

SECOND PART

I_N 1836 the woollen industry in Valdagno, reduced to almost complete paralysis by adverse times, had, as has been pointed out, a family air about it. It is quite possible that the wool was still given out to be spun in the houses. The Marzotto dyeworks were in another part of the town. The idea of a mill was still vague. Perhaps, as in the early years of the century, « the women and children — according to the Prospect of 1806 — worked with the raw material for cloth weaving eight months of the year », and the machines — as in the mill belonging to Bevilacqua and Storti, which was the largest of all — were « looms operated by men and fulling-mills by water without the aid of animal power ». The workmen had rather a primitive idea of industrial activity, somewhat of the artisan conception, with a certain slackness in discipline which was characteristic of the old independent craftsmen, especially in the small towns. « The workmen » Mr. Trettenero writes, « although devoted and few in number, were not always easy to handle. For example, the men would not work on Mondays and, when compelled to do so, damaged the tools and the machines, committing what we should call to-day acts of sabotage ».

At any rate, rudimentary machines. The work was carried on with a technique similar to that in vogue at the time of the old corporations or, one might say, at the time of the Romans. The wooden loom with its batten, its rollers for the warp, its combs and its warp-cords was, with few modifications, practically the same apparatus that the ancients had used. To operate the loom, the weaver treadled with his feet, holding the shuttle in one hand and in the



The Woollen Industry in the District of Vicenza a Century Ago: *Wool sorting*

other the batten for allowing the reed to beat up the weft. Perhaps they used the fly shuttle invented by Kay the previous century which allowed of wider fabrics being made without the need of a second operative for returning the shuttle to the weaver. It is also possible that the nobleman Tron, who had set up in business in the neighbouring town of Schio some years after the English shuttle had been invented and had no doubt kept himself posted with technical progress in the British woollen industry, had adopted the shuttle in his mill and made it known to other manufacturers, even outside Schio.

There had also been a series of important inventions, all English, relating to spinning and weaving, applied first to cotton and then to wool; Lewis Paul, the barber Richard Arkwright, James Hargreaves and Samuel Crompton were the inventors on the spinning side and Doctor Cartwright, Radcliffe and Johnson on the weaving side. The power loom, originally invented for silk by Jacquard of Lyons, made its appearance at the beginning of the century. The power problem had been substantially solved, although perfection was still a long way off, first for spinning and then for weaving; first water and the horse, then steam.

Even in England an atmosphere of big industry had barely been created. There was still an echo of the obstinate hostility of the workmen to these innovations. The obtusely conservative strain of the public was at loggerheads with the acumen and farsightedness of the few. Poor Hargreaves, who had invented the spinning Jenny (so named after his wife whose act in upsetting the spinning wheel had inspired him) whereby eight strands (later, many more) instead of one could be spun, had his house invaded by the mob and his machines wrecked. He moved to Standhill in Nottinghamshire, but even

there he was assaulted and wounded and finally ended his days in the poor-house. Nor was Arkwright with his water-frame free from persecution. Crompton died a poor man dependent on the charity of his friends. Well known to in-



The woolen industry in the Vicenza Region a Century Ago: *Washing*

dustrial history are the afflictions of Jacquard who, having constructed and set up his marvellous loom under the protection of the Government, was insulted and assaulted by workmen and on one occasion had a narrow escape from being thrown into the Rhone by an irate rabble, while the *Conseil des Prud'hommes* (conciliatory board of masters and men in industrial disputes) ordered the loom to be destroyed, the metal parts to be sold as scrap and the wooden parts as fuel. Even better known are the sanguinary uproars in the English industrial centres, explosions of discontent against the new conditions of the workers and against the machines which seemed to be the predominant cause. The machine was regarded as a monstrous threat to the man who worked with his hands. It is recorded that in 1661 a Pole in Danzig had invented a mechanical loom which could be worked day and night and that the authorities had him quietly seized and strangled or drowned. It was certainly a good thing for Leonardo da Vinci that his interest in improving spinning instruments was more or less theoretical and that he limited his activities to making sketches in his celebrated codes. The by-laws of Flemish towns expressly prohibited the working out and application of new manufacturing systems. It was only when the triumphal aurora of the great cotton industry stimulated invention in a century, like the eighteenth, full of scientific enthusiasm and more prone to practical application of science, that the woollen industry was caught in the giddy current and carried along to stupendous progress in the giant century of mechanics and electricity.



The Woollen Industry in the Vicenza Region a Century Ago: *Carding*

three fundamental operations of spinning, weaving and dyeing; then the fulling with all the dressing that the quality and the use of the cloth called for. The scouring took place in a mixture of hot water and soap-root. The beating was followed by a cleansing operation for ridding the wool of impurities not previously removed, an operation which nowadays is effected more frequently, in different forms and at different stages of production, beginning with the locks and ending with the cloth. Then followed the carding which prepared the fibres for spinning, and the yarn, after leaving the spindle and the warp-beam, passed to the loom. The operation of fulling, done on the cloth, served to cleanse it and make it more homogeneous. Although the records relating to this ancient art are both scarce and lacking in details as to the actual procedure, it may be assumed that the refined taste of the oriental peoples and of the Greeks and Romans toward the end of the Republic and during the sumptuous rise and even more sumptuous decline of the Empire, exacted from the wool-makers many of those attentions which modern industry has brought, it may be said, to perfection.

The Woollen Industry in the Vicenza Region a Century Ago: *Twisting*



The numerous operations which make this industry one of the most complicated and interesting that exist were for the greater part already known to the ancients — sorting, beating, scouring, carding, in addition to the

Instruments and methods lasted. The spindle did not change at all until it became mechanical — it was only yesterday; the loom, originally vertical as it appears to us in representations of famous mythical weavers — the enchantress Circe and the chaste wife Penelope, both

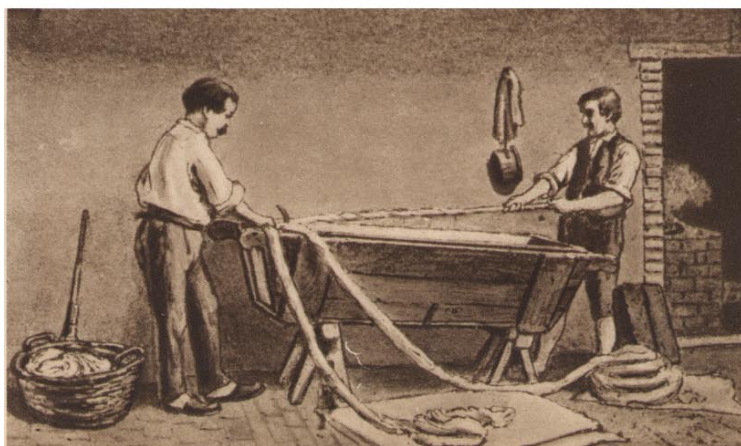
alive in the immortal hexameters of the *Odyssey* — soon became horizontal and in the Middle Ages was little different from what our grandmothers saw not only in the houses of peasants and artisans but in the mills, where industry already glowed with victorious ambitions. Of all the old methods of milling cloth perhaps the Roman system had, after many centuries, made the most progress. It was done, as is seen in some frescoes of a fuller's house in Pompeii, by men who trampled the cloth with their feet in vats, in the same way that grapes were crushed in wine making. Later, the cloth was beaten mechanically in fulling machines driven by water from mill races or by horse power.

But the old fulling art was more complex than the operation which goes by this name to-day. It served not only to full the cloth but to clean it as well and also to renovate soiled clothes.

The fullers used either Greek « nitre » — carbonates of soda and potash — or more often fuller's-earth, which came from the islet of Cimolo, one of the Sporadi group, or from Umbria or Sardinia. The earth from the last-named place was, however, considered inferior, and was used only for white cloths. The Roman fullers made large use of urine and to obtain supplies thereof they placed big vases in the open for the convenience of passers-by. These vases were, therefore, probably the prototype of the public urinal. Vespasian placed a tax on this liquid, which had acquired pronounced industrial utility. This is why public lavatories in Italy are still designated with the name of the practical minded emperor, whose wits had been sharpened by the needs of the Treasury and who, at the protest of his son Titus,



The Woollen Industry in the Vicenza Region a Century Ago: *Skeining*



The Woollen Industry in the Vicenza Region a Century Ago: *Sizing*



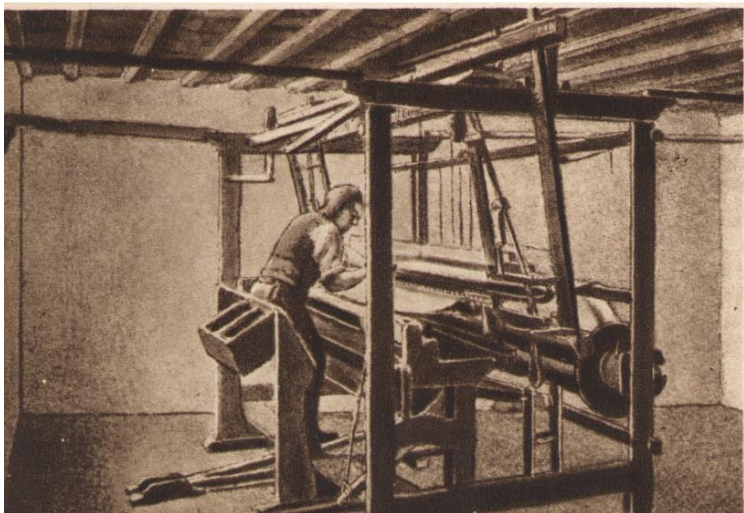
The Woollen Industry in the Vicenza Region a Century Ago: *Preparing the Warp*

disgusted with the tax on the fetid liquid, pulled out a coin saying «non olet» (it does not smell). Money, the majority of people think, shows no trace of being ill-gotten; it does not bleed, it might sometimes be said, nor does it shed tears.

More fair was the payment the fullers had to make for the water they needed, drawn from the aqueducts alongside which they erected their mills when they could not set them up on the banks of some natural watercourse, as they almost invariably did under the discipline of the corporative and municipal authorities.

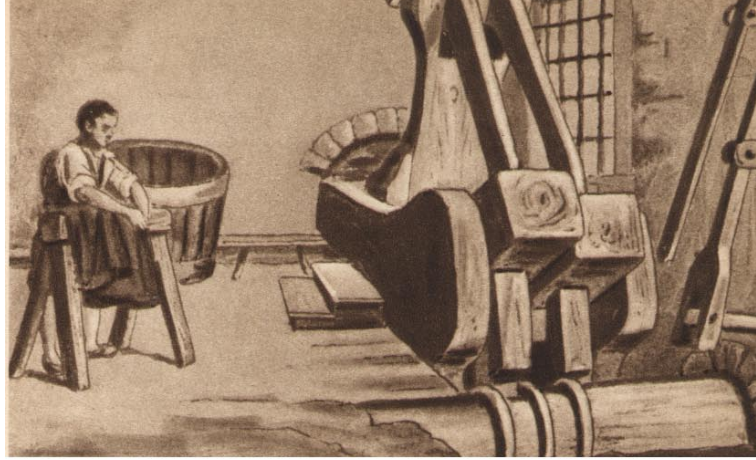
Under the system used by the old-time fullers, the process of trampling with the feet was followed by that of beating. The cloth, after having been washed in clear water and dried, was hung on a line and teased with a kind of thistle or teasel, still in use to-day, which was called the fuller's thorn, or with other means, which included porcupine skin. At a distance of two thousand years the figure on the Pompeian house is practically the same as in the technical illustrations of the beginning of the nineteenth century. To give a brighter appearance to white stuffs the Romans used, after teasing, to treat them with sulphur, placing them over a kind of oval wicker cage in which the sulphur presumably was evaporated by a small brazier. Other finishing operations followed. The cloth was rubbed with earth of the same kind as that used for scouring it in order to give it a certain gloss. It was then shorn, when it was not the kind of cloth

The Woollen Industry in the Vicenza Region a Century Ago: *Weaving*



one or both sides of which had to be left raw, like the Paduan « gausape ». Finally, the cloth was pressed after having been damped with water sprayed from the mouth.

The Pompeian frescoes actually show workmen with their legs immersed to various depths in vats in which the cloth had been placed, in an attitude of grape trampers. We see the milled cloth, dyed or washed, hung up on high



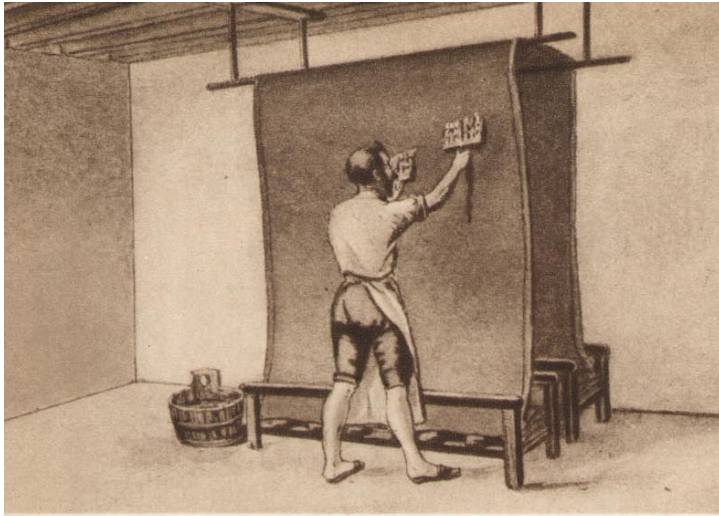
The Woollen Industry in the Vicenza Region a Century Ago: *Fulling*

canes to dry; and a workman in the presence of a woman seated, probably the mistress, in the act of handing a length of cloth to a girl, evidently a customer come to take away material previously left there to be cleaned. We see a workman engaged in combing a white cloth, striped with red, and another who is carrying a semi-oval wicker basket probably intended for laying the cloth over in an orderly manner or for drying it or, what is still more probable, for exposing it to the whitening action of sulphur fumes; the recipient he holds in his left hand seems, in fact, to be a kind of brazier to contain the sulphur. The usual mistress or manageress is seen delivering cloth to another girl. Finally, there is the press for giving a finish to the material. Other figurative representations referring to the art of fulling are to be seen elsewhere, for example, in the two Gallic bas-reliefs of the museum of Sens, portraying a fuller standing up in the vat and a cloth-shearer with a large pair of scissors shearing the cloth spread out on a board.

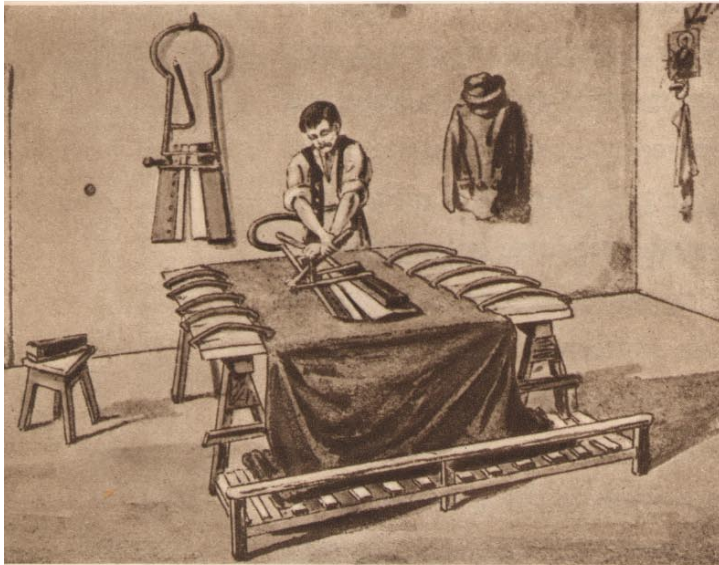
The plates contained in the « Methodical Encyclopedia of Manufactures and Arts » published in French in Padua in 1800 furnish a clear idea of the survival of means and methods in wool-making and their slow evolution before machines came in ever increasing number to replace man power even in the most delicate and complicated operations. As far as the first operation — the sorting of the wool according to the various qualities — is

The Woollen Industry in the Vicenza Region a Century Ago: *Hanging out the Cloth*





The Woollen Industry in the Vicenza Region a Century Ago: *Teasing*



The Woollen Industry in the Vicenza Region a Century Ago: *Cutting*



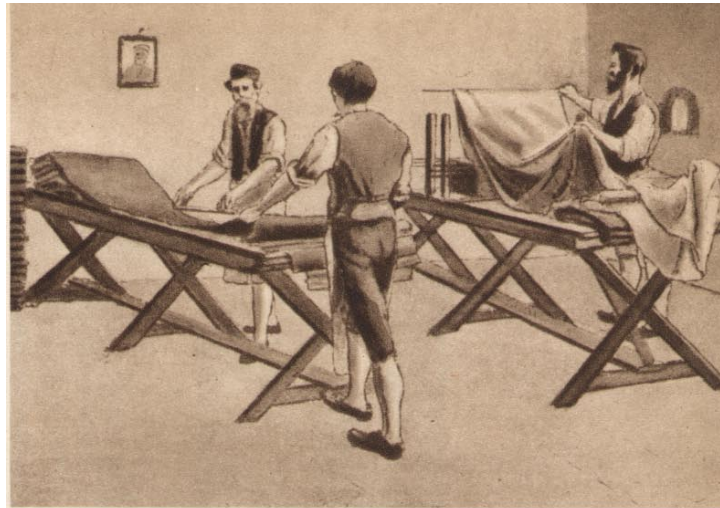
The Woollen Industry in the Vicenza Region a Century Ago: *Folding*

concerned, no machine will ever be able to substitute the eye and the experience of man. However, at the beginning of the last century, even the beating was done by hand, and also the carding, the spinning, the twisting, and the preparation of the reels for laying the warp. The looms did not differ on the whole from the ancient contrivances, although greater attention had been paid to details and several ingenious arrangements added. When wide fabrics were being woven, however, it was still necessary to have an extra workman to return the shuttle to the weaver, although the mechanical return shuttle had already been invented in England. The fulling machine had a certain imposing look about it. Then followed the other operations, all by hand.

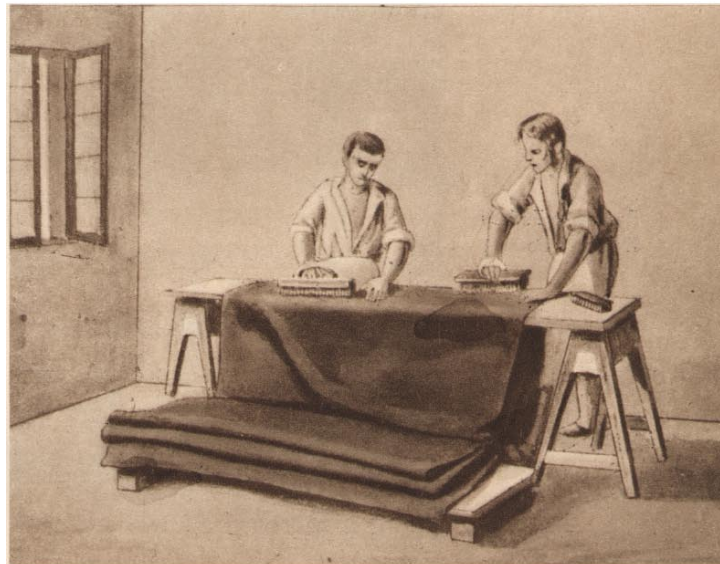
The slowness in the development of the woollen industry in Italy, even in the mechanical century, is clearly shown in an instructive book entitled « Machines I have seen » by Senator Alessandro

Rossi, in which comparisons are drawn between the various operations at a fifty-year interval — 1846 and 1896. The machinery of 1896 has now been largely superseded; but the primitiveness of 1846 is worth mentioning because it gives probably the most accurate picture of processing conditions in Valdagno ten years previously, when Luigi Marzotto resolved to face up to adverse fortune and forged the new destiny of his town and his calling.

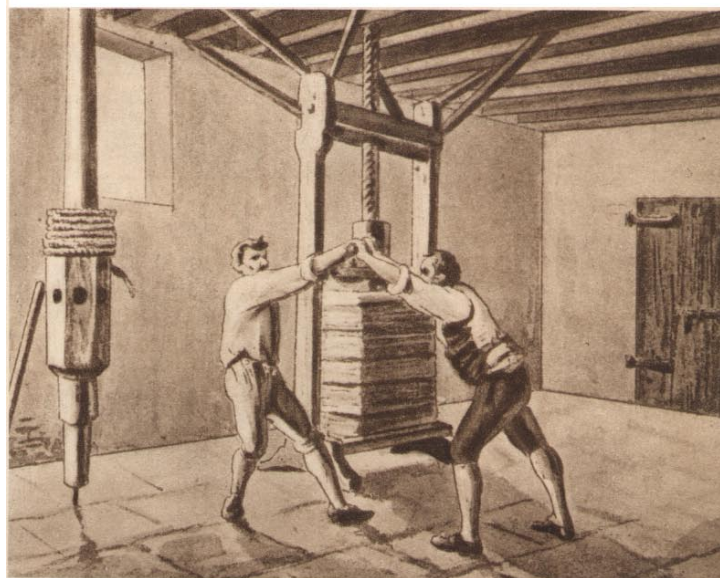
The wool was beaten with staves in hollowed tree trunks and was washed in baskets suspended from a bridge over a course of running water. As the water entered the basket the men moved the locks about with a wooden rake. The wool was naturally dried by the sun; after which it was again beaten and then cleared of any vegetable matter not previously removed. There were already small machines for carding, although this operation was generally done by hand, as was also the operation of re-



The Woollen Industry in the Vicenza Region a Century Ago: *Darning*



The Woollen Industry in the Vicenza Region a Century Ago: *Brushing*



The Woollen Industry in the Vicenza Region a Century Ago: *Pressing*



Ruins of a Fuller's House in Pompeii

ducing skeins to spools or spools to skeins — by means of the centuries-old winder — and the yarn was wound round a broad polyhedral or cylindrical support — which still remains, although now driven by electricity —, namely the warp beam. The operation of sizing also required the services of two men, one at each end of a



The Pompeian Fuller

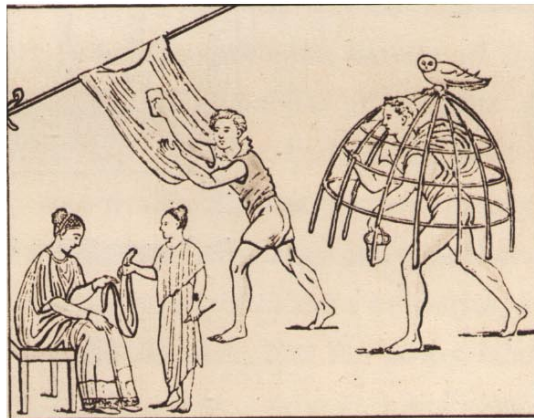
wooden vat. The looms were all hand driven and with the wider fabrics the weaver was usually assisted by a woman who returned the shuttle to him.

About the middle of the nineteenth century the milling machine for fulling and cleansing the cloth was similar to the machine



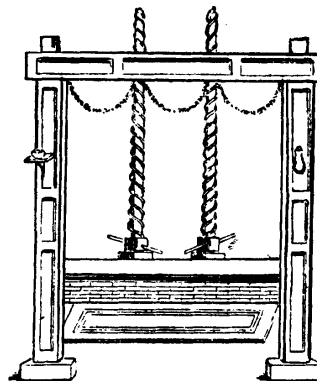
Pompeian Shearer

reproduced in the Encyclopedia of half a century before; if anything, even more rudimentary, with its wooden pistons driven by wheels revolved by wa-



Other Operations in Pompeian Fulling

ter. Teasing was still done by hand, although here and there might be found a cylindrical machine with teasels arranged in series. For drying there was God's good sun (when it appeared); and the cloth to be dried was hung out on lines held up by props. The cloth was, however, in many cases, shorn by hand with scissors, and the folding was done by two men sitting at opposite ends of a table. The brushing was also a manual operation, and was followed by the pressing. Finally, there was the finishing process, performed with traditional simplicity, and the measuring.



The Pompeian Fuller's Press

WHAT woolmaking in a big factory is like to-day may be seen in the very place where a century ago it was so patriarchal; and in the progress, development, dimensions and order may be contemplated the monument that four generations of Marzotto have raised to innovating science and, above all, to faith in work.

The grey pile set in the hollow of the valley, the long and lighter building of the modernized weaving department, the palatial offices of the management and staff with the simple but handsome façade, the wide internal roads scored with rails, the dominant chimneys, the traffic at the entrance, steady as the flow of human energy, commercial and industrial, that rotates the wheels, operates the machines and guides the sure motions of the worker's hand: all this is an hymn to refined necessity and to prodigiously ingenious activity.

There is a kind of literature — the so-called didactic type — which went out of fashion precisely when the works of man became more stupendous in variety and sapience. Hesiod and Virgil celebrated husbandry in their hexameters, and Italian poets, from Alamanni to Rucellai, Spolverini, Lorenzi, Arici, followed in their luminous wake. The eighteenth century, which was also the century of the spread of scientific and technical culture, abounded ad nauseam in didactic poems. Then came silence — or almost. Perhaps the greater linguistic accuracy and the greater wealth of detail that were needed precluded the hendecasyllables, with their periphrases and metaphors, from portraying the machines and artifices of modern industries; it seemed, moreover, to the superficial observer, that the poetry inherent in pastoral life was lost in the depressing atmosphere and mono-



THE INSIDE OF THE WOOL WAREHOUSE

tonous mechanicalness of the factories. The poetry of industrial work was largely ignored and even the clamorous revolutionists of aesthetics, who proclaimed the sovereignty of the machines, of electricity, of speed, of creative uproar, after all limited their effort to vague representations, forgetting that baring one's arms is not the same as doing the job.

Moreover, poetry has no need of verses. There are many who appreciate that the life of an industry is a poem full of sturdy beauty now that visits to factories have become a valuable accompaniment of school teaching and realistic literature seeks themes and colour in workshops, calling up men's passions in a perspective of metal colossuses, in a setting of glazed roofs, dangling pulleys, endless belts, wheels, pistons and levers, between lights and shades in an intricacy of lines, like the dense ramification of a fantastic forest.

And of all industries, the most complicated and varied as to the number of processes from the raw material to the finished product and as to the diversity of aspects in apparent uniformity, is that of wool-making.

Here we have the warehouse, deep and high as a basilica. The portal is wide open: in the inside, lighted by large windows at the top of the walls above the gallery which runs round the building, is a mountain of bales showing slight subsidences here and there due to withdrawals for current needs. Suspended from the roof is a travelling crane almost extending from side to side of the building, which travels from the bottom to the entrance to take the new bales as they arrive from Oceania, America, Africa, Europe, the wools of Australia, the Argentine, Brazil, Cape Colony, Scotland, and our own Alps and Appenines, which last unfortunately have the least value. The vulture-like crane seizes and then releases its prey, resting over it in dominating contemplation. By a stretch of the imagination, the sight of these bulging sacks conjures up visions of immense plains populated with herds or of valleys and hollows of steep mountains, green beneath the snow cap and between the spray of the torrents, in

which flocks of sheep move slowly, guarded by dogs with iron collars and shepherds wrapped up in cloaks of a monkish colour, in a silence that browses on sparse and even thoughts.

The slowness of time in the extension of milleniums. From the Bible to the registers of the Australian sheep-rearers, from the Asiatic plateaux, which populated Europe with the sons of the Aryans, to the pampas of South America, where even to-day the territory is immense and the population sparse, time and space merge in the continuity of pastoral life, and everywhere life is taciturn and slow. The ancient Hebrew heard God close at hand in the great silence and dreamed, or was artful like Jacob, who cheated Laban of his sheep by placing coloured rods in the watercourses so that the ewes, when watering, might gaze upon them and, being thus influenced pre-natally, bear dappled or tawny lambs which he could claim as his.

The centuries pass like days. Life passes like running water, the source and the discharge of which are invisible; and Giacomo Leopardi, through the mouth of a roving shepherd of Asia, the land of

stargazers and seers, sings the desperate song of the vainness of living. With the flocks and shepherds proceeds the history of mankind, and religions come into being. The pastoral flutes of cane give birth to the first melodies. The idylls of Theocritus and Virgil, the scenes of Aminta and Pastor Fido, show love, jealousy and emulation of art as agitating the hearts of the shepherds when the sheep are brought into the shade of the rocks and trees at midday. But the simplicity of their exi-

The Big Crane in
the Warehouse





Sorting

stence seems destined to be the refuge of happiness; and the leitmotif of candid virtue and philosophic peace is developed in the poems almost to the point of producing nausea.

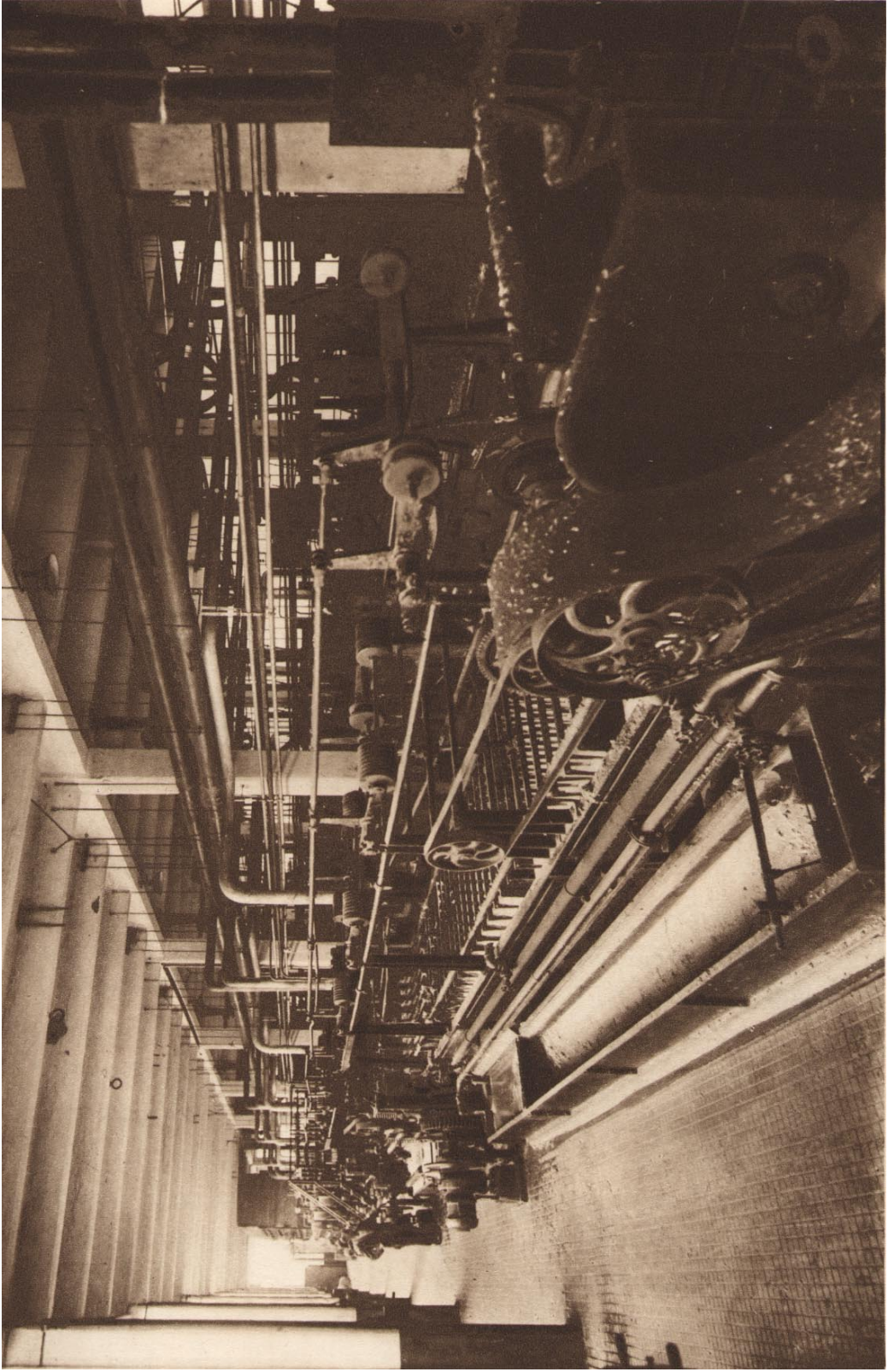
All these sacks, heaped up and padding the high walls, which have fallen on top of one another from the suspended hook of the crane, contain a world. A broad vein of universal literature has flowed in here. Here is enclosed the first cycle of the history of wool, the living cycle that has inspired so many painters — the pastures, the folds, the prone multitudes, the watering troughs, the washing in the brooks, the shearing, the reluctant though resigned sheep between the knees of the man armed with shears, while all around other pastoral work is proceeding. Thousands and thousands of fleeces. The echoes of the bleating sheep are lost in the distance. The slowness of an existence with a monotonous tempo terminates in this immobility, whence life begins anew alongside, totally different, with a throb of speed and an intensity bordering on frenzy in the constant effort of the machines.

The idyllic cycle, when the sheep with its unwashed and dense fleece was picturesque, being closed, the wool, now in the sorting

room, diffuses its characteristic acrid smell, which, however, is somewhat toned down by the size of the room and the large number of windows. Here the workmen pull out the fleeces from the bales and divide the locks according to the kind of fibres, the different qualities being placed in as many different baskets. The more uniform the quality, the more uniformly, and therefore the more rapidly and surely, can the wool be worked. The difference does not lie merely in the breeds of the sheep — this difference is already discernible in the bales from their place of origin — but in the various parts of the sheep itself — neck, back, belly, legs — and the sorters must be able to distinguish at a glance back wool from leg wool and the length of the fibre in the lock. Their hands seem to be endowed with intelligence. The dirty locks fall into their respective baskets with rhythmic rapidity. The sorting of the qualities is then checked and the baskets pass to the beating machines where the lock, a hard compact mass of filthy fibres matted together, has to be softened and opened out. Hard discipline. The machines are squat and ugly things, like overseers set to dominate rebels, and the stench is one which only habit can make bearable; a dull thud, and the lock is shot into the room below to be scoured.

In this room the no less unpleasant smell of the detergent is added to that of the wool. There is almost a symbol in this evolution of brutality — sin, contamination, vice, and the amount of work entailed in removing the evil, the fault, the embarrassment, and the passage along the successive spirals of that ruthless evil-smelling purgatory to the paradise of white locks, of soft ribbons or slivers, and of glistening yarn; a process of continual improvement in which nothing is lost, not even the refuse that leaves the beating machine, for after having been passed through a sieve to recover the wool still adhering to it, it is sold as fertilizer.

The scouring machine is enormous — they call it the Leviathan or the iron man — extending the whole length of the room. The dirty wool, sorted and beaten, enters at the head end, while at the top end



SCOURING

a closed oven dries the washed locks: vats of water in which a neutral soap has been dissolved, and a lateral duct along which the wool passes on its journey; the pace is slow below, for scouring is a work of patience, and swifter above, among the rotating pulleys and near the blue-painted water and steam tubes, in a slight haze with effects of light and shade between the windows and the masses of metal, and with occasional men who seem to move about the machines like contrivances a trifle more loose. The wool passes along the vats, full of a nasty liquid transformed by the colour of the detergent and the colour of the filth into a dirty pool with a foamy surface in which the locks are seized and turned over, so that every fibre may be cleansed, by rakes and forks that seem to be wielded by the invisible hands of the torturers of Malebolge, assiduous but without anger, vigilant, constant, and indefatigable. Not the iron man, but a black iron company that raise and plunge these instruments with a rhythm of living force. A dull battering and a movement regulated by the diligence of the operation, but dominated in the room by the sound of the engines.

On all sides, the giddy palpitation of the engines seems to press hotly upon the various rhythms.

A pneumatic tube sucks up the wool, now already white and soft, falling from the oven or the drying machines, and propels it, warm and smeared with oil, to the cells; whence, after removal of the more accessible impurities, it is sent to the carding machines. The locks rotate in the various cylinders of the machine, which opens them out, disentangles the fibres and lays them out in a broad ribbon, the consistency of which is increased in the passage of the wool through the cylinders. Where, however, according to the purpose the wool has to serve, the ribbon form is unnecessary, the carding is done in mattress form, as they say, the wool coming out broad and loose, to be subsequently reduced to a tow-like consistency.

The impurities of wool are as tenacious as those of humanity. There is no end to the probing for them and removing them even when the wool has become cloth. The cylinders curry the wool, clea-

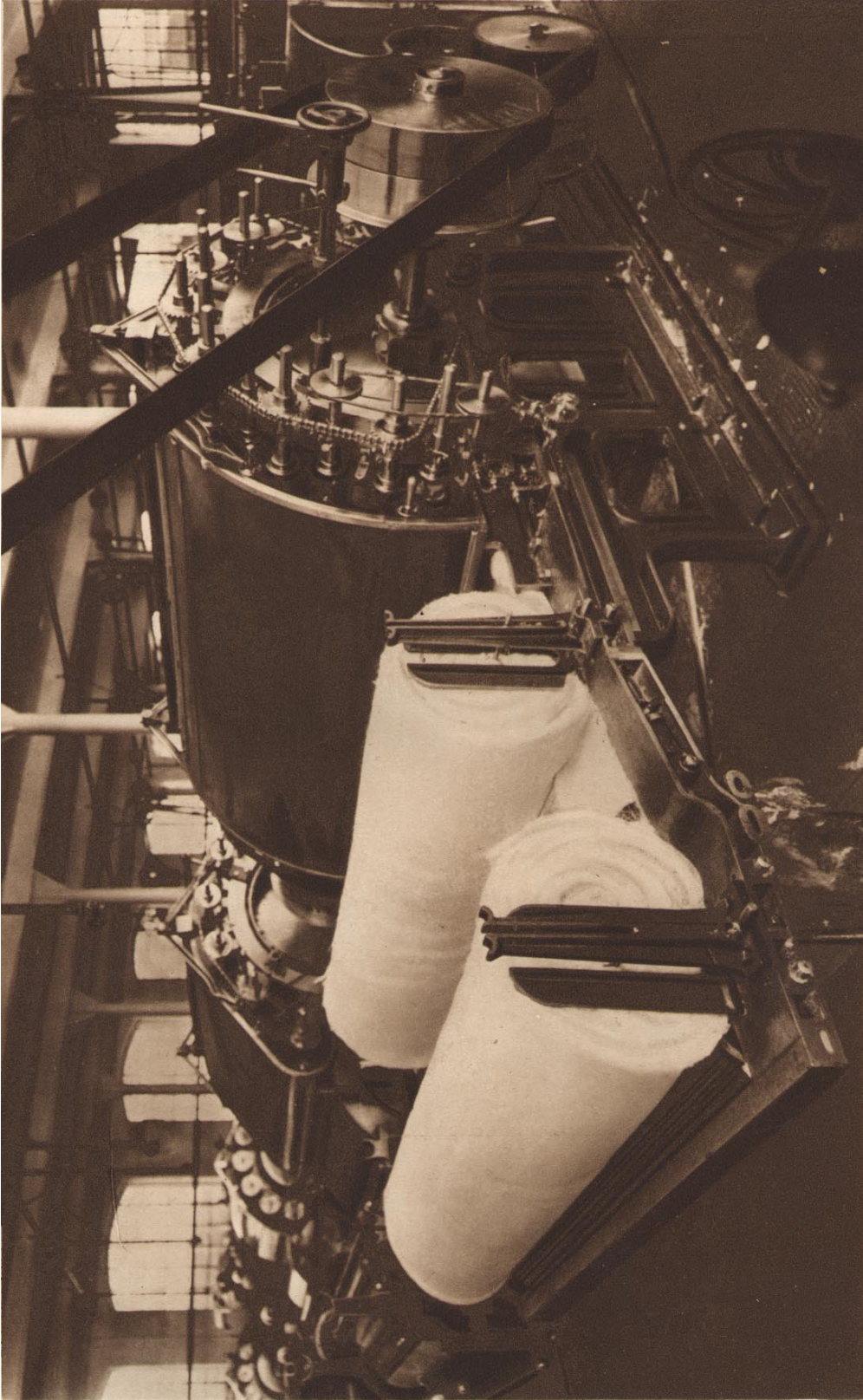


CARDING

ning it and disentangling the fibres without breaking them; the combs, the teeth of which become gradually more close, clean them and draw them out, first loosely and then more tightly, until, when this new torture is over, they slowly emerge as a regular and thick ribbon along a small channel, leading to machines that reinforce and «finish» them. They are then back-washed and gilled and the greater part of the fat removed from them (not all, as it is essential that the wool have a determinate percentage of fat and humidity). Finally, the wool is done up in skeins of equal size and weight. Everywhere in the immense room where the carding and the combing take place the lay visitor is confused by the multiplicity of operations and by the variety of functions exercised by innumerable machines, lined up and as orderly in their movements as gymnastic teams on a sports-ground. He no longer follows the strict succession of operations, but he feels their value and admires the results.

Now see what progress has been made. Man has created the machine and the machine has largely taken the place of man, who stands by to supervise the work done by it, to correct with a movement any irregularity in speed, to arrest the immobile race when the regularity of it seems to suffer. Often he seems to be an onlooker, as one gazing at an impetuous torrent from the bank; to be a beaten man somewhat dazed by the exuberance of the victor. But man is not only there. He is in the offices where new contrivances are designed, where metallic creatures are conceived for performing still more complicated or more delicate tasks, for saving time or for improving the product. He is in the workshops, which are the nursing homes of the machines, where they are born and where the new steel generations are brought up with cautious experiments in order that they may triumph over the inferior effort of their elders and drive them from the premises of the better establishments.

Scouring, carding and combing once upon a time: predominance of manual labour, simple tools excogitated under the urge of primitive necessity, asleep, so to speak, in the legacy of habit. Ima-



CARDING

gine the face of an « Umiliato » of the thirteenth century (one of a religious order then existing, celebrated for its wool-making activities), the woolmaker following thousand-year-old rules, who beat the wool with a mace, washed it in some watercourse, and combed out the locks with a small carding comb made of small laths and barbed wire with hooked spikes, upon entering a modern mill where these spikes are now mounted on huge rollers, differently arranged, where the operations are subdivided and detailed, made graceful by the logic of movements and effects, intensified and disciplined in accurate rhythms, with wheels, gearing and levers in place of muscles and tendons.

A panorama of machines within a frame of windowed walls let-

Dying Wool in the
Lock



ting in light from all parts; and among all this metal the delicious softness and the whiteness of the rolls of ribbon, a delight to the eyes accumulated and disseminated along the paths and open spaces of this forest of contrivances. The purgatory is over.

Truly speaking, close by there is another place where the wool seems to be still on the rack — the dyeworks. In the copper vats the solutions of colouring materials, dense liquids, pour over the gamut of colours, almost hiding it. In other vats, of wood or stainless steel — the former belonging to older periods — the rolls of ribbon or cloth are immersed to be dyed and are afterwards rinsed in pure water and brushed to even the fibres which have become slightly entangled in the dyeing. The smell is strong, almost biting, in the

Dying of the Pieces



heavy foggy atmosphere, with men in the distance moving about like spectres. And there is the smell of the steam from the driers. The rolls and pieces are heaped up alongside the ovens or in carts near the exit. The iron greys, the blacks, the dark or dull colours, do not stand out sharply; the yellows and the blues, on the contrary, blare like cocks in their antelucan songs at the end of summer nights, and seem to be in a greater hurry to leave. Fancy follows them to the vast warehouse, especially the part for ladies' materials, where the pieces on the shelves seem to be a keyboard of coloured octaves; or better still, to the yarn warehouse, down there, so delightfully bright, where the wools for knitting and crochet work in soft skeins are a chorus of girls singing at the top of their voices, with trills and embellishments represented by the whites, reds, blues and yellows, and sustained notes by the greens, oranges...



Combing

OF the three basic operations which have characterized wool-making through the ages, the first is carding and combing, and the second spinning. For many centuries there was a distaff or a wheel. The distaff, the primitive cane with its bunch of wool at the top and, at the extremity of the yarn in the making, the spindle, the oldest thing in the hands of the most distant woman. The dawn of the world: the woman who spins, the man who digs. The Greek religion: the Parcae intent on studying the fate of man, and Clotho, one of the three, with the distaff in her hand, spinning the days of mortals. The Hebrew religion: the strong woman in Proverbs in the Old Testament, who « sought the wool and the linen... and her fingers clasped the spindle ». The Christian religion: Saint Anna, spinning, teaches Mary the use of the needle. Ages and happenings pass; a distaff stands on the fringe of events. The virtuous Lucretia spins while Sextus Tarquin becomes inflamed with her beauty. Nor must one forget the Florentine family sweetness of the time of Cacciaguida in the verses of Dante, when a woman watched by the cradle and

*Another, with her maidens, drawing off
The tresses from the distaff, lectured them
Old tales of Troy, and Fesole, and Rome.*



Combing

The ancient distaff, which husbands presented, made of valuable wood and ivory, to the matrons of the Catonian Republic: distaffs of yesterday, in the corners of country houses, or still raised in the gnarled rugged hands of old peasants. In those hands Giovanni Pascoli saw the bunch of wool lose size and the spindle twirl. Quintus Valerius Catullus recalls the country women of the banks of Lake Garda rather than the women of Rome when, describing the Parca at work, he draws with great accuracy the picture of the spinner with wicker baskets at her feet containing the soft white locks, who held in the left hand the distaff with the wool wound about the top while with the right hand she lightly drew out the thread, wound it with her bent thumb around the spindle, evening it with her teeth, so that down was left on her dried lips.

Run, spindles, run, drawing the thread — sang the Parca. A much different kind of race nowadays, run by giant machines. The ribbon or sliver is attenuated, and the yarn flies out into vibrating space and is taken up by the bobbin. The tension in these iron frameworks, in the rapidity of movement, and in the apparently violent vibration, seems to border on frenzy. But the machine is a prodigy of

calculation and to the marvelling gaze of the observer becomes a prodigy of delicateness. The thin threads emerge and reach their destination, one alongside the other in numerous files. The ribbons slide and the bobbins rotate and fatten.

The most brilliant machine bears its British name «Selfacting». It is almost as broad as the room itself; the lower part where the threads run toward the spindles advances and recedes on pulleys under the upper part which carries and gives out the wool to be spun. It has another machine in front of it, so that in the space in the middle there are two lengths of thread moving backward and forward, and the workmen attending each pair of machines follow the movement, which seems like a figured dance.

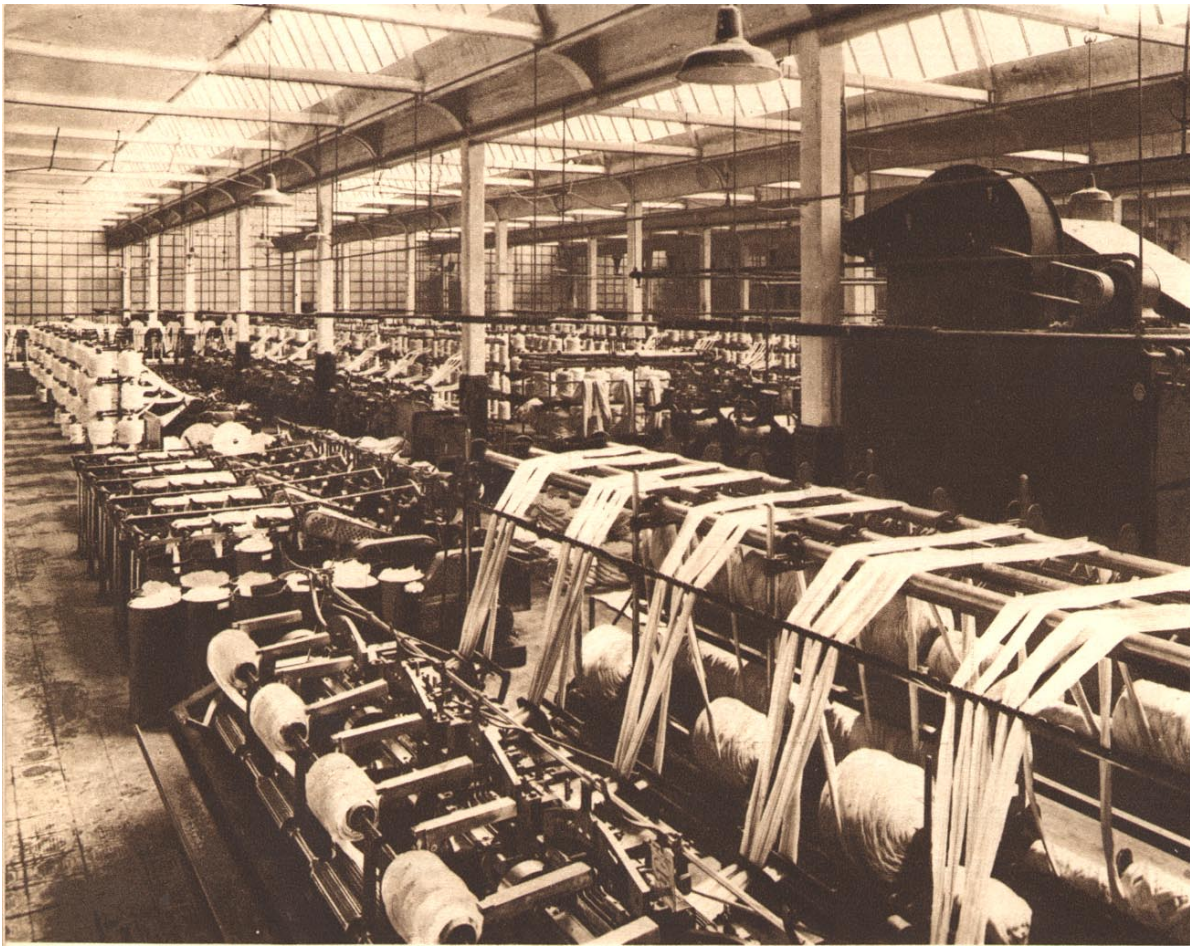
The threads are twisted two, three or more together according to the kind of material to be made and are then subjected to another operation which prepares the warp. They are wound off and on to a bobbin of another form, cone-shaped («cheeses» they call them), more suited to the machine that prepares the chain to be woven. In this more complex and rapid manner of arranging the thread it is difficult to recall the old winder which was used in domestic wool-making and which poetry accompanied through the centuries, drawing inspiration from its ancient family simplicity. Seated before a winder, over there beyond the mountains, near to the window of a humble cottage; our fancy sees Margaret dreaming of Faust who is resplendent with the diabolical gift of youth. She dreams and sings.

Here, everywhere, from the first to the last operation, the men and women sing no longer. The song has been stifled by the roar of the engines, the throb of the machines, the hissing of giddy contrivances and the humming of the slower moving parts. Electricity, iron and steel intone a symphony that shakes the whole building and lasts as long as work proceeds, prolonged incessantly from shift to shift;

and while the symphony lasts and its echo spreads beyond the walls, beating the air with its drowsy monotony, the worker keeps silent or, if he must talk, places his mouth to the ear of the other person and shouts, falling back into silence as though discouraged. These mighty giants make the vocal chords seem old and disused, just as their mighty mechanicalness does for the cane distaff and the wooden winder — something like the domestic trilling that reveals to the family and the neighbours the presence of the woman of the house, the busy bee.

Another Combing Room

To be exact, no noise is produced in the operation of laying the warp. Here the women seem to have regained command over the work



and to accept mechanical assistance merely to amplify the old winder and to make the traditional warping beam rotate with greater speed. But this silence is the companion of the major task. Not far removed are the clanging looms it is their business to feed. They are the quick and assiduous preparers. The threads from the new bobbins have to be arranged in the chain of the warp. Every so often these women receive their orders — so many threads, in so many lots, according to the type and width of cloth to be woven. And the thread is rotated and unwound, and then rotated and wound, in a series of movements that seem to complicate the work but in reality simplify it by providing an additional secondary operation that facilitates and accelerates the

Preparation of the Wool for Combing

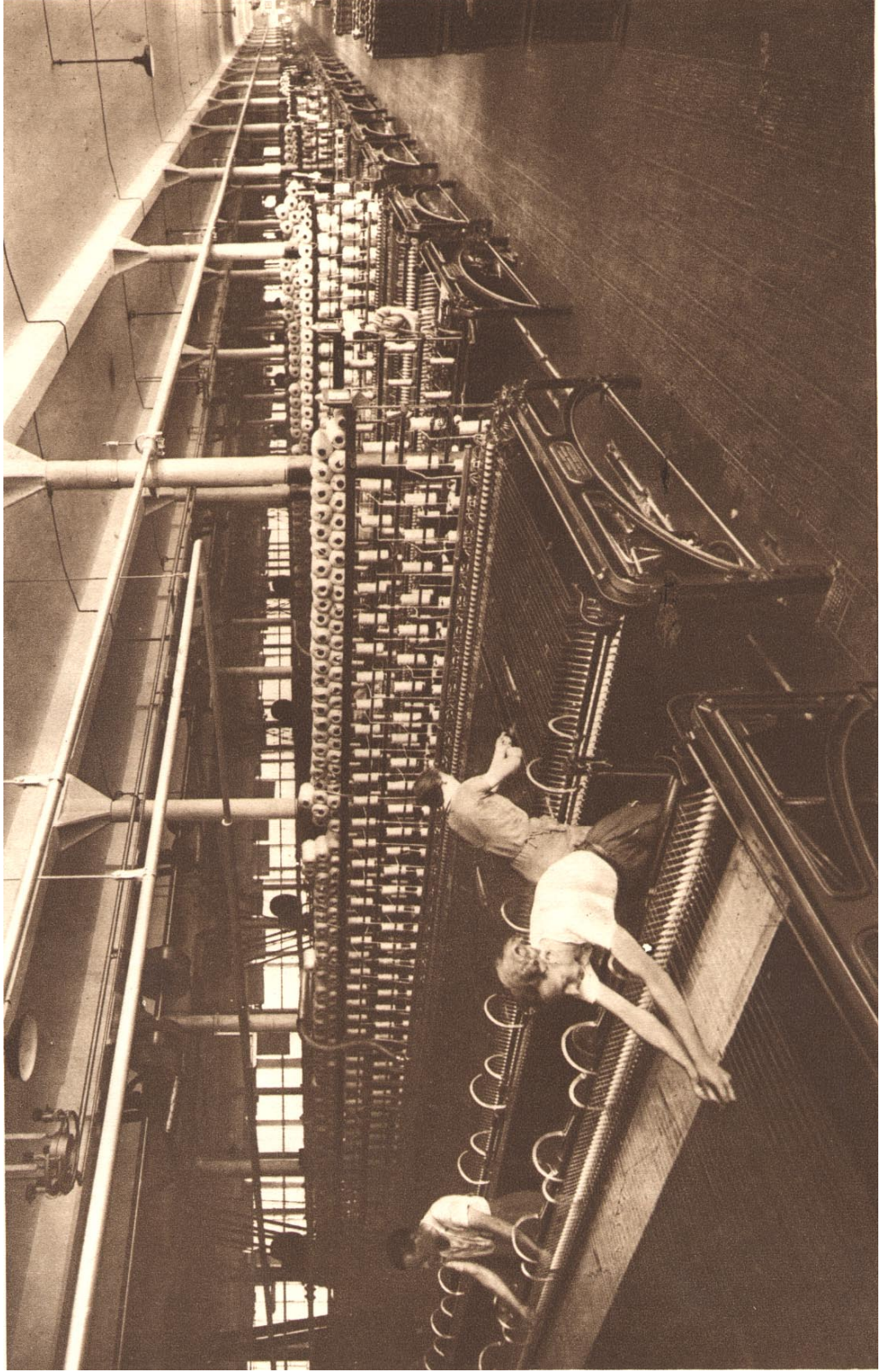




A Room of Continuous Spindles

principal one. An intermediary machine complements that which precedes and that which takes up the work where it leaves off.

The discipline impressed on this soulless mechanism by the genius of man is little short of wonderful. Several machines now do the work that once seemed simple, because its details must be cared for separately; and one sole machine, with the complicated harmony of its parts, does the work which at one time was the result of a series of manual operations, or of several machines. Inventive genius intervenes by degrees to perfect this discipline; gives new hands and eyes to the iron and steel and greater power and speed to one of these giants. Imagination sees the small machine as a single man, whose attention does not wander, who is never late, and whose movements are a marvel of acrobatic rapidity: a big machine is a squad of men magically reduced to metal and accurately co-ordinated in their movements and tasks. Over there, in the spinning room, the seven-hundred spindles of a machine are an entire village of women holding their distaffs. Farther away, in the weaving department, a machine



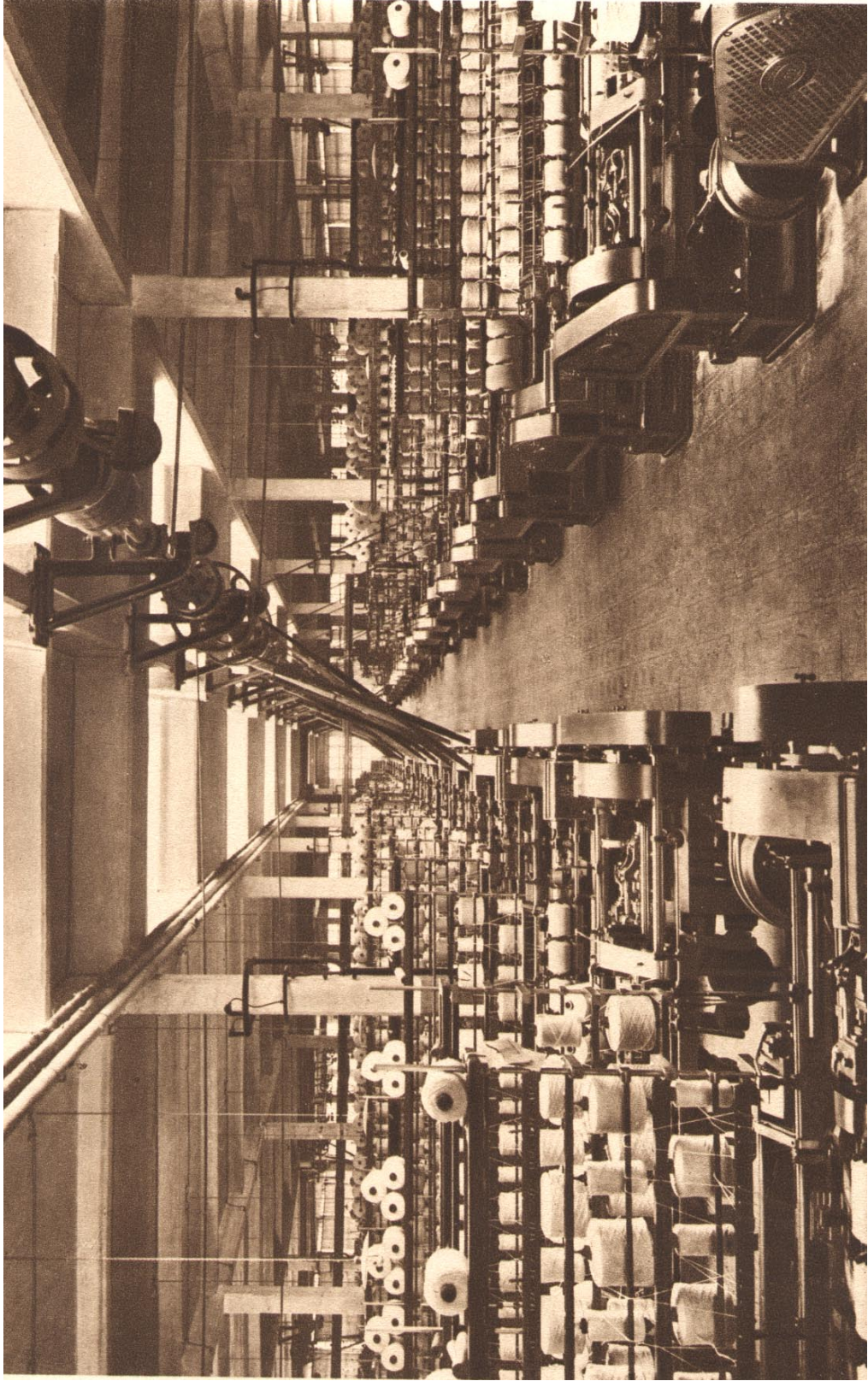
A ROOM OF SELFACING SPINNERS

takes the shuttle from the hand of the first member of a crowd of weavers and performs in one day the work of a year. Here the bobbins are discharged and re-charged, alternately lean or like marionnettes with their arms akimbo, peg-tops that spin the same for hours and hours; and the thread passes, drops, rises again, is warped and wound about the sizing beam in a broad multitude.

The beam passes to the sizing room, where a paste of starch is prepared for the purpose of glueing the threads together and strengthening the warp and making it more even. The beam is reeled off slowly and the chain passes into the vat, becoming impregnated with the gummy liquid; after which it is dried by steam-heated cylinders and coiled around another beam. The latter grows stouter while the sizing beam grows thinner and finally returns to the warpers for more thread. The loom beam takes its place in the gearing of the powerful looms. But before the formidable beat of the looms begins the warp threads must be arranged in healds, each in its proper eyelet; before the mechanical power reaches its apogee, generating cloth with the roar of a torrent, another antechamber of the ultimate stage of manufacture, the healding room, is dominated by manual work.

One receives the impression of an anacronism upon entering the room. The centuries seem to have lagged behind. Here are the warp cords dear to the memory of the domestic loom. Each of these women has come from the rustic rooms where the cloth was woven for the men of the house, where one woman pressed the treadle and beat the weft while another inserted the threads and arranged them in the combs, which moved up and down alongside, slightly forward and slightly backward, with a noise as of fragility in the lusty blow of the batten.

The arrangement of the healds in their wooden frames, or blades as they are called, resembles a score of music. So many blades,

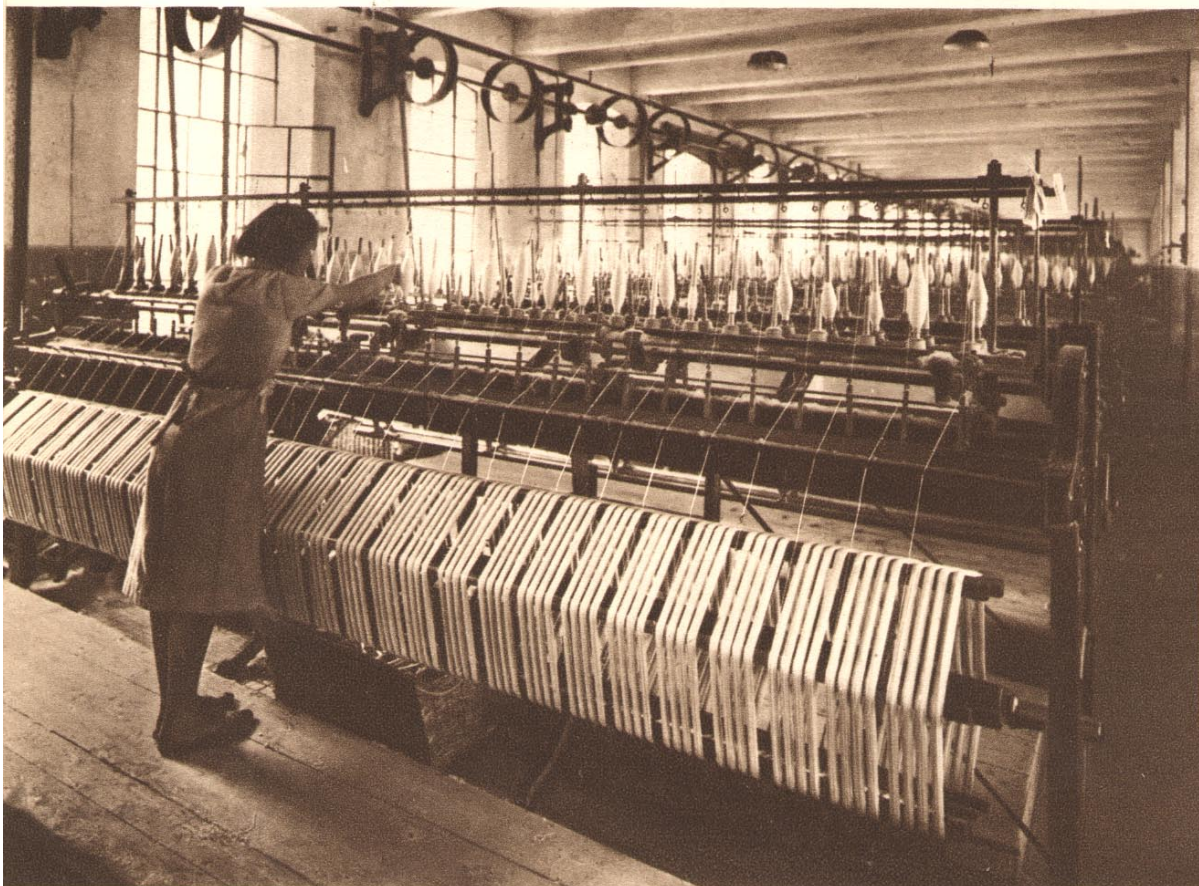


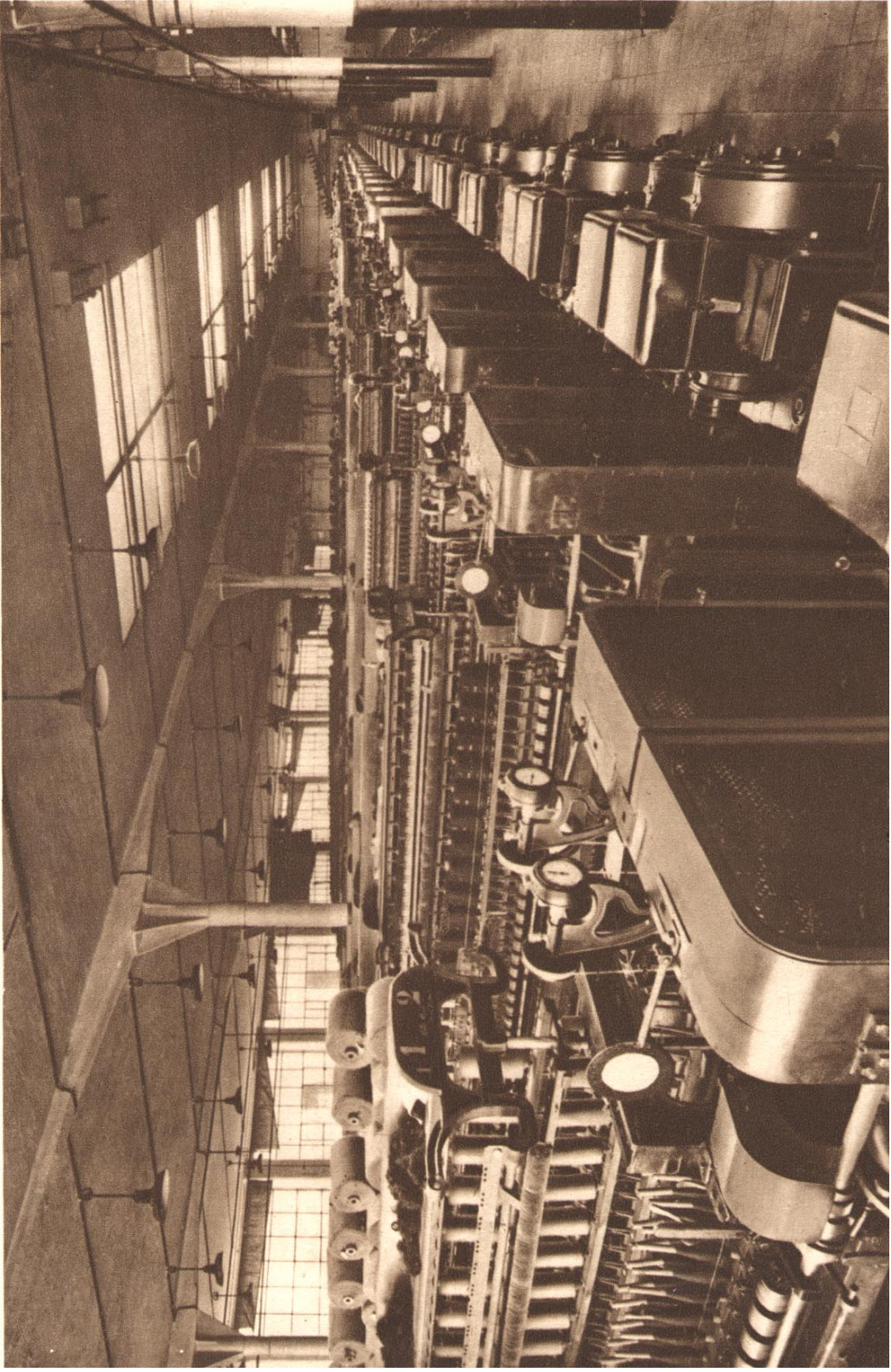
PREPARATIONS FOR COMBING

so many healds, according to the design that the machine has to make. All is gradation and measure. One would say that the inside of a harpsichord was being constructed and that the threads from the beam, each inserted in the hole of a heald, were the strings of the instrument.

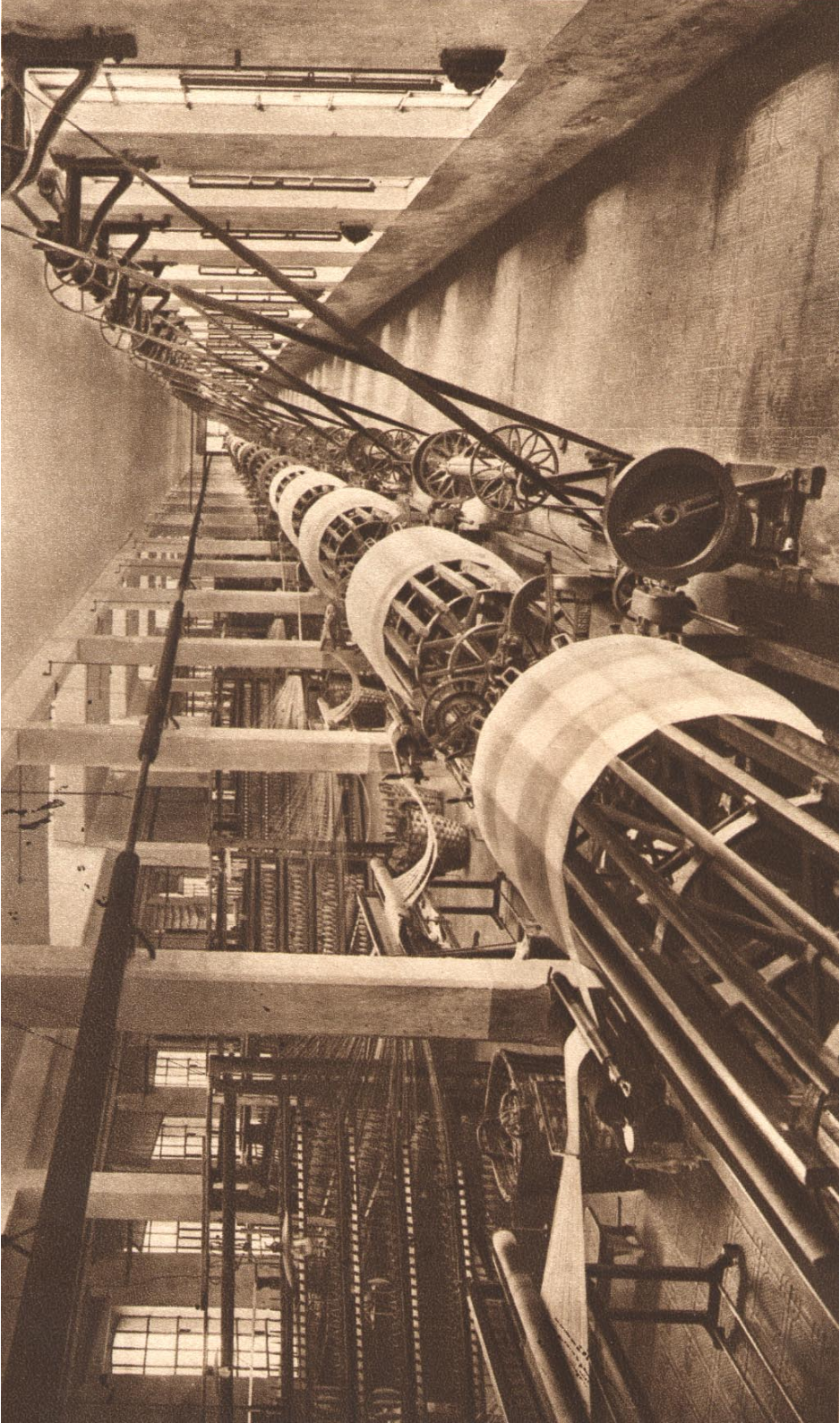
The work is quiet with a slight ticking sound. The women have expert eyes and their fingers, made sure and rapid by experience, move in short and agile motions. The fingers dance upon the blades and reeds. Two women facing each other pass the threads in the holes, from blade to blade, with a dexterity that seems to feel the stimulus of mechanical genius, all speed and accuracy. The live light from the windows alternates with the diaphanous shade of the walls and together play upon the hair, the face and the hands of the work-

The Reels





TWISTING



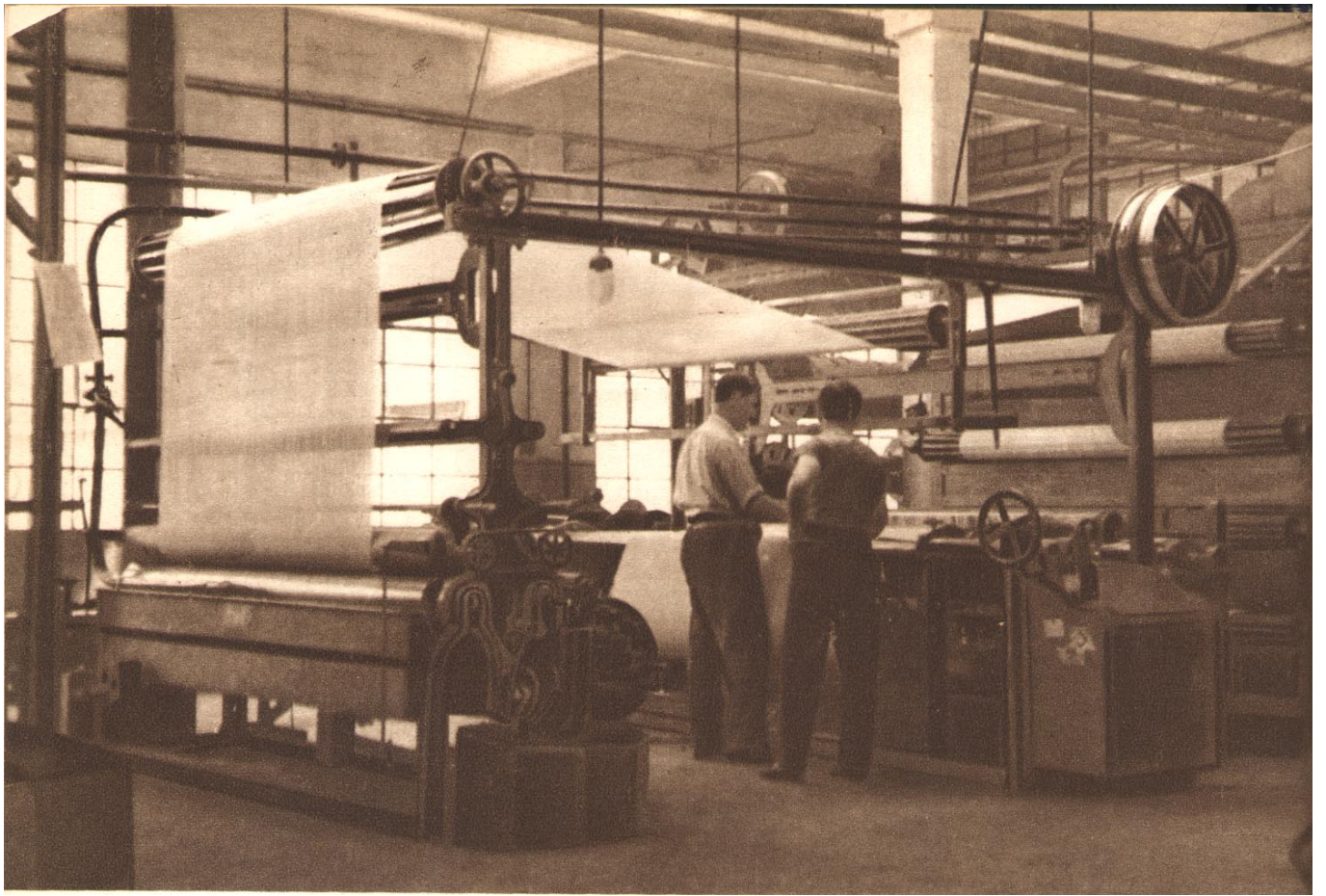
WARPING

ers, the majority of whom are young women, some pretty, with that delicate prettiness not infrequently seen in country girls and workgirls. One feels like saying — Sing! Sing away while arranging the healds, sing while holing the threads, sing, preparing in fancy the web of your days, with hope and love.

This may not be, however. Not so much because the discipline of the great industry forbids it as because the machines do not permit of it. The machines are jealous and the engines arrogant. From room to room, from floor to floor, from building to building, these glistening giants, prodigiously working, constitute a greatness alongside which man feels small and is silent. These women and girls, who would sing heartily enough rinsing the clothes in the trough of the fountain or stripping ears of Indian corn before the door of the house, relegate even speech behind their closed lips in order to prepare in all haste the meals that the metallic beasts will devour. Their roaring, heard through the open doors and windows, is like an impatient clamour. And the fingers dance nimbly and blithely among the healds.

Healding

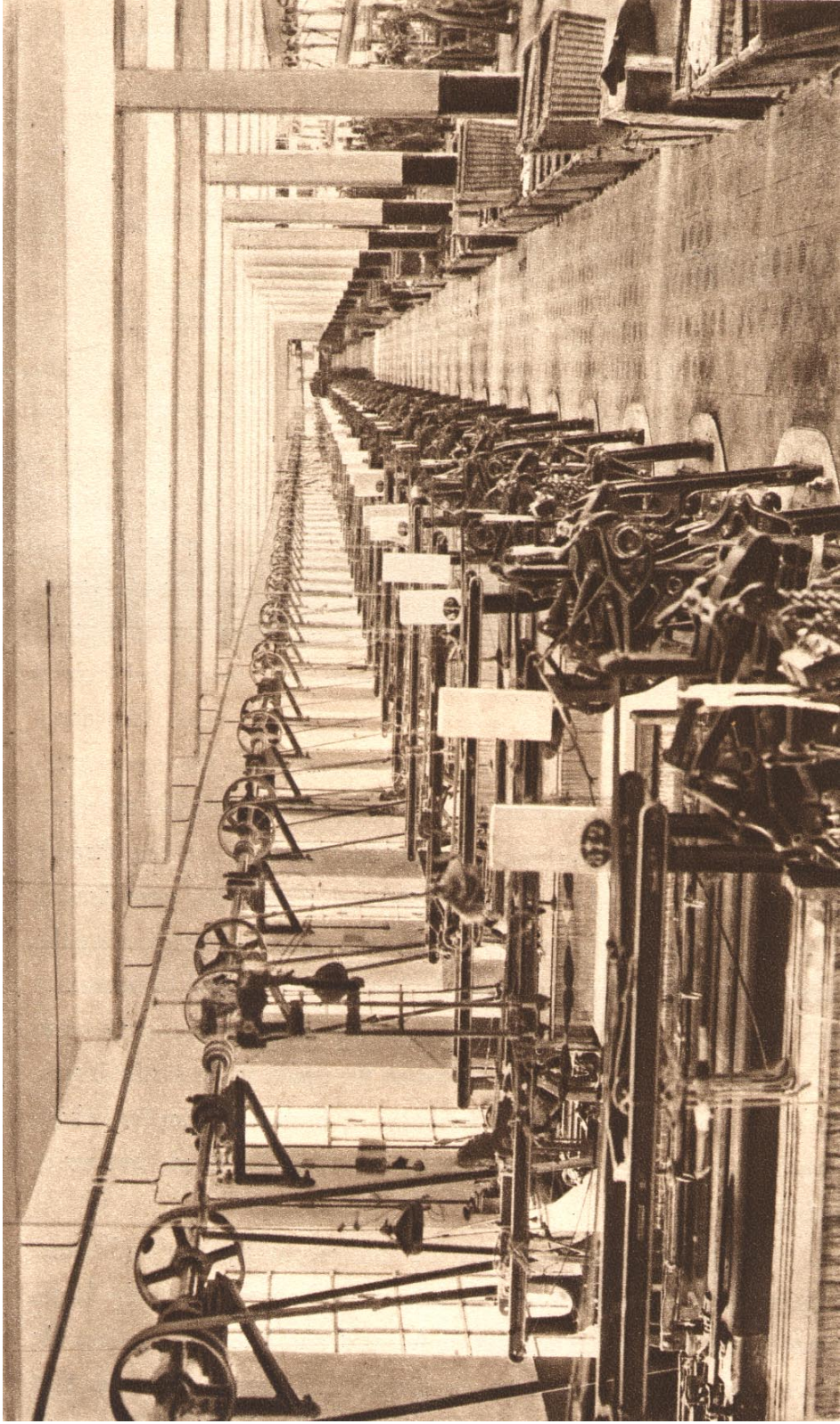




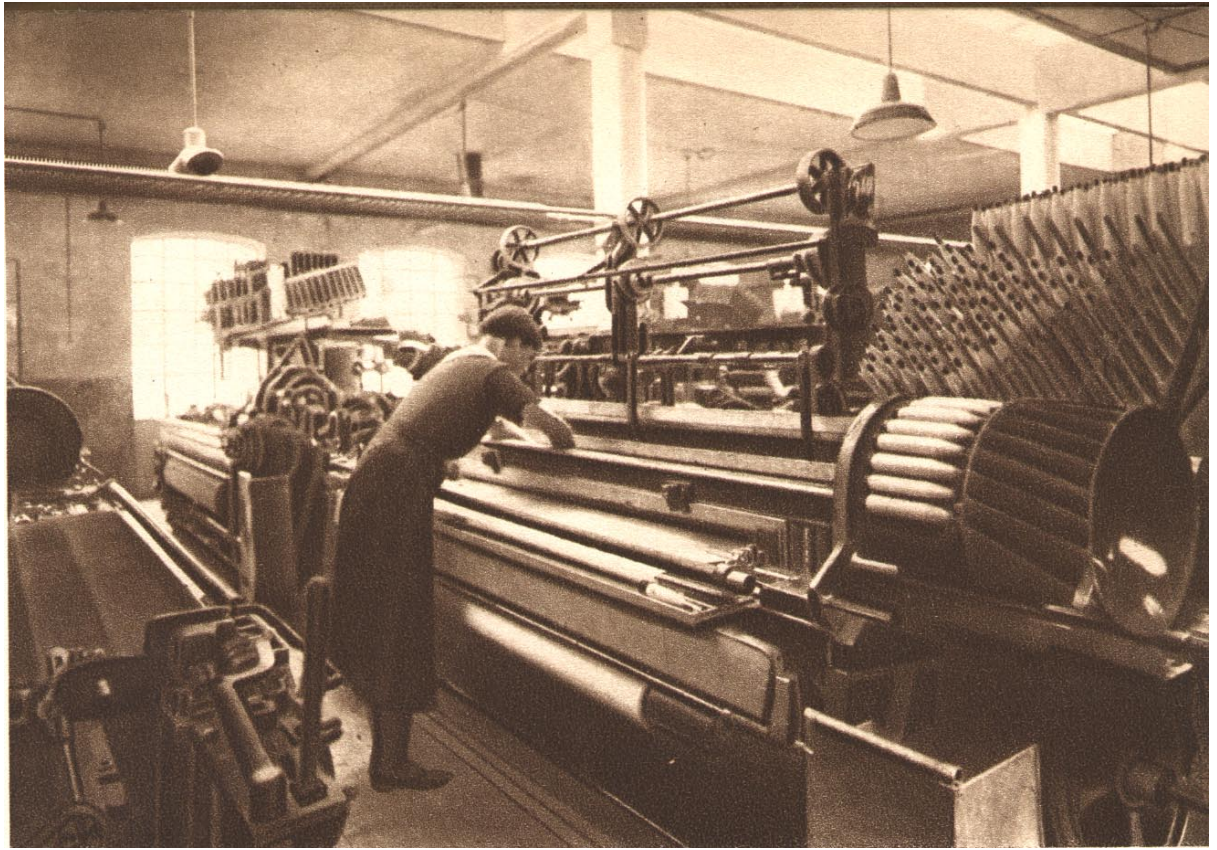
SIZING

WE are now in the realm of the third fundamental operation, the one which was born with the history of mankind — Weaving. The first men crossed raw fibres, like they had begun to cross stalks and flexible twigs the better to cover their bodies after the substitution of the arboreal cover for the shelter of the cave. Plaiting is among the first signs of invention. Weaving. Humanity, like the industrious woman who rose at dawn and began to work the loom, opened its eyes at the dawn of time and wove, naturally. The brain is the loom of thoughts. At first the threads were suspended from a horizontal board which was held up by two other boards, like doorposts, and to keep them taut weights were attached to the lower extremities. On this kind of soundless harp the women interwove the weft. Later, the warp was laid out on a horizontal plane and the threads were varyingly raised by the combs through which they were drawn. The weaver used his feet to move the combs apart before shooting the shuttle into the space thus created. The loom was good to humanity for centuries: good as the bread, always made in the same way, as the cart with its wheels that furrowed the roads of the earth; it was, in short, one of the essential formulas of human civilization which could, and can be, developed, complicated, and refined, but never subverted.

The power loom continues the species, multiplying and intensifying them. Once there was the woman or the man before the loom, seated with arms stretched out or forward and knees in motion. He rises, disappears, wafted away by magic. And here is the loom that works by itself in his place. And since man with the limited strength



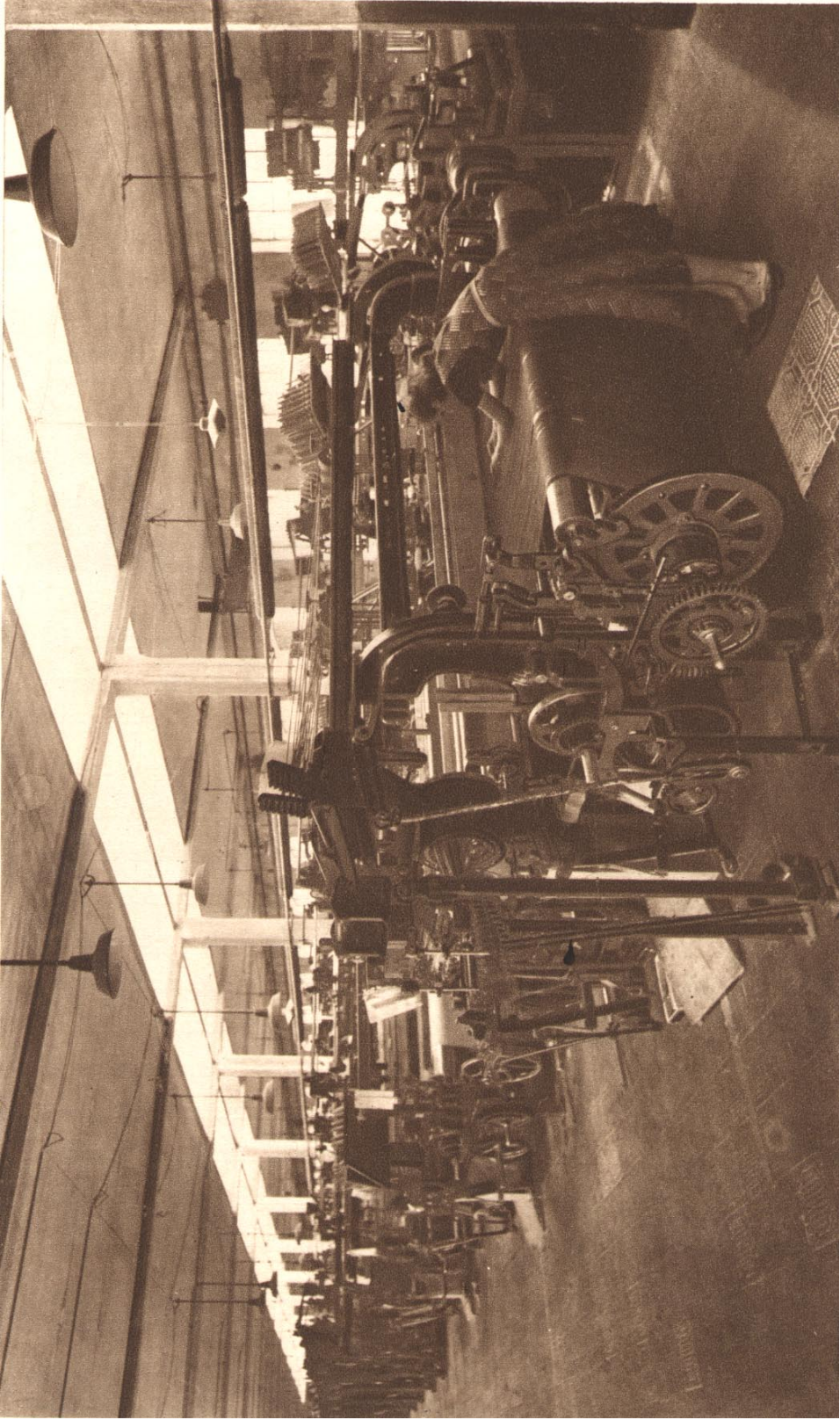
A WEAVING ROOM



An Automatic
Loom

of his muscles has disappeared, the loom has taken to racing at break-neck speed, to working frantically. The healds are displaced every instant, and the shuttle traverses the warp like an almost invisible lightning flash which the tired eye is unable to follow. The colossus is all members and joints that co-ordinate the work. High up, at the sides, there are contrivances that seem to keep an eye on the design and to know the moment when the blue or the green thread must take its place in the grey background. The concordance is regulated to perfection and the keyboard sets to work, doing its scales and colouring its gamuts. The shuttle, which seems to have no other wish but to fly incessantly within the measured space, shoots its endless thread, preceding in its course — always a fraction of an instant before — the contrivance that beats home the weft in the cloth. At one end the warp beam strips itself while at the other the cloth roll becomes bloated. And between the two ends there is a tumult of iron and steel, a kind of lucid delirium.

No, man has not disappeared for ever. He has returned, almost on tiptoes, to look on and to follow. He himself does not know whether he has been degraded or promoted. He no longer sits before the



AUTOMATIC LOOMS

loom, master and executor, with the vast instrument under the command of his arms and legs. He is there on his feet, moving quietly about on the watch for irregularities in speed and with an eye on the various contrivances to guard against breakages and stoppages. Just as mechanical genius has impressed a minute regularity on that whirlpool of work, so force of habit has given an almost languid calmness to that vigilance over the giddy impetus. Both keep time, the man and the machine; the machine that causes it to shower in fractions of seconds, the man that recomposes it in hours on the control sheets.

But the layman entering the immense room is immediately assailed by the din and submerged. He looks at the distant glimmer from the windows, at the lights along the walls and at the lamps whose rays impinge even by day on the labyrinth of machines as though to make sure of their inmost bearings. But the giants seem to rush upon him at a mad gallop. From way down there dark masses and cold gleams as of arms hurl themselves forward, overflow, would fill the earth with their clamour. For all the world like a deafening cascade.

The men are shadows. How many are there? It does not matter. The machines form a gigantic whole, the size of which dims the design, the shape and the face of the individual machine. The farthest away seem to be on the horizon, while the nearer machines seem to rear up with such impetus that their immobility becomes almost unnatural. The immediate effect is that of a raging mob, an army advancing to the attack, a force that cannot be held back in that closed space.

But they stand there enormous and docile. The visitor approaches them, looks, stops to observe the details, sees the soft and fragile wool playing safely in the midst of that powerful iron like a maiden in the arms of a giant she has subjugated; and the noise, which was like a blind wall, decomposes into a certain variety of tones; and the mass, which conveyed the feeling of an oppressive weight, reveals the delicateness of its works. The cascade no longer beats upon the ear like a mace that stuns. There are notes in this metallic uproar.

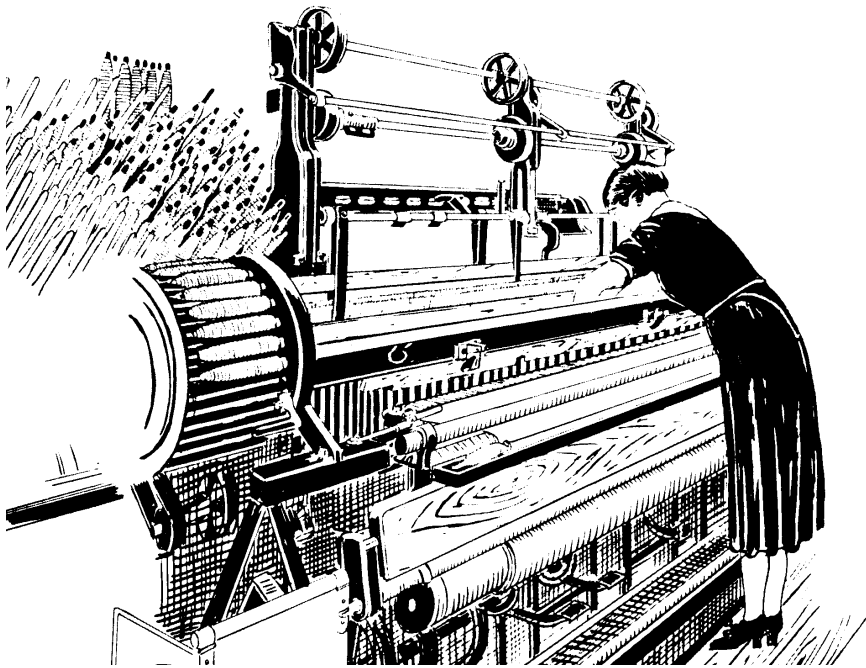
There is the throb of the engine, a dull noise of a dark colour; there is the peculiar rhythm of the weaving, a velocity punctuated with blows; above, as though sprayed into the air, are the hisses of frictional origin; and, like rockets, lacerating shrieks of steel parts worked to the utmost. An orchestra in a fundamental state of acoustic frenzy. And this machine, born of a lust for power and speed, this concrete idea of crushing tons, is, within the massiveness of its foundations and outlines, full of small delicate things that reflect creative genius in the highest degree. Man creates in the likeness of man. Here are members, organs, particles that live together in harmonious diversity, each element with its own function and, it might be said, with its own breath. Each controls an action and obeys an order. Services and orders interlace and spread. This part rotates precipitately, that one proceeds with calm solicitude; another moves slowly, dripping its motion, so to speak, on the giddy race that has to do so many yards an hour, so many pieces a day, so many loads of cloth a year. There are individuals in this crowd, independent groups in this formidable servitude; the gaze becomes enchanted when following certain subtleties, certain refinements of these distinctions marshalled together in such a rigorous unity.

A big machine makes one think of a Utopia of discipline realized in metal because it could not be embodied in a human community. Nobody is free and nobody is above another. A higher extraneous force commands. In the whole of the machine even the parts that determine the movement of other parts live in a state of obedience and make the life of the subordinate parts more easy and safe; no part lives without working and no part can exact from another an effort beyond its nature and power or burden other parts with the work due from it. And the machine goes while its electrical soul lasts.

The enormous room vibrates and reverberates. The fine threads on the bed of the looms disappears in the compactness of the cloth: here, also, union means strength and generates fundamental and primordial utility. The cloth takes shape in its designs and colours, va-

rying sometimes from machine to machine, each with its unequal destination. There is the cloth which will go to distant Asia, where the men still have a liking for female colours; that which will carry humble uniformity into rural districts with something of the uncombed and unshorn fleece about it; that which by reason of the fineness of the fabric and the delicateness of its design will satisfy the taste of the man-about-town attentive to the slight but authoritative changes in fashion; that for the soldier, of a hue fixed like the flag; that in a variety of lively and fresh shades, with greater fancy in design and even in relief, which will seek to ingratiate itself with the blonde or the brunette, the young or the older woman, in town, at the seaside, in automobile, on the sportsfield, in church or in the dance halls.

The noise of the vast room is a paeon in honour of the strongest material and the most powerful force harnessed by the genius of man to substitute the weaver's short wind, to satisfy the demands of multitudes grown beyond measure, to concentrate the work in great assemblies of steel, arms and brains. Under the hands of the invisible harnesser these gigantic horses in the four rooms one above the other fill the air with their mighty neighing.





Inspection and
Marking of the
Pieces

THE third basic operation is finished. The cloth is there, an eternal and elementary necessity like bread and the wheel. But it is in a rude state, as though damaged by the great battering it has received at birth; its compactness is too recent and seems to be still forced. It is a savage creature of which a civil creature has to be made; and from now on machines and men will divide in more equal measure the work to be done on it, the machines less vehement, the men more numerous. And the operations are legion, and though seemingly secondary are such that without being subjected to them even cloth of the best wool would resemble a beautiful woman who has left the house without first having prudently and dexterously spent some time at her dressing table. They are the finishing operations.

We re-enter into silence with a feeling of relief. The eye and the mind repose in this room without machines, where trestles and

tables shine with the constant rubbing from the materials; but the lustre of the wood is soft in the light and does not clang like that from the steel. The women examine the pieces, passing them slowly under their intent scrutiny, ready to point out any faults they discover. Their business is only to note the faults; the menders are farther on. The task of each is limited so that the work may proceed with greater speed and accuracy. Division of labour means multiplication of results.

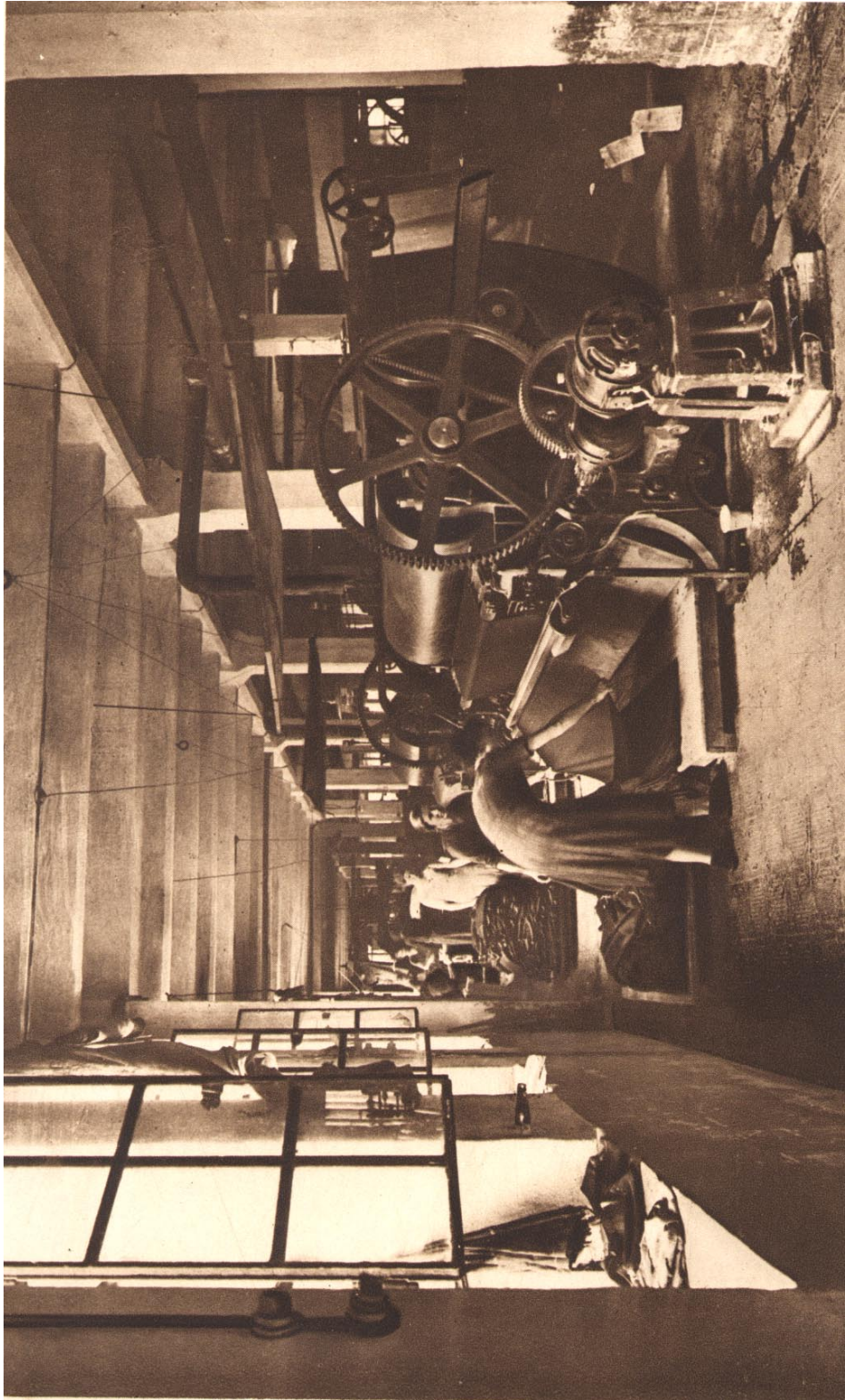
The examiners have a curious air of pedantic schoolteachers, holding their piece of chalk and intent on scoring the mistakes of the big machine or the mistakes which occurred through an oversight or fault during the previous preparations. The correctors, curved over their work, re-establish the rule and remove the faults. After other mechanical operations, hands of other nurses, in another room, take the young cloth and subject it to the operation known as tweezing. Seated at inclined benches, with tweezers or pincers in the right hand and a bunch of sorghum in the other, they search for the last impurities, taking out the motes and brushing them away. The right hand darts with precision, while the left moves as though driv-

Fulling

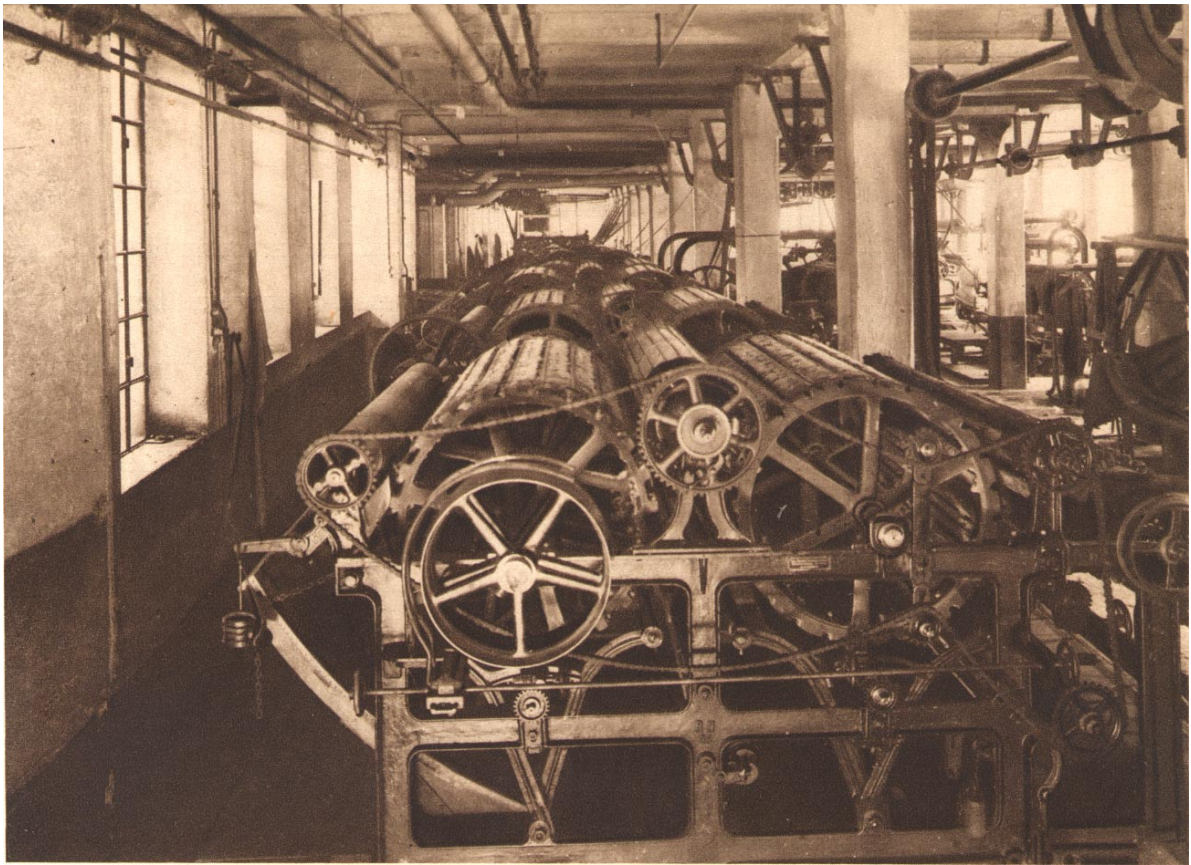




CARBONISING THE PIECES



IRONING



Teasing

ing away flies. Looking down the room the movements seem to be in unison, with that mechanical aspect which also human labour, disciplined and in common, assumes.

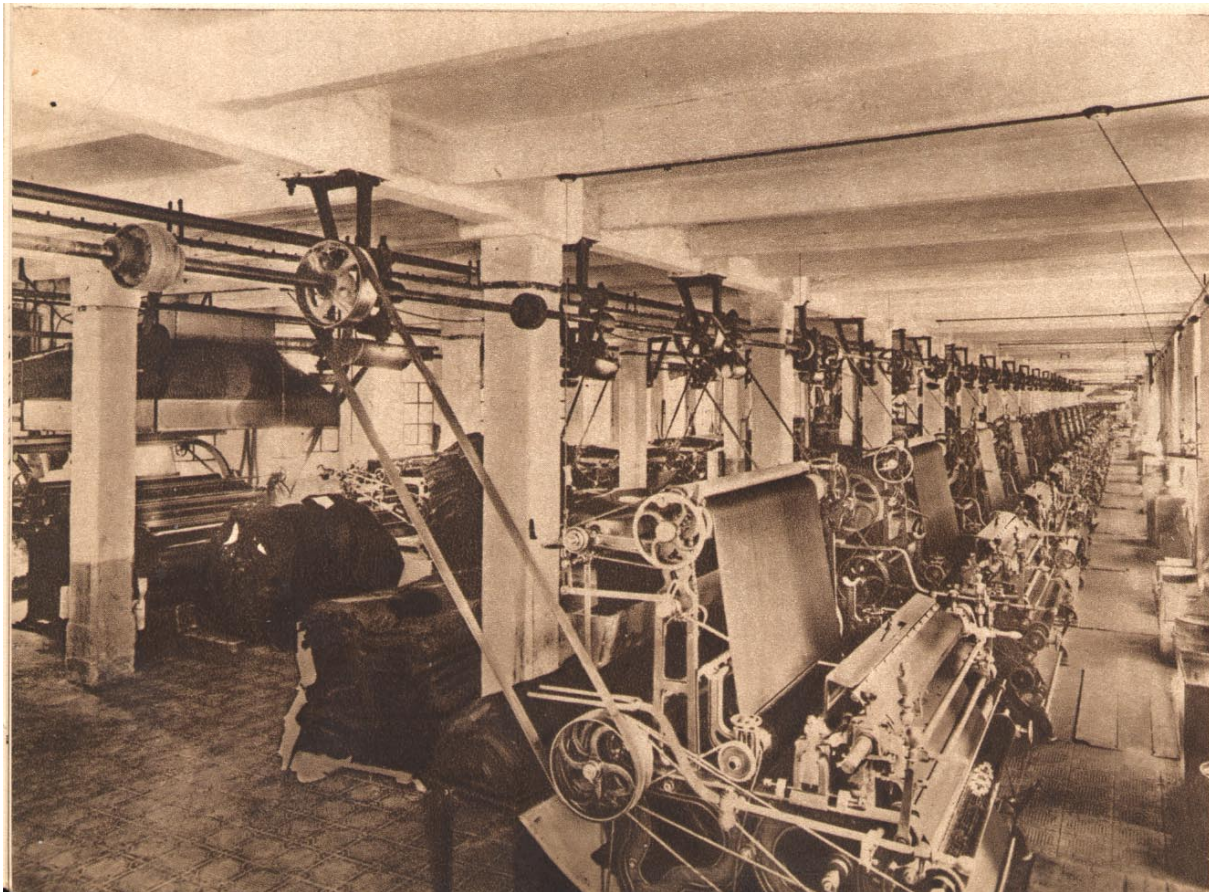
What infinite patience from the first cleansing of the wool to this varied purification of the cloth! Some qualities of it are placed in a machine that cleans them chemically. This operation, which is known as carbonising, consists in carefully burning only the vegetable corpuscles that still adhere to the material. And even after that the women return to the attack.

If description could ever replace reality, which alone can completely satisfy the desire for knowledge and hold the attention without effort, one might dwell at length on this long series of operations to which the cloth is subjected, now beaten and tormented, now caressed, ruffled and then smoothed down, put to wash again and then to dry, stretched, brushed, ironed, pressed...

Here are the fulling machines, so different from the Pompeian tubs with the legs of the fullers in the midst of the cloth and the

urine, and more complete than those in use a century ago, while still belonging to the more simple class of machines. The cloth is cleaned and felted, after which it will need to be damped and then dried. Its travail is not yet over, however. Here are the teasing machines for brushing up the nap, raising it. The machine replaces the hand of man in using the teasel, which for some time was metallic but has now become vegetable again. It is a hardy variety of thistle, which up to yesterday was imported from France but is now cultivated in Tuscany. The teasel raises the nap; the helicoidal blade of other machines — the cutters — clip it and level it to perfection (like the barber digs his fingers into his customer's hair to raise it, cutting underneath with the scissors). After which — this is the business of other machines — the cloth, duly damped, has to lose a certain unwanted gloss it has acquired and be tempered in order that later, too late, it may not suffer any considerable shrinkage (the tailor, before cutting it, will damp it again to guard against this risk); and it has to be accurately fixed in its width. It will be

Shearing





IRONING