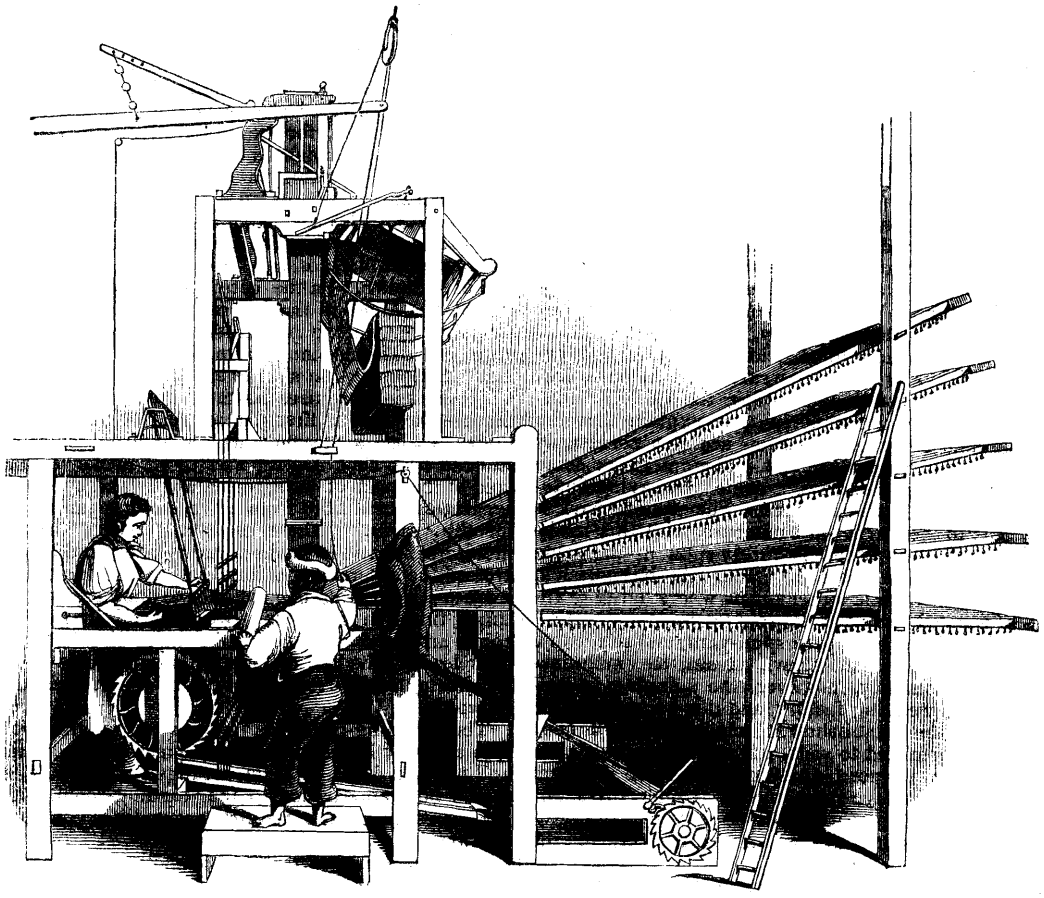
A DAY AT A SCOTCH CARPET-FACTORY.



[Brussels-Carpet Loom.]

THE good City of Glasgow—the "metropolis of the West," as it is termed in Scotland—presents many remarkable features as a centre of productive industry. Like Liverpool, it is the scene of vast shipping arrangements, receiving and despatching each day well-laden vessels from or to every quarter of the world. Like Dudley or Merthyr Tydvil, it is the centre of a rich mineral district, yielding iron in almost exhaustless abundance, and coal wherewith to smelt the ore thus obtained. Like Manchester, it is the centre of a cotton manufacturing district, presenting the whole of those gigantic arrangements incident to this branch of manufacture, from the carding and spinning of the fibres, to the dyeing, bleaching, and printing of the woven fabrics. Like the West Riding of Yorkshire, it exhibits—both within its precincts, and in the various towns by which it is engirdled—a multitude of establishments wherein woollen or worsted are worked up into various woven fabrics. There is perhaps no other of our great towns which presents the features of a manufacturing centre in such a marked way as this; since shipping, iron, and woven fabrics are, it must be confessed, of rather opposite character as agents in the commercial prosperity of a town.

Among the establishments last alluded to, viz., those for the woollen and worsted manufacture, is one which will occupy the chief part of our attention in the present paper. It is a Carpet Factory, in which the whole circle of operations, from the washing of the dirty fleece to the shearing of the woven carpet, is conducted. The nomenclature familiarly applied to carpets is—like many other instances of manufacturing phraseology—ill calculated to convey an idea of their distinctive features or of their mode of manufacture. The terms Scotch, Kidderminster, Wilton, Brussels, Turkey, Persian, Venetian, &c. as applied to carpets, no longer strictly indicate the places of manufacture, however applicable they might have been in the first instance. Indeed, there is no little confusion in the matter; for 'Scotch' carpets and 'Kidderminster' carpets are the same: 'Venetian' carpets were never, it has been asserted, made at Venice at all: 'Brussels' carpets are made at Kidderminster; while 'Kidderminster' carpets are not made in that town so extensively as in Scotland. These anomalies apart, however, we will endeavour to give such a sketch as will illustrate the broad features of the manufacture generally; and for this purpose it matters little where we

take up our station, provided the manufacturing arrangements are sufficiently complete.

Glasgow is plentifully provided with suburban parishes or districts, the names of which afford a convenient mode of distinguishing the different parts of this very busy city. The whole of that portion of the city south of the Clyde is in this way distinguished; and Port Eglinton, where the factory is situated, which we are about to visit, is at the southern margin of the whole. If we start from the Jamaica Bridge—or, as it is called *par excellence,* for its importance, "Glasgow Bridge"—the eastern boundary of the busy "Broomielaw," or harbour of Glasgow, a southern route leads us to the establishment whose tall chimney and many-windowed front indicate factory operations within. Within the gates of this building, then, we will suppose ourselves to be placed, and will glance around. There are two or three long open courts or yards, bounded on either side by the workshops wherein the manufacture is carried on; and at the farther end are the boilers, furnace, chimney, &c., belonging to the steam-engines which supply moving-power to the machinery.

It is necessary here to mention the connection between the spinning and the weaving in carpet-work. We had occasion, when describing the Cotton-manufacture in a recent Supplement, to explain that the spinning and weaving of cotton are not necessarily carried on in one establishment, or by one firm: some being "spinning-factories," some "weaving-factories;" and some both conjoined. The same remark is applicable to the Carpet-manufacture, with this modification, that the worsted is rarely spun in the same factory where the carpets are made. At Kilmarnock, at Kidderminster, and other towns where large quantities of worsted are used, there are "worsted-mills," the owners of which prepare spun-yarn, and sell it in a spun state to the carpet, shawl, tartan, &c. manufacturers. Occasionally, however, the spinning is conducted in the weaving factory, and this happens to be the case in the establishment which we have been obligingly permitted to visit, and which is also convenient for our purpose, inasmuch as three different kinds of carpeting are there made. Under these circumstances, therefore, we will glance at worsted spinning before noticing the actual manufacture of the carpets.

The wool reaches the spinner in two forms; *fleece*-wool and *skin*-wool: the first being that which results from the shearing, and the latter being the wool taken from the animal when killed. The former is the better of the two, but both are employed. The wool comes in bags containing about ten stone each—a 'stone' in this commodity being 24 lbs.—therefore equal to 240 lbs. per bag, technically called a 'pack.' The bags are in the first place stowed away in a long shed or warehouse; from whence they are transferred to an upper floor, occupied as a sorting-room. Here a number of men stand at benches in front of a range of windows; and the wool, when taken from the bags, is placed on these benches to be sorted. So different is the mode of growth on different parts of the animal's fleece, that as many as ten different qualities of wool are procurable from the same fleece; some best fitted for the warp of the carpet, some for weft, some for coarse work, some for fine, &c.; and it is the office of the sorters to separate the fleece piecemeal into its various qualities.

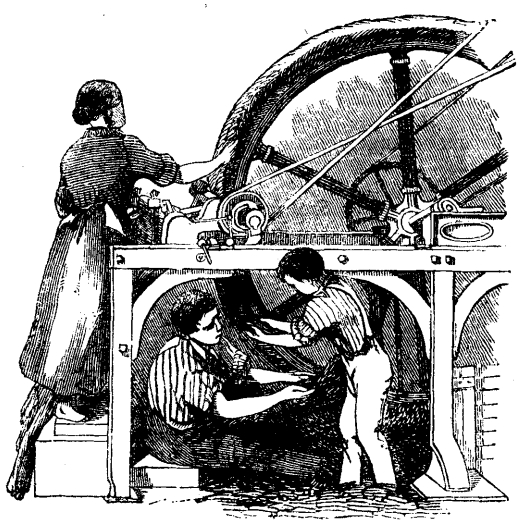
The wool, thus separated, is next transferred to a lower building, where it is washed, scoured, or cleansed from the grease adherent to it. The washing is a very simple affair, but the 'wringing' or draining is ingeniously effected, thus:—There is a wooden vessel filled with a hot ley of soap, soda, and water, into which the wool is dipped; and after a little stirring, the wool is lifted up by a kind of pitchfork, and held where it can be caught between two rollers, which by great pressure force out the water from the wool, leaving it nearly dry. To complete the drying, the wool is then taken to a hot-room, where an economical use is made of the heat radiating from the boilers of the steam-engine: the drying-room is over the boiler-room, and is thus effectually heated by caloric which would otherwise be wasted. This is only one among many instances which our manufactures exhibit, wherein the possession of a steam-engine yields benefits not originally contemplated when it was erected; such, for example, as a supply of hot water from the condensed steam, the warming of a whole factory by steam, the heating of rooms for drying goods, &c.

The sorted, cleansed, and dried wool then undergoes processes by which its fibres are brought more or less into a parallel position, preparatory to the operation of spinning. In the cotton manufacture the process of 'carding' is that by which the fibres are laid straight; but in the preparation of wool some kinds require a different mode of procedure, called 'combing.' Supposing the wool to be of that kind or for that purpose which requires carding, the routine proceeds thus:—The wool is first placed near a revolving cylinder, called a 'teazer,' whose external surface is studded with bent hooks; and these hooks, catching hold of the locks of wool, disentangle and open them, separating them fibre from fibre, and preparing them for the 'cards.' These cards are points or wires, much finer than the hooks of the 'teazer,' and disposed around the exterior of a long series of cylinders: the wool is caught from one cylinder to another, twenty or thirty times in succession, whereby all its fibres become arranged very nearly in a parallel layer; and after leaving the last cylinder, it assumes the form of a delicate, tender riband or 'sliver' about two inches in width.

The 'carding-machines' employed in this operation are very large and complex pieces of mechanism; and ten or a dozen of them, arranged side by side, give a very busy appearance to the 'carding-room.' They are almost automatic, requiring very little personal attention.

The 'combing' of the wool is another mode of separating the fibres from their knotted locks. In the preparation of hemp for ropes, and of flax for linen, the fibres are disentangled by means of an instrument called a 'heckle,' consisting of a number of teeth or spikes inserted in a board; and a somewhat similar plan is adopted for wool. The fibres are torn one from another in three different ways, all involving, however, the same general principle of action. In the simplest mode of proceeding, the wires of a kind of large comb are heated, and the comb being fixed with the wires uppermost, the wool is laid on them, and combed out by the teeth of another similar comb. This is the method for the finest wools. That of coarser quality is placed on the surface of a revolving roller, and combed out by passing on and between the points of a kind of heckle. There is, however, another and a larger machine, which acts in a remarkable manner. It consists of two large wheels, six or seven feet in diameter, rotating so that their peripheries may be nearly in contact. The periphery, or circumference, of each wheel is formed by a series of wires or spikes, on and between which the wool is placed: the wires on the one wheel then comb out the wool on the other, and at the same time separate it into two portions—short fibres, called 'noils,' and long fibres, called 'top'—which are afterwards used for different kinds of work. The short fibres are taken from the wheel,

in a bunch, by another boy or girl, while a third removes the longer fibres in a continuous but irregular string. The portion of the machine at which the juvenile operatives are engaged is here sketched. Without detailing the particular circumstances under which 'carding or 'combing' are resorted to, or the respective purposes to which the 'noils' and the 'top' are applied, it will suffice to say that all this is preparatory to the



[Combing-wheel.]

spinning of the yarn: it may, however, be explained that the long 'combed' wool is used principally for Brussels and the finer kinds of carpeting, while 'carded' wool is employed for Scotch or common carpets.

We next transfer our attention to a long shop or room wherein the worsted is 'drawn' and 'roved,' processes precisely analogous in principle, and nearly so in details, to those pursued in the cotton manufacture. The fibres are passed between rollers, doubled, passed again between rollers, and so on many times in succession, until they have assumed a degree of parallelism almost perfect; and, being in this state, they are brought to the form of a loose tender cord, about an eighth of an inch in diameter, called a 'roving.'

The rovings are spun into yarns for the weaver by the usual action of the 'throstle' and the 'mule' spinning-machines. The spinning rooms are the finest part of the factory; long, airy, well-lighted, and filled with the machines whose revolving bobbins reduce the roving to the state of yarn. All the spinning-rooms are attended by the bare-footed damsels whose duty it is to mind the machines, and whose appearance marks one of the points of difference between the working classes of England and Scotland. In England it is very rare indeed to see either sex, especially females, without shoes and stockings, except in the very humblest and most depressed classes of the community: the stockings may be full of holes, and the shoes may have scarcely any 'under leathers' to keep the 'uppers' together; yet, such as they are, we everywhere see them. In Glasgow, however, and in most parts of Scotland, the absence of feet-coverings is by no means an evidence of extreme poverty or slovenliness. When Jeannie Deans took off her shoes and stockings, and carried them in her bundle during part of her journey to London, she only followed a well-understood practice among her countrywomen. In the kitchens of many taverns and respectable houses of Glasgow, at the present day, the female domestics have neither shoes nor stockings on; and out in the open streets, especially in the vicinity of the Broomielaw and of the Salt-market, gold ear-rings and pink bonnets, and silk ribands and shawls, may frequently be seen accompanied by bare ankles. When, therefore, we meet with similar instances in a spinning-mill, we may attribute it not to any peculiarity attending the occupation, but to the custom of the place.

But to return. Some of the spun-yarns are doubled and twisted again, to make strong threads for the warp of the carpet; while others are prepared, so as to present more elasticity than strength, for use as weft or cross threads. When, however, the spinning is finally effected, the yarn is carried up to the 'reeling-shop,' where a number of hexagonal frames or reels are at work, on to which the yarn is wound, in the same manner as the silk in a silk-mill. Some of these are called '4-quarter reels,' some '8-quarter;' and the yarn, after being removed from them, is wound up into hanks, and the hanks into bundles.

So far as this factory is a worsted-mill, we may now leave it, since the worsted-spinner's operations are at an end when the spun-yarn is bound up into hanks and bundles, and the bundles may be either sold to other manufacturers or worked up by the looms of the same factory. The dye-house is the next place to which we have to direct our attention. All carpet-worsted is dyed while in the state of yarn, sometimes by the carpet manufacturer, but at other times purchased by him in a dyed state. The dye-house at the factory which is the object of our visit is provided with the apparatus, mostly of a simple kind, for dyeing the hanks, which are opened so as to allow each individual yarn to be acted on. The usual mineral and vegetable colours are employed; and the yarn, after being dyed, is hung upon poles to be dried in a heated room.

We now approach that part of the operations in which the spun and dyed yarn is about to be woven into the form of a carpet: the warp threads to be attached to the 'harness' and 'heddles' of the loom, and the weft threads to be wound on the pirn of the shuttle. It must be familiarly known to every one who has ever examined the texture of different kinds of carpets, that very great diversity is exhibited by

them; and unless these diversities are borne in mind, the manufacturing arrangements can hardly be understood. Some kinds of carpet exhibit the same pattern and the same material on both sides, the colours only being reversed: another kind exhibits a woollen or worsted surface on one side, and a hard hempen or flaxen surface on the other: another kind presents all the appearance of a velvet surface, exhibiting the peculiar 'pile' or 'nap' which forms the distinguishing characteristic of velvet: another kind presents a richly soft surface half an inch in depth, in which the ends of the fibres, instead of their sides, are exhibited to the eye. It is obvious that very different arrangements of the weaving apparatus must be called for to aid in the production of these different kinds of carpet.

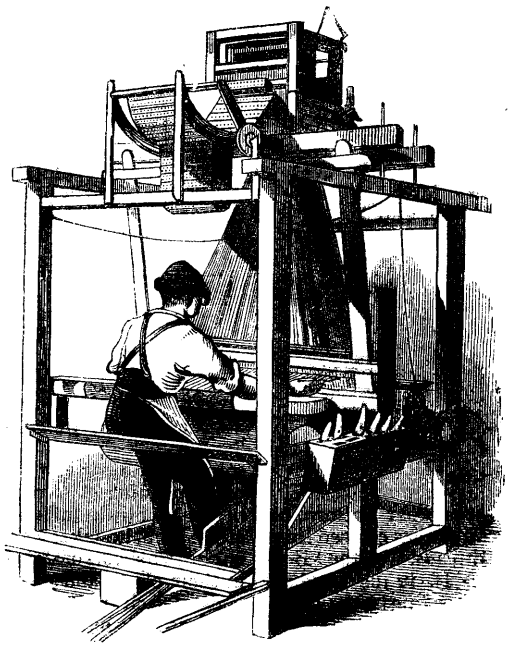
The first which we may notice is the common *Scotch carpeting*, which is woven in lengths about a yard in width, and then sewed together edgewise to form a carpet. This carpeting is formed without the admixture of any flax. The warp is of worsted and the weft is of wool; the difference between the two being that wool has shorter and finer fibres than worsted; and the fabric is so constructed as to constitute a double cloth, having two sets of warp and two of weft, each warp being intersected by both the wefts. It is, in fact, like two pieces of worsted cloth united together, surface to surface, and it might be possible to separate one from the other without destroying the web of either. Kilmarnock, a busy town eastward of Ayr and southward of Greenock, is one of the chief seats of this manufacture. It is stated in the recent 'Topographical Dictionary of Scotland,' that "the carpet manufacture may, amid many conflicting claims, be regarded now as the staple of Kilmarnock. Even twenty or twenty-five years ago it rivalled that of Kidderminster in England, and had no competitor in Scotland; and about that time, or a little later, it was greatly improved by the mechanical inventions of Mr. Thomas Morton, a citizen, who gives name to a locality in the vicinity of the Gas-Works, who taught his townsmen at once to save time and labour, and to achieve accuracy and an extensive variety in their patterns; and who, so early as 1826, received public demonstrations from the manufacturers of the town of the debt of obligation which they felt his genius had imposed.... The wages of the carpet and rug weavers run from 12*s.* to 14*s.* per week nett, and occasionally higher. The yearly value of the carpet manufacture was estimated, in 1837, at 150,000*l.* The carpet-factories are six in number." Brussels, Wilton, and Scotch carpets are made in Kilmarnock; but in that town, as well as in Scotland generally, the last-named variety is that which is most extensively made.

The general process of weaving Scotch carpeting is the same everywhere, and may be illustrated by the arrangements at the Port Eglinton factory. The weaving-shops are long rooms, having looms on either side, and a passage through the middle. Each weaver has his seat in front of his loom, where he drives the shuttle with one hand, regulates the shuttle-box and the 'batten' or 'lay' with the other, and works the treadles with his feet. No steam-power is employed, nor is an assistant necessary, as in some other kinds of carpet-weaving. The worsted warp-threads are arranged in two tiers, or, if it be a 'three-ply' carpet, in three tiers, by which a triple cloth is produced. Above the warp-threads is a very complicated assemblage of cords, called the 'harness,' the object of which is to draw up certain of the warp-threads for allowing the passage of the weft between them; and as the weaver, even if his feet and fingers were doubled in number, could not manage all these strings in their varied complexity, he is aided by an ingeniously constructed barrel, whose surface is studded like that of a barrel-organ. The studs are arranged on the surface in a certain determinate order, which depends on the pattern to be produced in the carpet; and when the barrel rotates, the studs, acting on several short levers, govern the movements of the warp-threads in a certain order, just as the arrangements of the pins on an organ-barrel act upon the pipes in a certain order according to the time to be played. As one organ-barrel, studded in a certain way, can only lead to the performance of one tune or set of tunes, so one loom-barrel, with a definite order of studs, can only lead to the production of one design in the carpet. The analogy between the two cases is so close, that we willingly make use of one to illustrate the other.

The mode of arranging the pins on the barrel depends altogether on the pattern to be produced, and this pattern is first drawn upon paper. There are designers for carpet-weaving, as well as for calico-printing; the artists in one case as in the other exercising their taste to produce new and elegant designs. We had occasion in the last Supplement to allude to the artists' room at a calico-printer's, and we may now similarly speak of one at the carpet-factory, the qualifications of the designer being the same, but developed in a different style of productions. From the designs the barrels are studded, and thus made ready for the loom; but every year witnesses the gradual decline of this mode of proceeding, the more efficient 'Jacquard' apparatus being used in its place. How this beautiful contrivance is brought to bear on the movements of the warp-threads, we had occasion slightly to notice in our sketch of the bobbin-net manufacture at Nottingham; and we may now mention that it is extensively used in the carpet manufacture. Sometimes there are as many as six hundred perforated cards for the production of one pattern, and two or three hundred levers or needles acted on by them.

The horizontal warp-threads, with the studded barrel or the Jacquard apparatus over them, form what we may term the permanent furniture of the carpet-weaver's loom; but the arrangement of shuttles is also very curious. There are from two to twenty shuttles for each pattern, the number being great or small according to the number of colours in the pattern. These shuttles are placed in a kind of box at the weaver's right hand, and he takes them out as he wants them. We may suppose that red, blue, and white, for example, alternate in the pattern: in such case he throws a red shoot with one shuttle; lays it down and takes up the blue shuttle, with which he throws a shoot; lays down this again, and takes up the white shuttle; and so on, keeping his hands incessantly employed, for he has not only to change the shuttles in this manner, but also to drive up each thread of weft as it is thrown. The arrangement of the barrel or the Jacquard apparatus is such, that when one colour, or one set of two or three colours, is done with for a time, a little bell is rung, by which the weaver is warned to place those shuttles in the side receptacle, and take others into use, according to the pattern. On the next page is a representation of the general appearance of a Scotch-carpet loom.

Let us next glance at a more expensive and finished carpet than the Scotch, viz. the *Brussels*. These likewise are made at the Port Eglinton factory, and by an arrangement which we will endeavour to describe. A Brussels carpet is composed of linen and worsted, the cloth or textile fabric being formed wholly of linen, and the worsted forming a kind of surface superadded to the fabric thus made. The mode of effecting this is highly curious:—The Brussels carpet-loom exhibits at its hinder end a series of frames, five or more in number, filled with bobbins of yarn; the frames being placed at such angles as to allow the yarn from all the



[Scotch-Carpet Loom.]

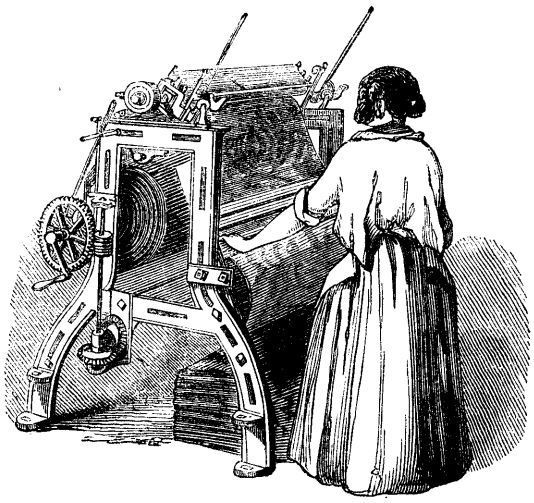
bobbins to unwind and form a uniform warp of threads. The weaver, sitting in front of the loom, is provided with a number of brass wires, each rather longer than the width of the carpet to be woven; and these wires enable him to give that ribbed or corded appearance which is so conspicuous a feature in Brussells carpeting. There are usually five colours in a Brussels carpet, and these colours are formed wholly by warp-threads, of which there are about two hundred and sixty of each colour in twenty-seven inches width of carpet. The warp-threads are governed by some such apparatus as in the former case; and when a 'shed' has been opened, the weaver throws a shoot or two of linen thread. He then introduces a wire under some of the coloured warps, and over all the rest; by which a series of loops is formed, which present a round and full appearance when the wire is afterwards withdrawn. He thus proceeds, throwing a shoot or two of weft, then beating them well up, then inserting a wire, then throwing more weft, and so on, repeatedly changing the colour of the uppermost warp-threads by mechanism connected with the treadles. At intervals he takes out all the wires, which have assisted in forming the ribbed-like surface of the carpet. One effect of raising the upper coloured warp in this way is wholly to hide the linen thread. The weaver is assisted by a boy in adjusting the 'shed' for the reception of the weft.

Taken in all its parts, the Brussels-carpet loom is decidedly a complex piece of mechanism, and requires for its due comprehension a very close attention, even from an eye-witness of its operation. Our engraving at the head of this article, though it cannot show the mode of action in this form of loom, will give some idea of its general arrangement and appearance. The same apparatus, with a slight alteration, is used for the production of *Wilton carpets*, which differ from Brussels chiefly in this—that the rib or raised part, instead of remaining whole, as in Brussels carpet, is cut by means of a sharp instrument, so as to form a velvet like pile The wires, instead of being smooth at the upper surface, have a groove running along the whole length, which assists the weaver in drawing a very fine knife across the worsted yarns which lie over the wire, and thereby severing them.

However different the common Venetian or stair-carpeting may appear to be from these finer kinds, yet it resembles them in this—that the warp alone forms the visible upper surface; the weft, which is sometimes woollen, sometimes linen, and sometimes cotton, being thrown in to form the fabric, but without showing at the surface. The warp is generally arranged in stripes of different colours, and sometimes a kind of plaid pattern is produced; but generally the pattern is so plain as to require but little complexity in the weaving apparatus.

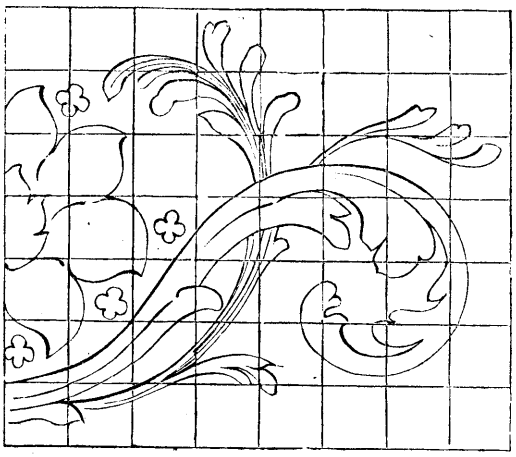
Most carpets, after being woven, require to have the surface sheared or cut, for the removal of loose fibres, and for regulating the length of nap in those which constitute pile-carpets. This shearing is effected by a very ingenious machine, in which a screw, whose worm or thread forms a cutting edge, revolves so that this edge shall come in contact with a straight horizontal edge, and thus act like a pair of scissors. The carpet is so adjusted as to be drawn between these two edges, by which the surface is sheared all over; the quantity cut off being dependent on the adjustment of the two cutting edges. The machine is represented on the next page.

Turkey or *Persian carpets* are the most costly and luxuriant of all, and are produced in a very remarkable way. They are not extensively made in this country; but there is an article of manufacture known as 'Persian rugs,' which will afford us some idea of the matter, and which is one of the kinds made at the Port Eglinton factory. The arrangements for making a Persian rug are these:—The warp is formed of linen-yarn, and is arranged vertically. Just above the level of the



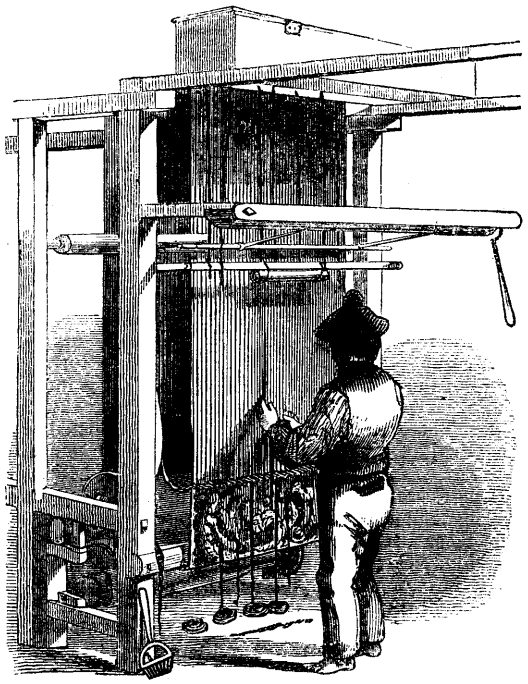
[Carpet-shearing Machine.]

weaver's eye is placed a rolled-up paper pattern, on which the device is drawn, and which has crossed lines to represent the warp and weft threads, like the 'Berlin' patterns now so well known. If, in the annexed sketch, we suppose a number of other lines to be introduced between those here given (and which we have omitted, to avoid confusing the figure), it will represent a portion of one such pattern. The weaver is provided with stout worsted yarn of various colours, and twists this yarn round the separate warp-threads, twining it round two threads, and then cutting it off so as to leave two loose ends, say half an inch long each. He has scissors in his right hand, with which he cuts the worsted. He looks up at his pattern repeatedly, to see what coloured



[Persian-rug Pattern-paper.]

worsted is to occupy a particular spot, and to use the corresponding coloured thread. When he has knotted in a row of little tufts of worsted across the whole width of the web, he takes a shuttle in his hand, and throws in one or two shoots of stout linen-yarn, which keep the tufts in their places and assist in forming a firm fabric. The ends of each tuft stand out prominently, and by a subsequent dressing and cutting they form such a level and full surface as to hide completely the linen threads. This is throughout one of the most remarkable modes of producing a carpet, from its extreme simplicity, and the beautiful material which it produces; but it is necessarily a very slow and expensive process. The loom is wholly free from the complexity of 'barrel' and 'Jacquard' apparatus, and boys can work it effectively.



[Persian-rug making.]

Such are the principal variations in the mode of producing carpets, apart from any consideration of the minute shades of difference which may occur in different factories, or of new or patented improvements, such, for example, as a mode of producing Turkey carpets wholly by weaving, which has been brought forward by a Glasgow firm, and which has led to the production of very beautiful fabrics.

PAISLEY SHAWLS AND HIGHLAND TARTANS.

Carpets, shawls, and plaids may not appear to have a very close connection one with another; but, in truth, the analogy, in a manufacturing point of view, is by no means distant; and we, therefore, will find a corner in our article for a few details relating to them.

Every one has heard of Paisley shawls; but few persons would be prepared for the vast extent to which the manufacture is carried on in that town. The whole town lives by shawls, almost as completely as Redditch does by needles, or Burslem by earthenware. If we place in one class or group all those inhabitants of Paisley who work directly at the manufacture of shawls, and into another all those who live by supplying the former with their daily necessaries, we should find that the two would go far to include the whole of the inhabitants of the place. It is not one particular kind of shawl exclusively which is thus associated with Paisley as a seat of manufacture; all kinds—silk, cotton, wool, silk and cotton, silk and wool, cotton and wool—all are manufactured here.

From the authority before quoted we learn that Paisley, as a seat of manufacture for spun fabrics, has gone through the following cycles of change. The Union with England, in 1707, was the moving power which first developed the energies of the townsmen, exhibited first in the manufacture of coarse chequered linen cloth; then imitations of striped muslins, called 'Bengals;' and then chequered linen handkerchiefs. after a time a lighter style of fabrics was introduced, such as plain lawns, lawns striped with cotton, and others ornamented with figured devices. Rather more than a century ago the making of sewing-thread, known by the names of 'ounce-thread' and 'nun's-thread,' was commenced, and carried on for many years to a very large extent. When cotton made its astonishing advance in our manufacturing districts, the Paisley linen-thread gave way to cotton-thread, which is still largely manufactured there. About the commencement of George III.'s reign, the Paisley weavers introduced a kind of silk gauze, which was so admirably wrought, as to supersede for a time everything else of the kind. The trade prospered greatly: companies came down from London to establish new firms at Paisley; and these firms not only employed the weavers of Paisley, but those also of all the villages in its vicinity, as well as establishing warehouses and agencies in Dublin, London, and Paris. But the article manufactured was one peculiarly dependent on fashion, and fluctuations took place so suddenly and completely, as to bring it to ruin. Under these circumstances the men of Paisley, instead of desponding, betook themselves to the muslin trade, which they raised to great eminence, and opened a field for the employment of a great number of females in tambouring or embroidering muslins. About thirty years ago the gauze trade again revived, and, together with the plaid or tartan trade, is now carried on to some extent; but all of these yield at present to the shawl manufacture, which, introduced about forty years ago, now forms the staple product of Paisley. There is something in this chain of events which might afford a lesson to the weavers of Spitalfields, who still continue weavers of silk and nothing else, whether there be much or little demand for their labour. There can be no doubt whatever that workmen, when their labour is bestowed on commodities which are keenly exposed to the fluctuations of fashion, ought to hold themselves prepared to strike out a new class of manufacture when one is declining; and this is what the Paisley manufacturers and weavers, much to their credit, seem to have done.

The value of the shawls manufactured in Paisley, in 1834, was estimated at a million sterling, and in subsequent years it has been much more. At the present time there are supposed to be four thousand 'harness' weavers, that is, weavers employed in the more complicated patterns of shawls; one thousand plain weavers; and three or four thousand 'draw-boys' or assistants, all employed in the shawl manufacture in Paisley; besides the large number of persons engaged in the subsidiary processes, and four or five thousand weavers in Bradford and its vicinity preparing the plain 'centres,' to which the Paisley men attach ornamental borders. It is pleasant to find at the present time, when so many branches of manufacture are in a gloomy state of depression, that the shawl-weavers of Paisley are almost every one actively engaged.

The town bears evidence of the avocation of its inhabitants, for we hear the clack of the loom in many a street as we pass along. The means of conveyance, too, between Paisley and Glasgow, show how great is the intercourse between the former and the Manchester of Scotland, as Glasgow may justly be termed. Although the distance is seven miles, yet it is traversed by railway for the trifling sum of *4d.*; and not only so, but there are well-appointed steam-boats which run on the Clyde from Glasgow to Renfrew, where the travellers are transferred to a railway, three miles in length, to Paisley, the fare for steam-boat and railway combined being *6d.*: it is true that on this latter railway there is horse-traction only, and carriages of a somewhat rude description, but still the maintenance of such fares seems to indicate a vast intercourse of working people between the two towns.

The shawl-factories of Paisley are not very numerous; the general system of manufacture being somewhat akin to that followed by the stocking-weavers of Nottingham. There are in various parts of the town 'shops' of looms, each 'shop' occupying the lower 'flat' or story of a building, and containing six or eight looms. These looms are owned by the operative weavers, one each, who pays a certain rent per week for 'standing;' or they are all owned by one person, who lets them out to the poorer class of weavers. Some of these looms are of a simple character, for weaving the plainer patterns; while others exhibit much more complexity of adjustment.

The general character of the processes of shawl-weaving bears much analogy to that of carpet-weaving, as we have before observed. In both cases the worsted yarns and the silk and cotton yarns for shawls are dyed before being used in the loom or the shuttle; in both cases draughtsmen are engaged to prepare patterns, which are divided into squares to facilitate the adjustment of the loom; in both cases the woven fabric passes through a shearing-machine to cut and level the surface. One of the most marked differences between them, however, is this—that the shawl has sometimes a plain centre, with a figured border at two or four of its edges; and in such case the border is woven as a broad web, containing several repetitions of the pattern, which are afterwards cut asunder, and each is sewn on to a shawl-edge.

In one of the Paisley factories, that of Messrs. Thomson, the following is the general character of the processes which we witnessed. In one room the 'lashing' or 'leashing' of the looms was being carried on, that is, the fixing of the harness or strings by which the warp-threads are governed. In the weaving-shops were about forty looms, some on the Jacquard principle, and some having the aid of a 'draw-boy' to form the shed for the weaver's shuttle. Some of the looms, in which six or eight differently-coloured wefts were woven into the shawl, had a curious appendage for bringing any shuttle to the proper place. The six or eight shuttles were placed on as many stages in a kind of vertical frame or scaffolding at each side of the loom; and by means of a kind of lever, governed by the weaver's left hand, he could bring down the frame, or lift it up, so as to bring any one shuttle on a level with his warp-threads. In some branches of weaving the same thing is effected by giving an oscillatory motion to the frame containing the shuttles. In all those forms of loom where a 'draw-boy' is employed to manage the movements of the warp-threads, he is engaged by the weaver himself, who pays the boy from 3*s*. to 4*s*. per week for his aid.

In one large room there were forty or fifty females seated on low stools, cutting the shawl-border webs into strips, and sewing them on the 'centres,' which may in some cases be plain, and in others decorated. Nearly all the shawls made at Paisley have 'borders' differently woven from the 'centres,' and which require to be sewn on by the aid of needle and thread. In some instances fringe constitutes the border, instead of a woven fabric; but both alike require the work of these females to attach them to the centres.

In another part of the establishment was the dye-house, where the yarns were dyed. Here the apparatus for dyeing was such as usually belongs to a dye-house, with the addition of a simple kind of press for shielding one portion of a hank of yarn while another portion is receiving dye, with a view to produce a peculiar effect called 'clouding.' In other parts of the building were calendering and pressing and packing rooms, to give to the manufactured article its final delicacy of appearance.

The screw-like shearing-machine, before described as in use in carpet-making, is likewise applied in shawl-making, but under a somewhat different arrangement. As there may not be shawls enough made at one establishment to employ one of the machines, several manufacturers send all their shawls to one shop or building, the owner of which charges a few pence for shearing each shawl. The system is, in fact, one of the many exemplifications of the advantage of "division of labour," so often exhibited in our manufactures. It also adds one to the proofs that "nothing is worthless;" for the cotton filaments sheared from the various kinds of shawls, after being separated by a chemical process from the worsted and silken filaments, are sold to make packing-paper. The sweepings of the shearing-shop sell for four or five guineas per ton.

When we have glanced at the various kinds of carpet on the one hand, and at the varieties of shawls on the other, we shall not have much difficulty in forming a general idea of the weaving of Plaids or Tartans. This branch of manufacture is carried on to a pretty good extent in Alloa, Alva, Tillicoultrie, and various other towns and villages around Stirling, as well as in Galashiels and other parts of Scotland farther southward; but the manufactured product for the most part finds its way to Glasgow, where the wholesale dealers, shippers, and warehouse-keepers have great facilities for prosecuting their business. This kind of centralization seems to some extent a natural consequence of large commercial arrangements, and is strikingly illustrated in Lancashire, where Manchester is the great depôt for woven goods produced at the factories of Bolton, Bury, Clitheroe, Blackburn, Rochdale, Oldham, Ashton, Stayley Bridge, Dukenfield, Hyde, Stockport, &c. Every year seems to afford increased indications that Glasgow is becoming such a depôt. We visited two such establishments, one of which—Messrs. Campbell's—is the largest in Scotland, wherein the vast assemblage of woven fabrics illustrates the use and necessity of classification. Four or five stories or 'flats' of an immense house are filled almost to overflowing with these goods: the Galashiels productions occupying one department; the plaids of the Stirling district occupying another; the shawls of Paisley a third; the printed cottons of Glasgow and of Manchester another; the hosiery of Nottingham another; and so on. These warehouses, unlike those in the neighbourhood of Cheapside in London, keep all kinds of 'soft goods' (as woven fabrics are called in Scotland), whether made of woollen, cotton, silk, or linen; and, moreover, at Messrs. Campbell's the wholesale and retail are so curiously combined, that while one customer may be making a large wholesale purchase in one room, a little barefooted girl may be purchasing a pen'orth of tape or of ribbon in another; and this, too, in an establishment wherein the sales are said to amount to little short of a million sterling per annum.

With respect to that portion of these goods which comprises tartans or plaids, there is a feature observable which scarcely any other exhibits, viz., a prevalence of particular patterns. Each Highland clan has a particular plaid, by which it is known, and which descends from age to age unaltered as to pattern. The warehouses therefore, where these commodities are sold, have a certain degree of uniformity in their stock, arising out of this circumstance, each plaid having a well-known name and a well-known character. There are, however, fancy plaids, worn by would-be Highlanders, which have no definite character whatever. If any circumstance, such as a visit to the Highlands on he part of the royal or the high-born, should give an additional temporary popularity to plaids, all kinds of vagaries are produced in the way of patterns, widely deviating from the true clan-tartans. But no matter: if a very young gentleman can show his smart-plaided stockings or cap, or if a young gentleman of larger growth can procure a plaid waistcoat or trowsers, he forthwith dubs himself a Highlander, and thinks of Roderick Dhu or Rob Roy, without stopping to inquire whether it be or not a recognised tartan.

As regards the materials of these tartans, they are of silk, or cotton, or worsted, or mixtures of two of these, much in the same way as shawls; but the weaving is much more simple, since, as the whole device is produced by stripes crossing each other and forming a check, it can be produced by a simple kind of loom. The threads of warp are arranged in their different colours, so as to produce the long stripes, while the shuttles of weft are of colours suitable to produce the cross stripes. There are sprigs, flowers, or ornamental devices, and the movements of the warp-threads are thus rendered so easy, that the weaver can regulate them by his treadles.