

BROCADE, in *Commerce*, a sort of stuff, or cloth of gold, silver, or silk, raised and enriched with flowers, foliages, or other figures, according to the fancy of the manufacturer.

Formerly, the term was restrained to cloths woven either wholly of gold, both of wool and warp, or of silver, or of both together; but by degrees it came likewise to pass for such as had silk intermixed, to fill up and terminate the flowers of gold and silver. At present, any stuff of silk, satin, or even simple taffety, when wrought and enriched with the flowers, &c. obtains the denomination of brocade.

In the manufacture of brocades, the flattened gilt wire is spun in threads of yellow silk, approaching as nearly as possible to the colour of gold itself. The wire, winding off from a bobbin, twists about the thread as it spins round, and by means of curious machinery, a number of threads are thus twisted at once by the turning of one wheel. The principal art consists in so regulating the motion, that the several circumvolutions of the flattened wire in each thread may just touch one another, and seem, as it were, one continued covering. At Milan, it is said, there is made a sort of flattened wire, gilt only on one side, which is wound upon the thread, so that only the gilt side appears; the preparation of this wire is kept a secret, and has been attempted in other places with little success. There is also a gilt copper wire, made in the same manner as the gilt silver. Savary observes, that this kind of wire, called false gold, is prepared chiefly at Nuremberg; and that the ordinances of France require it to be spun, for its distinction from the gilt silver, on flaxen or hempen threads. The Chinese, instead of flattened gilt wire, use slips of gilt paper, which they both interweave in their stuffs, and twist upon silk threads; but whatever be the pretended beauty of the stuffs of this kind of manufacture, it is obvious that they must want durability: accordingly, the Chinese themselves, as we learn from Du Halde, sensible of this imperfection, scarcely use them any otherwise than in tapestries, and such other ornaments as are not intended to be much worn or exposed to moisture.

The Venetians have carried on a large trade, to the Levant, in a kind of brocade called *damaſquite*, which, though

though it has only about half the quantity of gold or silver as that made among us, looks far more beautiful. The flattened wire is neither wound close together on the silk threads, nor the threads struck close in the weaving; yet, by passing the stuff betwixt rolls, the disposition and management of which is kept a secret, the tissue or flower is made to appear one entire brilliant plate of gold or silver. The French ministry judged this manufacture important enough to deserve their attention; and accordingly, for contriving the machinery, they engaged the ingenious M. Vaucanson, known throughout Europe for his curious pieces of mechanism, who, in the memoirs of the academy for the year 1757, gives an account of his success, and of the establishment of such a manufacture at Lyons.

The lower roll is made of wood, thirty-two inches in length and fourteen in diameter; the upper one of copper, thirty-six inches long and eight in diameter: this last is hollow, and open at one end, for introducing iron heaters. For making the rolls cylindrical, he has a particular kind of lathe, wherein the cutting tool, which the most dexterous hand could not guide in a straight line through such a length as thirty-six inches, is made to slide, by means of a screw, on two large steel rulers, perfectly straight, and capable of being moved at pleasure, nearer, and always exactly parallel, to the axis of the roll.

He first disposed the rolls nearly as in the common flattening mill. In this disposition, ten men were scarcely sufficient for turning them with force enough to duly extend the gilding; and the collars, in which the axis of the rolls turned at each end, wore or galled so fast, that the pressure continually diminished, insomuch that a piece of stuff of ten ells had the gilding sensibly less extended on the last part than on the first. He endeavoured to obviate this inconvenience by screwing the rolls closer and closer in proportion as the stuff passed through, or as the wearing of the collars occasioned more play between them; but this method produced an imperfection in the stuff, every turn of the screw making a sensible bar across it. To lessen the attrition, each end of the axes, instead of a collar, was made to turn between three iron cylinders, called friction-wheels: but even this did not answer fully, for now another source of unequal pressure was discovered. The wooden roll, being compressible, had its diameter sensibly diminished: it likewise lost its roundness, so that the pressure varied in different points of its revolution. On trying different kinds both of European and Indian woods, all the hard ones split, the soft ones warped without splitting, and, of more than twenty rolls, there was not one which continued round for twenty-four hours even without being worked in the machine.

These failures put him upon contriving another method of pressing the rolls together, so that the force should always accommodate itself to whatever inequalities might happen. The axis of the copper roll being made to turn between friction wheels as before, that of the wooden one is pressed upwards by a lever at each end furnished with a half collar for receiving the end of the axis. Each lever has the end of its short arm supported on the frame of the machine, and the long arm is drawn upwards by an iron rod communicating with the end of the short arm of another lever placed horizontally: to the long arm of this last lever is hung a weight, and the levers are so proportioned, that a weight of 30 pounds presses the rolls together with a force equivalent to 17.536 pounds, which was found to be the proper force for the sufficient extension of the gilding. By this contrivance four men can turn the rolls with more ease than ten can turn those which are kept together by screws; and the same weight acting uniformly in every part, the pressure continues

always equal, though the wooden roll should even become oval, and though the stuff be of unequal thickness.

A piece of cloth, of about two ells, is sewed to the beginning and end of the stuff, to keep it out to its width when it enters and parts from the rolls, which could not be done by the hands for fear of burning or bruising them: as it would take too much time to sew these cloths to every small piece of an ell or two, a number of these is sewed together. The stuff is rolled upon a cylinder, which is placed behind the machine, and its axis pressed down by springs to keep the stuff tight as it comes off. Four iron bars, made red-hot, are introduced into the copper roll, which in half an hour acquires the proper degree of heat, or nearly such a one as is used for the ironing of linen: the wooden roll is then laid in its place, and the machine set to work. If more than thirty ells are to be passed at once, the wooden roll must be changed for another, for it will not bear a longer continuance of the heat without danger of splitting, and therefore the manufacturer should be provided with several of these rolls, that when one is removed, another may be ready to supply its room: as soon as taken off from the machine, it should be wrapt in cloth and laid in a moist place.

The principal inconvenience attending the use of this machine is, that the heat necessary for extending the gilding, though it improves the brightness of white and yellow silks, is injurious to some colours, as crimson and green. A double pressure will not supply the place of heat: and the only method of preventing this injury, or rendering it as slight as possible, appeared to be to pass the stuff through with great celerity.

Rich brocades may be cleaned, and the lustre of them recovered, by washing them with a soft brush dipped in warm spirit of wine.

Neither alkaline liquors nor soap should be used for this purpose; because the former, while they clean the gold, corrode the silk, and change or discharge its colour, and the latter also alters the shade, and even the species of certain colours. But spirit of wine may be used without any danger of its injuring either the colour or the quality of the subject, and, in many cases, it proves as effectual for restoring the lustre of the gold, as the corrosive detergents.

Spirit of wine seems to be the only material adapted to this intention; however, this is not proper in all cases: for if the base metal, with which the gold of the covering was alloyed, has been corroded by the air, the particles of the gold may thus be disunited; and the silver underneath, tarnished to a yellow hue, may continue a tolerable colour to the white; but in such cases the removal of the tarnish would be prejudicial to the colour. See Lewis's Com. Philo-
sophico-Technicum, p. 62. 226.

BROCADE SHELL, in *Conchology*, a trivial name given sometimes to *CONUS GEOGRAPHICUS*. Linn. In a more general sense, the epithet brocade, synonymous with the French *brocard*, is applied to various other objects of natural history, whose disposition of colours, and markings, bear a fancied resemblance to that sort of stuff, silk, cloth, and which is commonly understood by the word brocade. Brocard among the French, and brocade with us, is not, therefore, the language of naturalists, but of dealers, and unscientific collectors.