It is necessary to experiment with different kinds of cotton and silk yarn.

(4) It is necessary to secure from the United Kingdom yarn of the quality, mercerisation and colour essential to the making of different shades of first class *kalābatūn*.

(5) Experiments will be made for the manufacture of inferior types of lametta and *kalābatūn*. The taste for tinsel has reached every stratum of society, and it would be difficult, nay, unfair, to raise a tariff wall against cheap imports and thus deprive the poor man of his showy apparel. A substitute should be put on the market which will be within the reach of the man in the street.

(6) So far as *sachcha kalābatū* and lametta go, *i.e.* silver wire with gold gilt, the author recommends the levying of a protective duty of 33 per cent. This duty will be required for the transitional period during which it is expected that the manufacture of real *kalābatū* and lametta will be carried out on improved up-to-date lines machinery mostly taking the place of the hand worked-processes of drawing, flattening and twisting.

(7) It is very necessary to send out a man connected with this business to Europe to study the methods of manufacture. The author fears that no purpose would be gained by deputing a mechanic to Lyons or Nurenburg, because the processes of manufacture in those places are not concentrated but decentralized. Every process is a secret preserved by the family of workers, and no individual knows more than one or two processes out of the several to which the metal is subjected before it comes out as the finished product. At the same time, it may be possible to obtain in this way some information which may really facilitate an improvement in the process of manufacture in this country. A journey to the United Kingdom would not be very helpful.

(8) It is necessary to depute some one connected with the business to be trained abroad in the methods of plating silver and other inferior metals with gold. Birmingham may prove an appropriate seminary for the training in wire-colouring.

GLOSSARY

| | | |
|-------------------------------|-----------|--|
| <i>Bādā</i> | | Lamotta. |
| <i>Bārā</i> | | Brass discs with tapering holes lined with gems or hard stones. |
| <i>Chaparā</i> | | Flattener. |
| <i>Dakkaiya</i> | | Ditto. |
| <i>Charkh</i> | | Reel. |
| <i>Guchhlī</i> | | Hank. |
| <i>Gullī</i> | | Metal bar. |
| <i>Janār, Janrī</i> | | A plate in which are perforated different sized, tapering holes through which wire is drawn. |
| <i>Kakābattī or Kalābatun</i> | | Silk or cotton yarn cased in metal wire. |
| <i>Kandīlā or Kandla</i> | | Metal bar. |
| <i>Kandīlā-kash</i> | | Drawer of metal bar. |
| <i>Māshā</i> | | One twelfth of a <i>tola</i> . |
| <i>Pāsā</i> | | Metal bar. |
| <i>Pās tania</i> | | Drawer of metal bar. |
| <i>Rattī</i> | | One ninety-sixth of a <i>tola</i> . |
| <i>Sang-i-yasab</i> | | A kind of jade. |
| <i>Tania</i> | | Drawer of metal bar. <i>Pāsā tania</i> is same as <i>Kandīlā Kash</i> . |
| <i>Zardozi</i> | | Embroidering with metal thread. |
| <i>Zarbāft</i> | | Weaving with <i>kalābattū</i> thread. |
| <i>Jhul</i> | | Elephant covering. |

APPENDIX.

- (१) तस्मिन्जीमूतसंकाशं प्रदीप्तोज्ज्वलकुण्डलम् ।
 लोहिताक्षं महबाहुं महारजत वाससम् ॥
 वाल्मीकि रामायणे सुन्दर काण्डे १० सर्गे ७ श्लोकः ।
- (२) महारजतध्वजपटांशुं दन्तच्छदमयूखजालैः ।
 दय कुमार चरिते ३ उच्छासे ।
- (३) ताः पताका इवोद्भूताः पत्नीनां रुचिरप्रभा ।
 नानावर्णसुवर्णानां बल्लमूलेषु रंजिरे ॥
 वाल्मीकि रामायणे सुन्दर काण्डे ८ सर्गे ५४ श्लोकः ।
- (४) क्षेपणो गुणः क्षुद्रमिति कर्माणि । क्षेपणः काचार्षणादीनि ।
 गुणः सूत्रवानादीनि ।

कौटिलीयं अर्थशास्त्रम् ।

The translation of the above passages is as follows :—

- (1) Therein that long-armed, red-eyed, cloud-coloured man who had glowing earrings (in his ears) and who was wearing garments made of gold thread.
- (2) By the net work of the rays proceeding from your lips, you have put to shame (cupid's) the silken banner made of gold thread.
- 3) Pleasingly shining borders of those upper garments shone on the lower garments of the wives (of Rawana) like banners of gold cloth of various colours.
- (4) *Kshepana*, *Guna* and *Kshudra* are 3 kinds of ornamental work. Setting jewels in gold is termed *Kshepana*, thread making or string making is called *guna*.

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