
GLOSSARY.

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INTRODUCTION.

The object of this glossary is to furnish a brief description of the occupations peculiar to each industry considered. No attempt has been made to describe complete processes; parts of processes essential in the definition of occupations are sometimes given, but these are not always arranged consecutively from the first to the last manipulation of the material used, although such arrangement generally prevails. The problem was to place the employee in accurate connection with his duties—to describe what he does, rather than the part of the process he undertakes. What an employee does certainly constitutes a part of a process, but it has been thought unnecessary to describe the process of which this is a part.

The descriptions of the occupations were prepared by special agents of the Census Office after personal investigation and observation at factories in the several industries, supplemented by inquiry of manufacturers, foremen, and other skilled workmen, and by correspondence. The names of many of the occupations recorded in pay rolls are not found in either general or technical dictionaries; such new terms may be due to an increased subdivision of labor or to varying local usage. As far as possible, for each industry, the different names for the same occupation are placed together. It will be observed that the terms are not only given, either positively or by implication, in the body of the text, but are also all noted in the margin and referred to in the alphabetical list of all occupations in all industries (pages 1207 to 1228), thus placing the whole at the convenient service of the reader.

For brickyards, piano and rubber factories, and slaughtering establishments, statistics are presented, in the general tables, only for "all occupations" combined; consequently no description of the different occupations is necessary. The manufacture of collars and cuffs is similar to certain portions of the manufacture of clothing, and consists principally of cutting, sewing, and laundering. As the returns from collar and cuff factories are few, no separate descriptions have, therefore, been presented. The glossary does, however, contain an account of the occupations in silk mills, even though the returns are not included in the occupational comparison; the industry is represented in the establishment comparison and some occupational statistics are therefore exhibited.

In the glossary, as in the tables of wage statistics, each industry is treated as a unit. The industries and industry groups are presented in the same order here as in the general wage tables (pages 1 to 614). But within the industries the arrangement is designed to show as far as possible the sequence of processes in the factory. Within the groups of industries the same term is frequently found in several industries with practically no difference in significance; so to avoid repetition of descriptions, such occupations are fully described only in a representative industry which contains the largest number of occupations common to the group, and that industry is the only one for which descriptions of all the occupations reported are given. Whenever any occupation with the same name and entailing similar duties is found elsewhere in the group, a reference is made to the fuller description, the aim being to describe the same occupation but once.

In the preparation of this glossary it was found that in different parts of the country the same terms sometimes have different meanings, and also that for the same work different names were frequently reported; examples of these variations are mentioned in the general introduction¹ and others are given below. Many terms whose meaning did not readily appear were found to be purely local in their use, while others had spread over a large part of the country. Examples of the latter class are found in the printing industry, in which "objectionable men," "correct men," and "fat men" were reported from several sections of the country with the meanings as given in the glossary for "printing." There were other terms whose meaning was not so readily found; in one textile factory it was found that the dyers were called "Jericho hands" from the fact that the dyeing was done in a small detached building nicknamed "Jericho."

Not only were there variations within industries, but occasionally the same designation was applied to occupations in different industries, workmen in these occupations sometimes doing essentially the same or similar work (only the material treated being different in the several industries); sometimes the occupations were radically different. For example: Dryers were reported in textile mills, tanneries, and tobacco factories, their occupations being much the same. Machine hands, reported for nearly every industry investigated, have much in common throughout the industries; but the widest range of skill is covered, from that required simply to keep the hopper of an automatic machine filled to that required for the adjustment of delicate machine tools. Annealers were reported by glass factories, foundries, and iron and steel mills, the process always consisting in using heat so to rearrange the molecules of the substance as to give greater durability to the mass, but the material, temperature, and management in glass factories are different from those in metal-working establishments. Banders were reported by textile mills, and clothing, glass, cigar, and tobacco factories. In textile mills their work is to replace bands which transmit power to spindles, etc.; in clothing factories, to sew bands on trousers; in glass factories, to raise a band around the neck of a bottle; and in cigar and tobacco factories, to attach labels. Fillers were reported in breweries, car and railroad shops, foundries and metal-working establishments, furniture factories, lumber and planing mills, paper mills, and wagon and carriage factories. In the industries of the woodworking group, and also in car shops, the fillers paint the surface of wood with filling; in foundries they tend the blast furnaces; in breweries they fill kegs with liquor; in paper mills they handle half stock. Numerous other instances of such occupations might be cited, but those already mentioned suffice for illustration.

There has also been attempted the difficult task of classifying the occupations in each industry into three grades, to show, generally, the degree of skill required to perform the various operations. The grades are not postulated of the occupations in the whole list of mills included in the investigation, nor of the groups into which

¹ See page xxi.

these are divided (textile, metal-working, woodworking, etc.), but only of the individual industries (cotton mills, lumber and planing mills, bakeries, etc.). Taking the whole range of industries, from "carpet mills" to "tobacco," it would be practically impossible to determine whether a workman engaged in a certain process in one industry is equal or superior to a workman at another and entirely unlike process in a different industry. General grades have been indicated, however, which it is believed will aid somewhat in the comprehension of occupations and wages. This grading is largely arbitrary, and too much reliance must not be placed upon it in interpreting the statistics of wages in the tables of this report. Manufacturers themselves disagree as to the degree of skill required in the various occupations. In the textile industries some manufacturers call their operatives skilled, without grading as to classes, holding that skill, even if it can be acquired in a brief period, is, nevertheless, skill. Others maintain, on the contrary, that no operative is skilled, because a person ordinarily receptive can be taught the processes in a very short time. Doubtless, however, both these classes of manufacturers would designate as skilled the foremen of processes, of machines, and of sections of operatives.

In the classification as to skill for the glossary the following rules have been observed: Foremen and others exercising duties of a supervisory nature are always included among skilled employees of the first class; in this class have also been placed employees whose work requires at all times the exercise of a high degree of judgment; sometimes a class of all-around employees has been adjudged worthy of this distinction; and sometimes, likewise, a specialist, who, though he operates but one kind of high-grade machine, does important work with this to a high degree of perfection. In the second class are more ordinary employees, who, while possessing skill in either hand or machine work, exercise it in a lower, routine manner; they have a certain manual dexterity in work which is relatively easy, or else requires little judgment; they have attained their proficiency in common with a larger class of employees, if not with less time and less effort than those of the first class. Most machine workers are included in the second class, but this varies with the industry considered and no unvarying rule can be laid down. In the third grade are often found tenders of machines, loaders, carriers, and the like. The distinguishing characteristic of this class is the performance of duties requiring no experience or judgment, or at most not enough to entitle the employee to rating in the higher classes of skill.

In each of the industries described in this glossary there are supervisory employees variously known as superintendents, assistant superintendents, foremen or forewomen, assistant foremen, overseers, overlookers, bosses, headmen, chiefmen, master workmen, second hands, third hands, section hands, etc., whose occupation—that of supervision—is common to all industries. Therefore one definition is sufficient, and frequent repetition or frequent reference is avoided. General managers or general superintendents are not included in this report, being something more than employees working for wages or for an ordinary salary.

A superintendent may be defined generally as one who supervises the employees in at least one factory building; a foreman or forewoman, an overseer, or an overlooker, as one who supervises a department, a room, a series of machines, or more than one part of a process; a boss, section boss, headman, master workman, etc., as one who has charge of a portion of a room, one machine, or one part of a process. Assistants help in the various branches of this work, while engaging at times in the actual and continuous manipulation of the material; they generally act as chiefs in the absence of their superiors. In some instances spare overseers are retained on the rolls; these sometimes take the place of overseers, assistants, or other supervisors who are absent. The term overseer is most common in the textile industries; in others the usual usage is foreman.

In the glossary for the several industries only occupations essential or peculiar to the industry under discussion are described.

Masons, bricklayers, plumbers, etc., in all industries, and carpenters, machinists, blacksmiths, steam fitters, painters, millwrights, tinsmiths, etc., in many, are usually engaged, not in making the manufactured article, but in building or repairing factories, machinery, and tools, in adjusting the heating and lighting apparatus, etc. It is to be noted that the doing of this work by regular employees rather than by outside contractors is more customary now than formerly. Such occupations, together with others of a general or supervisory nature, are not described under the separate industries.

Such employees as carpenters, machinists, millwrights, brick-makers, masons, bricklayers, painters, steam fitters, pipe fitters, blacksmiths, belt-makers, electricians, batterymen, coopers, saw flers, and wagon-makers, whose occupations are not peculiar, and in some ways not essential, to the manufactures carried on, may be called general or auxiliary employees. A carpenter is essential to some of the work done in a modern planing mill as classified in this report, but he is not as a rule, if at all, essential to the manufacture of metal-working machinery. A painter in a carriage factory is engaged in a process essential to the manufacture of carriages, but a painter in a cotton mill is not essential in the making of cotton cloth. A machine shop would be wrongly named if it had no machinists, but woolen goods could be made without the aid of a machinist as an auxiliary employee constantly on the rolls of a woolen mill. In the statistical tables of the report these occupations are combined as "general occupations not peculiar" to the particular industry.

The description here given of auxiliary occupations should not be confounded with the descriptions, given in their proper places, of occupations essential or peculiar to a given industry, some of which have designations like those in the auxiliary list.

The repair or machine shop of a factory, especially of a textile mill, is an important department even when no machinery is made for sale. If the machinery of the mill is defective in any of its organic parts, a machinist is called from this repair shop to remedy the difficulty. In some cases the machinist also makes machines and parts of machines for the establishment; it is essential that he be fertile in resource. A millwright is after the same order; he builds and sets up machinery, and has perhaps a more thorough knowledge of the work as a whole than the machinist.

A carpenter is an artificer in wood who repairs, at all times and places, damage to woodwork by storm, accident, or the ordinary wear of time; patches a little here and there; and cuts a new door or window, or a belt hole in a floor or ceiling; he sometimes is employed in building new frame structures, large or small.

A brickmaker in a glass factory makes bricks of clay tempered with water, sand, etc., and burns them to a certain hardness, usually in a kiln. Of these bricks, glass furnaces are built by the mason and the bricklayer. Masons and bricklayers, when auxiliary in other industries, repair the brick and stone work of factory buildings, chimneys, etc., and sometimes build new brick buildings. A painter is often employed painting or renewing paint where necessary. A blacksmith generally sharpens tools and sometimes makes rough tools; he assists the machinist by doing much forging and other work. A steam or pipe fitter puts in, adjusts, and keeps in repair steam-heating pipes or steam pipes for other purposes. Belt-makers, as auxiliary employees, do not make belts from rough leather as in leather factories, but only cut them to the length needed for the machines and put them together; sometimes they are called apron-makers, and the material used may be other than leather. Saw flers are very necessary to keep saws sharp, and have much knack in their work. Wagon-makers build or repair wagons for the use of the employing establishment, not for sale. Coopers make barrels and kegs in which goods are shipped.

Auxiliary employees whose duties might be considered more essential include electricians, who care for dynamos and other electrical apparatus used for either motive power or lighting; batterymen, who keep electric batteries in order; engineers, who tend steam engines; firemen, who maintain fire under the boilers; and

gasmen, who have charge of the generators of gas for illuminating or other purposes. Ice-machine men are sometimes found; these operate the ice-making plant that furnishes the ice needed for cooling material in the process of manufacture, or for use in drinking water, or both.

Helpers, general hands, laborers, carriers, and errand boys abound in all industries, with some apprentices. The apprenticeship system, however, seems not to be in great vogue in American factories, learners being more commonly reported. But in tabulating, no distinction was made between these two, and in all industries where separate presentation is warranted by the numbers, they are shown as apprentices. In some instances helpers have more skill than laborers; in potteries, for example, they are really learners of the trade, and are often quite proficient. A general hand often does a variety of work, some of it approaching the border line of skill, and in some cases he may be said to be an employee above the grade of a common laborer. Roustabouts are unskilled laborers who are employed for heavy work, such as moving cases, etc. The term originally signified a deck hand on a Mississippi river steamer, but is now applied to any such workers. Lumpers also are unskilled manual laborers. Carriers are generally boys and girls who carry materials from one department or room to another, and are often promoted to the vocations of those for whom they have carried.

Packers, craters, labelers, stencilers, shippers, and shipping clerks are also auxiliary employees having occupations common to many industries. The character of the occupations, which concern the distribution of the product, not its manufacture, is sufficiently shown by their designations.

Employees who have essential or peculiar occupations common to two or more industries include assemblers, banders, beamers, blacksmiths, boiler-makers, brass finishers, brickmakers, cabinet-makers, carders, carpenters, carvers, cheroot rollers, core-makers, decorators, drillers, fillers, fitters, forgemen, furnacemen, hammermen, heaters, latho hands, loom fixers, machinists, metal-machine hands, metal-machine workers, millers, molders, painters, pattern-makers, picker hands, planers, punch hands, reelers, riveters, sanders, sawyers, shearmen, slitters, slotters, spinners, stainers, stemmers, tool-makers, trimmers, warpers, weavers, wheel-makers, wheelwrights, and wood-machine hands.

TEXTILE INDUSTRIES.

Under "textiles" are grouped carpet, cotton, knitting, silk, and woolen mills, and establishments for dyeing and finishing textiles. In four of these industries—carpet, cotton, silk, and woolen mills—many of the occupations are alike. In each are carders, picker hands, reelers, beamers, warpers, spinners, loom fixers, and weavers. In some knitting mills which make their own yarns there are also carders and spinners; and in dyeing and finishing mills there are sometimes reelers and beamers of warps, but otherwise the occupations in knitting mills, and dyeing and finishing establishments are dissimilar from those in the other mills of the group.

The most skilled employees are the foremen, second and third hands, section hands, fancy weavers, mule spinners, warpers, slasher tenders, those whose work it is to repair and adjust—as loom fixers, card grinders, spinning-frame fixers—and a few others. Most of the other operations require but little skill, as the machinery has been perfected to a high degree.

In the second class are found workers who have experience and dexterity—for example, in tying knots or twisting ends together; to this class belong frame spinners, plain weavers, and in fact nearly all those who tend machines. They watch their machines, keep them supplied with material, and if the machine does unsatisfactory work, notify one of those whose duty it is to remedy such difficulties. Others who acquire a high degree of dexterity by working with their hands should also be placed in this class.

To the third class belong those who do manual labor and, in general, work which requires neither skill nor experience.

CARPET MILLS.

The grades of skill in carpet mills correspond generally to those in cotton, silk, and woolen mills. Of special weavers those weaving art squares and Brussels, Wilton, and plush or pile carpets, are in the first class. In this class are also some card cutters, warpers, and sewers.

Supervisory and mechanical occupations, general helpers, and errand and carrier boys are similar to those described below under "cotton mills."

There are few occupations in carpet mills that are not found among those in cotton, woolen, and silk mills, and establishments for dyeing and finishing textiles.

Weavers.
Dyehouse hands.
Finishers.

The tender of the machine in which the wool fibers are torn apart and the dust and dirt removed is known as a willower, but the term is synonymous with picker hand.

Willowers.
Picker hands.

Among winders there are single winders, who wind single yarns; double winders, who double a thread of one color; moresque winders, who twist two or more colored yarns, so that when the carpet filling is cut the pattern will be variegated; jute winders, linen winders, and linen cop winders, who are named for the kind of material they use. A bit winder winds the fragments or bits remaining on spools or cops which have been doffed. There is also an operative who redoubles yarn, winding three or more threads together for certain kinds of warp.

Winders.
Single winders.
Double winders.
Moresque winders.
Jute winders.
Linen winders.
Linen cop winders.
Bit winders.
Redoublers.

In the making of chenille carpets or rugs the procedure is somewhat different. The chenille cloth is woven on a plain loom according to the pattern, and then cut up lengthwise on a machine cutter by an operative called a cutter. These chenille strips are placed in a large machine steamer fitted with steam and hot-air pipes, so that the fibers shall be fuzzed up. They are then used in the loom as filling, taking the place of yarn.

Cutters.
Steamers.

Fringe is sewed onto rugs after they are woven, and, when attached by power, the fringe is knotted and cut at the same time.

Sewers.
Fringe knotters.

Weavers of art squares are of a relatively high degree of skill. Plush weavers also have greater skill than the ordinary weaver.

Art-square weavers.
Plush weavers.

In making Brussels and Wilton or pile carpets the weft threads are raised in the weaving by wires, which are sharpened by wire sharpeners. For Wilton carpets the wires have a knife attached to cut the raised pile, but for Brussels, plain wires are used.

Wire sharpeners.

Carpet with a pile, and some kinds of rugs, have to be sheared when finished. They are also steamed in order to soften the surface and separate the fibers. Then the carpets are wound by machine into rolls and made ready for shipment to market.

Shearers.
Rollers.

COTTON MILLS.

In cotton mills, as in all other textile mills, there are men of skill and experience who superintend or oversee the work in the various buildings and in the rooms and yards. These are known variously as superintendents, foremen, overseers, bosses, and yard bosses. Spare overseers are sometimes kept to fill vacancies created by sickness or other causes.

There are also first assistants to these supervisory employees, known as assistant superintendents, assistant foremen, and assistant overseers. Assistants in charge of rooms are known as second hands; and there are also groups of third assistants, known as third assistant foremen.

The division of superintendence is carried down to the sections of rooms, so that all sections have their supervisors, known variously as section bosses, section hands, section girls, and third

hands, some of whom, while exercising duties of a supervisory character, occasionally also work at the frame or loom.

In all mills there are employed a number of boys or girls who do a variety of errands about the various departments. Alley boys and alley girls sweep out and keep clean the spaces or alleys between the machines; bundle boys carry all kinds of bundles, yarn or other, from department to department; filling and roving carriers bring supplies of yarn or roving for the different machines.

Alley boys.
Alley girls.
Filling carriers.
Roving carriers.
Filling hands.
Roving hands.

There are also belt-makers, blacksmiths, carpenters, machinists, masons, painters, steam fitters, and other mechanics who construct or repair buildings or machinery. Where there are electric plants or electric looms, electricians, and battery-men are employed. Roll covers or rollers are employed to cover the rolls of the drawing, roving, and spinning frames.

Roll covers.
Rollers.

In every department there are helpers and laborers who do all kinds of heavy carrying and cleaning up.

In general, some of the principal classes of operatives may be graded as to skill somewhat as follows: In the first grade are foremen, overseers, second and third hands, section hands, loom fixers, mule spinners, warpers, beamers, sample and fancy weavers, and smash piecers; in the second are lapmen, slubbers, frame tenders, frame spinners, spoolers, twist-in, harness menders, and weavers of common cloth; in the third, picker hands, chain splitters, beam fixers, and handers-in.

The bales of cotton are opened by persons called bale openers. After the cotton from many bales has been thoroughly mixed it is thrown into the hopper of a picker. This is a machine that opens or shakes up the cotton, picking the tussocks of fibers to pieces and reducing the cotton to a light, open mass of soft, even consistency. Those who tend these machines are generally called picker hands or cotton shakers.

Bale openers.
Picker hands.
Cotton shakers.

The cotton which has passed through a picker is delivered in the form of a lap—a sheet of cotton of a thickness as uniform as possible, pressed into shape by rollers; the lap is wound on an iron rod. Operatives who handle this lap are called lapper tenders; often they also brush the cards, but sometimes there is an operative, known as a card brusher, who does nothing but brushing. Usually cotton is passed

Lapper tenders.
Lap hands.
Lapmen.
Lappers.
Card brushers.
First-breaker hands.
Second-breaker hands.
Finisher pickers.

through two or three pickers, called first and second breaker pickers and finisher pickers. The hands who tend these are known as first and second breaker hands and finisher pickers.

The picker lap is carried to the card room by card boys. Here it is placed in position behind a card, and its end introduced between the feed rollers, which draw it slowly in. The men who feed and watch these machines are called carders or card hands, and sometimes card doublers, from the doubling of the card product by the machine. The card separates the cotton fibers one from another and removes whatever foreign matter remains after picking.

Card boys.
Carders.
Card hands.
Card doublers.
Waste hands.
Wastemen.
Card clothiers.

This refuse is taken away by waste hands, and is afterwards removed from the yard by wastemen. The wiring or clothing of the cards is done by card clothiers.

Incidental to carding are card stripping and card grinding. After a cotton card has been operated for three or four hours, its teeth become choked with firmly packed cotton. This is removed by a small stripping cylinder, from which it is taken by hand cards. This process is called card stripping and is done by operatives called card

Strippers.
Card strippers.
Card grinders.

strippers. Card grinding is the process of sharpening card teeth, and is done by skilled men. The card grinders and strippers are responsible for the proper running of the cards.

Cotton intended for very fine yarns is combed—a machine process by which a steel comb is drawn through the fibers in order to remove the shorter ones. To prepare it for a combing machine, the sliver from several cards is led together and formed into a lap by a lap-head or ribbon-lap machine.

Combers.
Comb tenders.
Lap-head hands.
Ribbon-lap hands.
Lap winders.

In some sections of the country the only persons to whom the terms carder and comber are applied are the overseers of the respective operations.

The cotton is next doubled, drawn, and spun, these operations being stages of the process of converting sliver into yarn. Doubling is accomplished by leading together two or more slivers so as to form a single sliver—or roving—as sliver is called after the first twist is put into it.

Doublers.

Drawing is the reduction of the single strand formed by doubling to the size of one of the strands which went to form it, or to a smaller size. The cans containing card sliver are carried to the rear of the drawing frames, which are operated by drawing-frame tenders or hands. These machines are automatic, taking care of themselves until the drawn sliver has to be removed, or undrawn supplied, or a broken sliver pieced together.

Drawing-frame tenders.
Drawers.

Railway-head tenders.
Intermediate tenders.
Fine fly-frame tenders.

Speeders.
Fly-frame hands.
Intermediate speeders.

Speeder tenders.
Fly-frame tenders.
Fine speeders.

Cotton is usually passed through three drawing frames, of which one may be a railway head—a special form; the others may be either fly frames or speeders, the difference being only in the mechanism by which their bobbins and spindles are turned.

Slubbers.
Slubber tenders.
Rovers.

Roving-frame tenders.
Roving speeders.
Jacks.

Jack-frame tenders.
Jack tenders.

One of these frames is called a slubber, one a speeder, one a fly frame, and another for finer work, a jack. The slubber puts the first twist into sliver, which then becomes roving; the operatives in this process are sometimes called rovers.

Roving is converted into yarn by spinning. This operation is the final one of the series, and—like those immediately preceding it—doubles, draws, and twists the yarn in order to give still greater firmness and tensile strength. Cotton yarn is usually spun either on a ring frame or on a mule. The frames are kept supplied with material and bobbins, and their product removed by roving carriers and bobbin boys—sometimes called rail setters or rail fillers, from the rail or bar on which the bobbins are placed.

Spinners.
Ring spinners.
Frame spinners.
Mule spinners.
Roving carriers.
Bobbin boys.
Rail setters.
Rail fillers.
Yarn pourers.

A hand who supplies the different frames with yarn, carrying it from one department to another, is known as a yarn pourer, from the pouring of the material into the receptacles.

During a large part of the time the frame spinners and also the tenders of speeders and fly frames have only to watch the running of their frames, to piece up ends when they break, and to call for assistance when the frame fails to do its work properly.

A mule spinner has a boy—a piecer and doffer—who helps him to piece up broken ends, and also doffs or removes the cops when they are filled. The creel of a mule is kept supplied with roving by a back boy. As the bands which transmit power to the spindles and bobbins wear out, they are replaced by band boys or banders. Doffers are boys or girls who remove spindles, etc., from the backs of the various frames.

Piecers and doffers.
Back boys.
Back tenders.
Band boys.
Banders.
Doffers.

Two or more strands of yarn are often twisted together to form a yarn of more than a single ply. When this is done it becomes a more specific process, called doubling and twisting, and is done on a frame like a spinning frame without drawing rollers. In the manufacture of cotton yarn, from six to ten, or more, of these doubling, drawing, and twisting operations are gone through, in order that the yarn may attain the requisite tensile strength.

Doublers and twisters.

The yarn is then wound on bobbins by operatives called bobbin winders; into cones, by cone winders; upon quills, by quillers; or upon spools, by spoolers. In general these employees are all winders.

Whenever yarn is found to have been tangled in the process of manufacture it is untangled by unskilled spare hands, generally boys, called yarn untanglers.

The yarn made by the process described above is called warp or filling according as it is to form the longitudinal threads or the transverse threads of cloth.

The process of warp preparation for undyed or gray warp differs from that used when warp is to be dyed. In the gray process, as the bobbins of yarn come from the spinning frame, they are mounted on a spooler—a frame for winding yarn from bobbins onto large spools on which the warp yarn can be handled more easily. The spools are carried wherever needed by spool boys.

When bleached or white warp yarn is thus spooled, the work is done by operatives called white spoolers. The warp spools are mounted upon the creel or rack of a warping machine for the purpose of winding the yarn upon a warp beam (an exaggerated spool). This is done by warpers. Several of these warp beams are mounted behind a sizing machine, dresser, or slasher, through which the yarn from them all is drawn, and after emerging it is wound upon a single loom beam, forming the warp for an entire piece of cloth. In its passage through the sizing machine, or slasher, the warp is drawn through a size composed of water and flour, starch, or some such material. Operatives who make this size are called size-makers.

In preparing the warp for dyeing, it is first spooled, and then wound on a reel into skeins; sometimes it is reeled by hand, or the spools are mounted on a machine called a ball warper and the yarn drawn off in the form of a thick rope, which is wound into a ball. The warp is kept in proper form by passing a bit of string or tape between the divisions; this is done by tapers or lease pickers, who are hand operatives. A further step is sometimes taken by making the rope of yarn into a chain by employees called chainers.

The warp itself, however, dyed or undyed, and whether arranged in chain form or not, is also frequently known as a chain, and those making it are called chainers.

The occupations involved in dyeing are described under "dyeing and finishing textiles." (See page 1171.)

A chain after being dyed is wound on a warp beam; this process is called beaming, and in doing this the warp is split by operatives known as splitters, who are frequently hand operatives.

The warp beams filled with dyed warp are mounted behind a slasher, and from this point go through the same processes as gray warp.

When warp has been dyed in the form of skeins, it is sometimes placed on a ball warper and made into a short chain, sized in bulk and not beamed or passed through a slasher. It is placed on the loom beam by a process called hand dressing, which, being expensive, is used only on fine work.

For weaving, the warp beams are carried to the looms by beam carriers who also take away the cloth beams after the cloth is woven. Preparatory to weaving is the adjusting of the warp to the loom harness; this is done by warp drawers, web drawers, drawers-in, or tiers-in, who, with a small hooked instrument, pick up each warp thread in its order and draw it through its proper loop in the loom harness. On every loom there are two or more

of these harnesses; they are kept in repair by harness menders or fixers, and brushed frequently by harness brushers or harness boys. On some work each thread of the warp is picked up and handed to the drawer-in by a handler-in or reacher. New warp can be adjusted to the old by twisting new thread onto the old ones. Operatives who do this are called twisters-in.

The preliminary adjusting of the harness in the loom is done by a loom fixer, or, as he is sometimes called, because he builds the warp or chain into the loom, a chain builder. If the loom weaves properly, he turns it over to the weaver.

The pattern for the goods is made by designers, or pattern-makers. The patterns are first woven into samples, and these are pasted on cards and put up for distribution to the trade by employees called putters-up-of-samples.

The duties of a weaver and the degree of skill required in weaving vary with the kind of cloth being woven. On plain cotton cloth, such as sheetings and drills, in some mills, a weaver will care for as many as eight looms or a larger number of automatic looms. The weaver of designs or patterns must be more expert than the weaver of the ordinary run of cotton cloth, as it is important that the designs, which are used as samples of the goods made or to be made, should display good workmanship.

When a thread breaks, the weaver finds the broken end and pieces it up; if the filling has run out he changes the shuttle for one containing a full bobbin, at the same time replacing a full bobbin in the shuttle which has been removed. The filling and yarn are brought to the winder by boys called filling carriers and yarn carriers. Sometimes a shuttle will go astray and break a number of threads of warp; in such cases the piecing is done by a smash piecer.

A spare weaver, or spare hand, in any department of a mill is one who can operate a machine and who, while waiting for a permanent position and assignment to a loom, spinning frame, or other machine, takes the place of any operative who may not be present.

After leaving the loom the various weaves of cloth are carefully inspected by inspectors. Persons who cut loose ends from the cloth are called trimmers.

The finishing of cotton cloth, although carried on in many mills in connection with spinning of yarn and weaving of cloth, belongs to a distinct and separate industry, and is considered below under "dyeing and finishing textiles," where the packing and shipping processes also are described.

DYEING AND FINISHING TEXTILES.

The skill of operatives in dyeing and finishing mills may be generally graded as follows: In the first grade are superintendents, foremen, overseers, and second hands of all kinds, chemists, sketch-makers, engravers, pantograph setters, polishers, color mixers, and printers; in the second are pantographers, dyers generally, steamers, strainers, singers, soap makers or mixers, chemie mangers, calender hands, pilers, pressmen, layers-out, stencilers, and kier and vat folders; in the third are padding-machine men, winders, whiting-can men, patch dyers, squeezers, steerers, stitchers, beamers, remnant girls, check pullers, and box tenders. For occupations in superintendence, see "cotton mills," page 1169.

The occupations connected with the repairing of buildings and machinery and with the heating and lighting of the mills are

Harness fixers.
Harness brushers.
Harness boys.
Handlers-in.
Reachers.
Twisters-in.

Loom fixers.
Chain builders.

Designers.
Pattern-makers.
Putters-up-of-samples.

Weavers.
Cloth weavers.
Weavers of designs.
Weavers of patterns.

Yarn carriers.
Smash piecers.

Spare weavers.
Spare hands.

Inspectors.
Trimmers.

Folders.
Nappers.
Packers.
Shippers.

Bobbin winders.
Cone winders.
Quillers.
Spoolers.
Winders.

Yarn untanglers.

Spool boys.
White spoolers.
Creelers.
Warpers.
Dresser tenders.
Slasher tenders.
Slashermen.
Sizomen.
Size-makers.

Reel hands.
Reelers.
Skelners.
Hand reelers.
Ball warpers.
Ballers.
Tapers.
Lease pickers.
Chainers.

Dyers.
Dyehouse hands.

Beamers.
Splitters.
Chain splitters.
Warp splitters.
Machine splitters.
Hand splitters.
Hand dressers.

Beam carriers.
Warp drawers.
Web drawers.
Drawers-in.
Tiers-in.
Harness menders.

the same as in cotton mills. Laborers and helpers are under names slightly different. A layer-out is one who lays out the goods according to kind as they come from the different manufacturers, marking on them the kinds of processes to which they are to be subjected. Occasionally occupations pertaining more strictly to other branches of textile industry are found to be reported by dyeing and finishing mills, such as beamers, bobbin hands, etc. These are described under "cotton mills." (See page 1169.)

The dyeing and finishing of textiles depends so largely upon the science of chemistry that a well-equipped laboratory, wherein experimental dyeing may be done and a careful analysis of dyestuffs may be made before they are prepared or mixed for the dye bath, is a necessity. The person in charge is the chemist, and he has under him mixers, color mixers, and strainers.

The occupations involved in the scouring or washing, bleaching, and dyeing of yarns are described first; those involved in similar operations applied to the cloth itself, next; and finally, those belonging to cloth printing and finishing.

Cotton, woolen, and silk yarns, as well as woven fabrics, are scoured or washed and bleached and dyed in mills for dyeing and finishing textiles. Dye-house hands is a general term covering a number of occupations in the dyeing process.

A back washer is one who washes out of worsted slubbing the oil put in it before the carding; this is always done to tops intended for the French system of drawing.

A bleacher is an operative who tends the vat, or kettle, in which the yarns or other goods are saturated with bleaching preparation. He is also known as a kettle hand or kettler, either hand or machine, as the case may be. A hand who keeps skeins saturated is known as a saturator.

Yarn is dyed in vats or tubs in which the dye mixture has been placed, the operative who tends or superintends the vats being called a yarn dyer. The men who agitate the poles from which the yarn depends are called dye hands; this agitation is sometimes done by machinery.

There are varieties of dyers known from the form or kind of material they dye, as warp dyer, cloth or piece dyer, woolen dyer, plush dyer, silk dyer; from the color of the dye, as blue dyer, black dyer, and sometimes, where a variety of colors are dyed by one man, color dyer; from the kind of dye used, as madder dyer; from the method employed, as machine dyer, indigo machine dyer, machine fast-black dyer, web fast-black dyer, patch dyer. A patch dyer is one who dyes cloth in patches or spots left permanently receptive by chemical preparation.

The superfluous dye acid is removed from the yarn by the operators of the washing machinery or by men who tend tubs in which the skeins are given a lateral shower bath. The water is removed in a large metallic drum, which revolves rapidly and is fed and watched by extractors or whizzer hands, who get their name from the name of the machine, extractor, or whizzer.

A yarn poler is one who hangs yarn on poles after dyeing. A liquorman is one whose duty it is to see that the different dyestuff liquors are kept replenished. A tub washer is one who washes dye tubs or vats.

The process of scouring worsted yarn does not differ in principle from that used with cotton yarn. The hanks are linked together in a chain by means of small knotted and twisted loops of cord made by operatives called knotters. This chain passes through the bath and between squeezing rollers covered with some soft, durable material.

When ready to be sent away by the dyers the yarns are tied up into hanks by a bundler.

Silk yarn, after it is dyed and dried, is placed in a stretching or glossing machine by a stretcher. Cotton cloth when it comes from the looms has on its face a nap, or fuzz, which must be removed before the finishing can be done; so the pieces of cloth when first received by the finishing department are sewed end to end by stitchers or sewers to form a continuous band. It is then passed by preparers in the open width over the rollers and against a brush in order to raise the loose fibers. These are singed off by passing rapidly over a red-hot iron plate, or over gas flames.

Operatives who do this work are called operators of singeing machines, singers, or gassers. Generally the method of singeing by the gas-singeing machine is preferred, particularly in the case of light thin cloth.

After singeing, the cloth is taken to the bleach house for the purpose of removing the impurities from the fiber, softening the goods, and, finally, by a process of oxidation, bleaching the gray to a pure white. The rope of cloth is drawn into kiers (or keirs)—large cylinders of iron—tightly packed by being trampled under foot by kier hands, and then boiled. If boiled in soap (a process used as a rule only after printing) the kier hand is called an open soaper. The operators engaged in this process are called bleaching-machine operators. Vat folders are men who attend to loading the cloth into the vats, to be treated by any of the wet processes.

In passing from one machine to another the cloth is steered or guided by employees called steerers, who also assist the vat folders or kier hands. Gray boys pull the white or undyed cloth from machines, and lift bunches of cloth.

In order to bleach the goods still further the cloth is passed through a special washing machine by operatives known as chemic manglers.

The last step in this bleaching process is a final, thorough washing, after which the water is squeezed out between the two large rollers of a squeezer. After being opened to full width by tenterers on tentering machines or frames, the cloth is dried by passing it, tightly drawn, over and under a series of metallic cylinders or cans, operated by operators of drying machines or can dryers. A canman or whiting-can man is one who steams cans for the drying of the cloth.

In the mercerizing process for the production of cotton fabrics with a silk-like finish, workmen known as operators of caustic machines are employed.

A cloth scourer is one who scours woolen cloth, a fuller tends a machine which is designed to shrink the cloth, and a crabber is one who operates a crabbing machine for extracting the grease from worsted cloth.

Operatives engaged in the various processes of finishing are often designated by the general term finishers. The occupations of employees engaged in the finishing of woolen goods, however, differ from those of employees engaged in cotton finishing, the processes being different. Among the woolen finishers may be mentioned the gigger or jigger, who operates a giggering or teasing machine, used to roughen the surface of the cloth and give it a pile. When this operation is done in a machine having wire points instead of natural teasels the operative is called a napper.

A polisher or steamer attends a machine which winds woolen cloth upon a cylinder for the purpose of producing a luster. In the dry finishing of woolens the dust is removed and all the nap fibers laid in one direction by a brushing machine tended by a brusher. The cloth is then sheared in a shearing machine operated by shearers or machine cutters.

Layers-out.
Beamers.
Bobbin hands.

Chemists.
Mixers.
Color mixers.
Strainers.

Dyehouse hands.

Back washers.

Bleachers.
Yarn bleachers.
Kettle hands.
Hand kettlers.
Machine kettlers.
Saturators.

Yarn dyers.
Dye hands.

Dyers.
Warp dyers.
Cloth dyers.
Piece dyers.

Operators, washing machine.
Washers.
Extractors.
Whizzer hands.

Yarn polers.
Hangers-up.
Liquormen.
Tub washers.

Scourers.
Knotters.

Bundlers.

Stretchers.
Stitchers.
Sewers.
Preparers.
Singers.
Singeing-machine operators.
Gassers.

Kier hands.
Kier boilers.
Open soapers.
Operators, bleaching machine.
Vat folders.

Steerers.
Gray boys.

Chemic manglers.

Squeezers.
Tenterers.
Frame tenders.
Operators, frame machine.
Cloth feeders.
Operators, drying machine.
Can dryers.
Canmen.
Whiting-can men.

Operators, caustic machine.

Cloth scourers.
Fullers.
Crabbers.

Finishers.
Giggers.
Jiggers.
Nappers.

Polishers.
Steamers.
Brushers.
Shearers.
Shearing-machine operators.
Machine cutters.

The printing of cottons and of silks involves the same occupations.

Designers.
Engravers.
Die-makers.
Clampers.

A designer makes the design required, which is cut into a soft copper roller or die by an engraver or die-maker. This roller is then hardened and clamped into a rotary press.

In the pantographic process a sketch-maker makes a sketch several times as large as the required pattern. The design is photographed upon a zinc plate and cut out by plate cutters; by means of the pantograph it is then transferred to printing cylinders. The transferrers, who are usually girls, are known as pantographers. The pantograph setter is a skilled person who sets the pantograph at the desired angle for use by the pantographer.

Sketch-makers.
Plate cutters.
Pantographers.
Pantograph setters.

Operatives engaged in printing are known as printers, silk printers, or operators of printing machines. A back tender tends the back part of a cloth-printing machine.

Printers.
Silk printers.
Operators, printing machine.
Back tenders.
Shellmen.

A shellman is one who cares for the shells or the copper rollers of the machine.

In madder printing several additional steps are necessary. Padding-machine operators imbue the fabric with a mordant.

Operators, padding machine.
Aging-box hands.
Operators, dung machine.
Operators, soaping machine.
Operators, starching machine.
Starch-can men.

After the cloth is printed with a mordant, it is run through the dyeing machine, aged in chambers called aging boxes, which are tended by aging-box hands, and then taken to the dung machine for the removal of acids. The next processes are cleansing and soaping, starching, and drying. These operations are performed by operators of soaping machines and starching machines, and by starch-can men.

The dry finishing of cotton cloth calls for the services of the operators of calendering machines, who are also called calenderers, calendermen, and calender hands. An embosser is one who runs an embossing calender.

Embossmen.

Wet finished goods are finished by operators of the water mangle, or mangling machine, the principle of which is the same as that of the calender. Under the supervision of operators called sprinklers, jets of water are sprinkled upon the cloth moistening it sufficiently to give it the requisite degree of smoothness before starching.

Operators, mangling machine.
Sprinklers.

A percher is an inspector who examines the finished woolen cloth which is extended over a bar between him and the light.

Perchers.

For the preparation of goods for the market the following occupations are to be noted: A measurer or yarder tends a machine that measures the goods into yard lengths, and a folder or operator of a folding machine is one whose attention is devoted to seeing that the cloth is properly laid back and forth in folds; in practice the measuring and folding are both done at the same operation. A winder is one who tends a machine in which heavy goods after being finished are wound upon boards. A bander fastens each of the different pieces of goods by putting paper bands around them. A ticketer attaches descriptive tags or tickets, and a paperer wraps or covers them with paper. Pressmen and hydraulic-press tenders operate hydraulic presses by which piles of the different pieces are compressed so as to be packed in cases for shipment. A card girl is one who puts samples on cards for commercial travelers. Markers and stencilers are employees who mark and stencil the goods or packages with the name of the mill or brand. In general the employees who box and pack the finished products ready for market are called packers.

Measurers.
Yarders.
Folders.
Operators, folding machine.
Machine folders.
Winders.
Banders.
Ticketers.
Paperers.
Pressmen.
Hydraulic-press tenders.
Card girls.
Markers.
Stencilers.
Packers.

The term machine operator is a general designation inclusive of all hands who run or tend any of the various machines used in dyeing or finishing.

Machine operators.

KNITTING MILLS.

The various grades of skilled labor in knitting mills may be generally divided as follows: In the first grade are superintendents, foremen, and overseers of all kinds, cutters, knitters of cuffs and drawer-ribs, those operating full-fashion frames and Cotton's patent frames, pressmen, loopers, crocheters, and menders; in the second are general knitters, neckers, budders, seamers, buttonhole-makers, and button sewers; in the third, thread trimmers, brushers, needle boys, and ribboners.

The division of superintendence is as in other mills. Similarly there are bobbin boys, doffers, etc., much the same as are found in the cotton mill nomenclature. (See page 1169.)

Bobbin boys.
Doffers.

Occupations for the sorting and washing of wool in knitting mills are the same as those described under "woolen mills," page 1175. For occupations in dyeing yarns, see "dyeing and finishing textiles," page 1171. The occupations in carding and spinning wool and cotton for knitting mills are substantially set forth under "cotton mills," page 1169.

Picker hands.
Card-room hands.
Speeders.
Spinners.
Mule spinners.

The yarn is first wound off the cops, on which it is received from the yarn mill, onto the large bobbins or cones of the knitting mill by operatives called winders or spoolers. The bobbins are then taken to the knitting frames. The knitting machines are operated by knitters of various classes: One making plain or flat goods is called a plain knitter; ribbed goods are made by a rib knitter; if the operative makes cuffs only, he is called a cuff knitter; if the top of stockings or socks, a top knitter; if the bottom, a foot knitter. All power-knitting frames are automatic, hence the general term automatic knitter, to distinguish from one who operates a hand knitter. Sometimes the designation is purely local, one manufacturer calling a knitter of gloves a knitter, and one who knits hosiery an automatic knitter, although the machines used by both are run by power.

Winders.
Spoolers.
Knitters.
Plain knitters.
Rib knitters.
Cuff knitters.
Top knitters.
Foot knitters.
Automatic knitters.

The knitter takes entire care of the working of his machines, supplying them with yarn, cleaning and oiling them, and adjusting them when they do not work properly; he also pieces up broken ends of yarn.

Knitting-machine needles are commonly set in a lead base; the needle is set in a mold and the lead poured around it by an operative called a needle caster or needle boy. When different varieties and qualities of needles become mixed after using, they are sorted out by a needle sorter.

Needle casters.
Needle boys.
Needle sorters.

For occupations in napping or brushing the cloth for fleece-lined goods, see "dyeing and finishing textiles," page 1171.

The different sizes of knitted cloth are sorted out by a sorter, so as to be ready for the cutter. After the pattern has been chalked on by operatives called markers, the cloth is cut into bodies, sleeves, and legs. As in a dressmaking establishment, pieces of garments before being sewed are sometimes basted together by a baster.

Sorters.
Markers.
Cutters.
Basters.

The sleeves are taken to a looper or linker, who joins to them, on a looping machine, the pieces of ribbed goods which form the cuffs; the raw edges of sleeve and cuff are then trimmed or raveled off.

Loopers.
Linkers.
Trimmers.

In the best grades of underwear these operatives also make in the same manner all seams where two pieces of cloth are joined end to end, and the lower parts of shirts are similarly attached by such operatives, who are sometimes called ribbers.

Ribbers.

In some factories the operatives who, in making full-fashioned garments, join selvage edges on a machine like a looping machine, are called seamers, but the same term is used also for the sewing up of the sides of sleeves or drawers on a sewing machine. The operative doing this work is sometimes called a stitcher, the seamer being generally the one who sews a garment together after it comes from the cutter,

Seamers.

A runner-on is an operative who completes sleeves by knitting a seamless cuff on a rib-knitting frame and then, passing the needles through a small circular plain-knitting machine through a row of loops in this cuff, attaches the plain sleeve thereto. A cuff sewer is an operative who, with a sewing machine, sews cuffs and drawers bottoms onto flat-knit goods.

Runners-on.
Cuff sewers.

In making the best grades the top of the body is closed on a looping machine by a topper. The same name is applied to one who transfers the ribbed tops of stockings to the needles in the knitting cylinder preparatory to the knitting of the leg and foot.

Toppers.

The opening for the sleeve holes having been marked and cut, the sleeves are sewed in place on a sewing machine by a stitcher.

Stitchers.

Each completed garment is locked over, and any holes or imperfect places found are repaired by a mender, working by hand with a needle and thread.

Menders.

The garment, if it is to be dyed, then goes to the dyehouse. (The occupations are as described under "dyeing and finishing textiles," page 1171.) All knit goods are washed and then drawn while wet over wooden forms, which stretch them to the shape desired. This process is called boarding, and is done by boarders. The damp garment is then put into a dryer and dried on the form, so that it keeps the shape given it. The man who tends the centrifugal dryer, by which the water is partly extracted before boarding, and the one who tends the drying chamber, are both called dryers.

Dye and wash house hands.
Boarders.
Dryers.

The remaining processes constitute finishing, and vary, both in kind and sequence, with the kind of goods being made.

The opening for the neck and that down the front of the shirt are marked and cut; the cutting of the neck opening is sometimes done by an operative called a necker. The cut edges are bound with cloth on a sewing machine by binders, or are hemmed on a machine by hemmers; or a finished edge is made on a crocheting machine by crocheters, or a crocheted collar, made by collar crocheters; or lace trimming is sewed on, through this trimming, on fancy goods, a ribbon being sometimes run by a ribboner. Fancy or cat stitching is often done around the collar, either on a machine or by hand, by catstitchers.

Neckers.
Binders.
Hemmers.
Crocheters.
Collar crocheters.
Ribboners.
Fancy stitchers.
Catstitchers.

The places for the buttons and buttonholes are marked by button markers, and the garment is then taken by a buttonhole-machine operator, or buttonhole sewer, whose machine cuts and sews the buttonhole, and by a button sewer whose machine sews on buttons. Another girl, a buttoner, buttons the shirts.

Button markers.
Buttonhole-machine operators.
Buttonhole sewers.
Button sewers.
Buttoners.

When the seams have been made on a sewing machine and raw edges turned in, these edges are bound and partly covered with thread by an overseaming or cover-seaming machine, which stitches from side to side across the seam, the operative being known as an overseamer or cover seamer. When this work is done on sleeves, cuffs, and drawer bottoms of ribbed goods, the employee is often called a cuffer. Sometimes this work is done by a point seamer, on a special point machine. A tacker is one who sews a seam or edge over and over by hand.

Overseamers.
Cover seamers.
Cuffers.
Point seamers.
Tackers.

On the fronts of some women's underwear little radiating bunches of silk thread are sewed by hand for ornamentation; this is called budding or embroidering, hence the occupational term budder.

Budders.

All the stitching done on a garment after boarding constitutes a part of the finishing process, and all the operatives may be called finishers. It is done usually on power-driven sewing machines; thus it is seen that the term finisher has a wide application.

Finishers.

After the garment comes from the sewing machine, in some instances the thread ends have to be tied. They are then trimmed or cut off.

Tiers-of-ends.
Thread trimmers.

Drawers go through much the same process as shirts. Around their top they have a band or facing, stitched on by banders or facers; to this, suspender tapes are sewed on either side. Buttons are put on and buttonholes made, as in the case of shirts.

Banders.
Facers.

In the back part of the band, eyelets are often inserted by eyeleters; these may be finished with little metal rings, pressed into position by a machine, or may be stitched around like buttonholes by an eyelet stitcher, or sewer. Through these eyelets are drawn pieces of tape or lacing, the former by operatives called bowers, the latter by lacers. Cloth straps may take the place of the eyelets and lacing; those who sew them on are called strappers.

Eyeleters.
Bowers.
Lacers.
Strappers.

Tape is commonly sewed down the inside of the drawers, bordering the opening in front, by operatives called tapers. This is done usually on a machine having two needles, and using two threads at the same time; these machines may be used also in stitching other parts.

Tapers.

When the tops of stockings are turned over and sewed in the form of a hem, the process is called wetting, end sewing, or hemming, and is done by end sewers and hemmers. Operatives who embroider fancy designs on the ankles of stockings are called clockers, from the clock or design placed thereon. Before stockings are boarded, they are turned right side out over an upright stick, by employees known as turners and sock turners.

End sewers.
Clockers.
Turners.
Sock turners.

Both washing and ironing, or mangling, are done as in a power laundry, by washers, ironers, and manglers.

Before packing, the garments are folded and laid between sheets of cardboard by folders and pressers; they are then pressed in powerful hydraulic or screw presses; the employees who operate the presses and put in and remove the goods are called pressmen.

Folders and pressers.
Pressmen.

A brusher is an operative who, with a hand brush, removes loose threads from the garments. Another operative stamps the trade-mark and size on the garments, with a hand stamp. They are then inspected and packed, labeled, and shipped.

Brushers.
Stampers.
Inspectors.
Packers.
Labelers.
Shippers.

Hand sewers are those who work by hand with thread and needle, basting, mending, etc.

Sewers, hand.

Sewing-machine operators is a general term for all who work at making, stitching, and finishing the garments on sewing machines.

Sewing-machine operators.

SILK MILLS.

Operatives in silk mills may be generally graded according to skill required, as follows: In the first grade are superintendents, foremen and overseers of all kinds, fancy weavers, designers, loom fixers, harness builders, reed fixers, warp pickers, card cutters, spot cleaners, and preparers; in the second are general weavers, spinners, throwsters, doublers, twisters, matchers, dressers, and braiders; in the third are skeiners, card lacers, reelers, spoolers (of sewing silk for the market), quillers, winders, cocoon sorters, bobbin boys, and carriers.

The occupations found in superintendence and oversight are similar to those described under "cotton mills" (see page 1169), though some overseers are called overlookers. The occupations of helpers and errand boys are also similar to those described under "cotton mills."

There are also many kinds of mechanics, as in cotton mills. In some mills there are gasmen who tend the gas machines by which gas is generated for the use of the establishment; electricians also are employed to run dynamos for the operation of motors, by which looms and spinning frames are run, and for lighting purposes.

Silk, as imported in hanks or skeins in its natural gum, is called gum-silk; in this condition it is kept in stock at the mills in charge of the gum-silk man.

Gum-silk men.

In the preparation of organzine, which is used for the warp of silk goods, there are five processes after the hanks of hard or gum silk have been loosened up by a bath: First, winding, which is done by hard-silk winders on hexagonal power frames called swifts, by which the silk is wound from the hanks to bobbins; second, first time over, spinning on the spinning machine by employees called spinners; third, doubling on the doubling machine, by doublers; fourth, second time over, spinning; fifth, reeling, by reelers. When the silk is thrown for tram, which is used for weft or filling, the processes are the same, except that there is not so much spinning, since

Hard-silk winders.
Spinners.
Doublers.
Reelers.
Throwsters.

the thread does not need to be so strong. Sometimes the foreman of the throwing department in a regular broad-silk mill is called a throwster; in other cases the term is applied to the employees who do all the processes of throwing—winding, spinning, doubling, and reeling. None of the operatives engaged in these processes are greatly skilled.

For occupations in winding and spooling, following throwing, see "cotton mills," page 1169.

When the weaving of silk is done on the Jacquard loom, the filling is wound on quills instead of bobbins.

Quillers.

Sewing silk, embroidery twist, and machine twist are formed in a twisting machine, which unwinds several yarns from as many bobbins and twists them together into a solid cord, the operatives being called twisters and machine hands (twisters); these cords are doubled in a doubling machine, as for silk yarn. There is a process in doubling in which the sizes of the threads are matched in the spinning; this is done by matchers.

Twisters.
Machine hands (twist-
ers).
Matchers.

Most sewing and embroidery silks are put on spools for the market by operatives called spoolers; the spools are printed by spool printers with a legend stating the kind and quality of silk and the name of the manufacturer. Some kinds of silks, however, are wound into balls on machines tended by ballers, and some are reeled by hand into cuts, skeins, or yard lengths. Sometimes skeins are made by people outside of the mills.

Spoolers.
Spool printers.
Ballers.
Hand reelers.
Winders.
Skainers.

Spun silk is made from pierced, stained, or imperfect cocoons or from waste silk. The cocoons are sorted, and then in order to loosen glutinous fibers, they are boiled in a hot soapy solution in a revolving machine called a preparer. Next they are placed in a spreader—a beating machine—by which they are batted into a downy condition. They are then put through a dressing frame or combing machine, and afterwards treated like cotton, by slubbing, roving, and spinning. After the thread is spun and twisted it is controlled or cleaned in a machine, and also gassed to remove imperfections and knots by being passed over a series of gas jets. The occupations in the preparation of silk yarn for warp are substantially the same as in cotton mills (see page 1169); but the warp thread is picked in order to remove the remaining knots and other imperfections by an employee called a warp picker.

Cocoon sorters.
Preparers.
Machine hands
(spreaders).
Machine hands (spin-
ners).
Machine hands (con-
trollers).
Bonmers.
Drossers.
Warp pickers.

Occupations involved in placing the beam in the loom, in replenishing it, and in repairing smashes are similar to those in cotton mills. (See page 1169.)

Loom fixers.

The Jacquard loom is used for figured patterns. To make these patterns, cards must be cut or perforated according to the design previously made, and then laced together to form an endless card. This band revolves over the cylinder which comes in contact with the needles that control the lifting hooks in the Jacquard machine.

Card cutters.
Card lacers.

In silk mills the one who replaces worn-out cords in the lingoos—long needle-like metal attachments which hold the harness cord in place—sometimes is called a lingo threader.

Lingo threaders.

There are a variety of weavers operating silk looms—those who can do all kinds of weaving, those who can weave ribbon only, upholstery goods only, velvet only, or broad goods only. In general, silk weaving requires a higher degree of skill than the weaving of most other textiles.

Weavers.
Ribbon weavers.
Upholstery weavers.
Velvet weavers.
Cloth weavers.

Broad goods, velvet, or ribbon must be cleaned or picked of imperfections before it is sent to the finishers; this work is done in the picking room by pickers. Some operatives scratch into close order with a sharp pen the open threads of the texture, which is placed on a frame before a window so that the light may shine through it; this work, which is also called trimming, requires much dexterity.

Pickers.
Trimmers.

Inspectors examine the finished product for imperfections. If there are oil spots in the goods, they are removed with acids or other harmless cleaners. Mufflers or handkerchiefs are hemmed on the sewing machine.

Cleaners.
Spot cleaners.
Hemmers.

For occupations in the processes of dyeing, finishing, and printing in silk mills, see "dyeing and finishing textiles," page 1171.

Dyehouse hands.
Dyers.
Dyers, piece.
Dyers, yarn.
Finishers.

WOOLEN MILLS.

As to skill, occupations in woolen and worsted mills may be graded as follows: In the first class are persons engaged in the various kinds of superintendence and oversight, as overseers and section hands, and also wool sorters, card grinders, comb setters, pin setters, mule spinners, mule fixers, loom fixers, pattern-makers, fancy and sample weavers, embroidery-makers, smash piecers, and the like; in the second are card hands, preparers, comb tenders, card strippers, drawing-frame tenders, frame spinners, yarn inspectors, warpers, beamers, weavers generally, drawers-in, etc.; and in the third are picker hands, back washers, doffers, bobbin boys, general hands, and those in similar occupations.

For occupations in superintendence, see "cotton mills," page 1169.

There are many mechanics employed in woolen mills and their duties are practically the same as in cotton mills. Designations differ somewhat according to locality, and are more specific in some instances than in others. For example, a flyer-maker making flyers for frames, may be classed in some establishments as a machinist instead of under the more specific title; so bobbin-makers, in certain of the woolen mills, are principally repairers of bobbins, and in some mills may be listed under a broader designation. Flyers, bobbins, and the like are seldom made in the mills and such occupations almost always refer to repair work. Some woolen mills report boiler-makers, who repair rather than make boilers. Belt-makers are sometimes called apron-makers, an apron being the belt upon which a moving mass of material is carried into, through, or out of a machine. Roll coverers are men who cover the worsted spinning rolls.

Flyer-makers.
Bobbin-makers.
Boiler-makers.
Belt-makers.
Apron-makers.
Roll coverers.

There are helpers and laborers of all kinds, and many errand boys and carriers, variously known, as in cotton mills.

Errand boys.
Carriers.

On being delivered in the wool room, the bags of wool are opened by wool sorters who remove the fleeces and tear them apart with their hands, separating each into from three to six or more parts. Wool pullers (reported on the Pacific coast) pull wool from sheepskins. In mills where rags are used in making shoddy they are sorted by rag sorters before being bleached.

Wool sorters.
Wool pullers.
Rag sorters.

The wool is scoured, or washed, in scouring machines, for the removal of dirt and of the grease natural to the wool by scouring-

machine hands or feeders. The maker of the soap solution used in the scouring machine is called a soap-maker. Burr-picker hands are unskilled workmen who operate machines by which the large burrs are removed from wool intended to be made into yarn for woolen goods. A carbonizer is a skilled operative who has charge of a machine, tended under his direction by unskilled carbonizer hands, which removes by a chemical process small burrs and other vegetable matter. In the manufacture of shoddy the same process is used to remove cotton from rags.

Washing-machine hands wash the wool to remove the excess of acid employed in the previous process, and dryer hands dry it in a dryer.

The wool is next oiled and mixed by oilers and mixers, and weighed by wool weighers. A wool supplier is a general hand who supplies wool to the wool washer. A blowerman is one who puts wool or other material into pneumatic tubes which carry it wherever wanted.

For occupations in picking, wool carding, card grinding, and card stripping and roving, see "cotton mills," page 1169.

Where particularly long staple wool is being used for worsted yarn, a process called preparing, a kind of gilling done by preparers, takes the place of carding. The carding and balling-head tenders put the sliver intended for worsted yarn through a balling-head machine, which winds four slivers into a ball in which form it is presented to the comb.

Employees who tend combing machines are called combers, comb tenders, and comb minders. Mechanics who set the combs in the machines are comb setters, and those who put the pins in the combs are pin setters; these are skilled workers.

Combing is followed by two or three more doubling and gilling operations, and then by doubling, drawing, twisting, and spinning operations like those described in the manufacture of cotton yarn. (See "cotton mills," page 1169.) Between combing and spinning there are from six to ten of these operations.

Some doubling and drawing is done by what is called the French system, in which no twisting is done, the roving being simply rolled together and condensed enough to keep it from breaking until it is spun.

Weigh-box tenders are operatives who tend weigh boxes, in which the several bobbins are weighed in order that there may be selected and drawn together such bobbins as will produce a certain average weight for the drawn sliver. Dandy tenders operate a kind of drawing frame called a dandy.

For occupations in spinning yarns for woolen cloth on either ring frames or mules, see "cotton mills," page 1169.

The term can boys—from the can in which the slubbing is carried—is one of the variant descriptions of roving carriers. Bobbin hands or bobbin setters are the same as rail setters. A bobbin sorter is a boy who sorts or selects bobbins according to size and quality. In worsted mills a band-maker is called also a tape-band stitcher. Filling carriers are boys who carry filling from one place to another.

For occupations in spooling and winding, see "cotton mills," page 1169.

The yarn is inspected by yarn examiners or inspectors, and carefully weighed at many stages, so that the goods to be made from it shall be of the desired weight. It is weighed both off the bobbin and on it, and when it is reeled, by employees called yarn weighers and bobbin weighers.

For occupations relative to preparing and beaming the warp yarn, placing and adjusting the yarn beams in the looms, and the fixing and repairing of looms and webs, see "cotton mills," page 1169. Before the weaving is begun, designs are made by designers, and these are first worked up into samples. (See "cotton mills," page 1169.) In some large woolen mills there is a sample tester—one who tests the samples made as to quality of design and execution.

The weaving of woolen goods is like all other weaving, see "cotton mills," page 1169.

In addition to the harness cleaners (see "cotton mills," page 1169), in some mills there are reedmen, who clean the loom reeds, and burlers and knotters who, after the cloth has been inspected and automatically measured, pick out all the knots with steel tweezers. After that, speckers take out fine specks composed of bunches of cotton or woolen fibers, or of other material. The cloth is then inspected again and next goes to the menders, who sew in strands of filling or warp which have been dropped, and mend holes.

For occupations in dyeing and finishing and preparing for the market, see "dyeing and finishing textiles," page 1171.

WOODWORKING INDUSTRIES.

Under woodworking industries are grouped lumber and planing mills, and furniture, wagon and carriage, and agricultural-implement factories.

Occupations common to two or more of these industries include sawyers, planers, wood and metal machine hands, sanders, turners, carvers, lathe hands, blacksmiths, trimmers, painters, stainers and fillers, etc., carpenters, cabinetmakers, wheelwrights, wheel-makers, and assemblers.

General divisions of superintendence are the same in all the industries of this group; so generally are the occupations of auxiliary mechanics in the building or repairing of buildings and machinery, and also the occupations of general helpers and boys.

In general, the workmen of the first grade of skill in the group are the foremen and other supervisors, and their assistants, assemblers, builders, testers, turners, blacksmiths, machinists, cabinet-makers, inlayers, carvers, layers-out, inspectors, and wheelwrights. In the second grade are many kinds of common sawyers, lathe hands, machine workers, embossing-machine hands, singers, box-makers, painters, and the like. The third grade of skill includes employees with occupations of an ancillary nature, or such as involve the mere mechanical feeding of machines, as cleaners, sanders, wrappers, packers, etc.

AGRICULTURAL IMPLEMENTS.

A separation of employees in agricultural-implement factories into three general grades of skill may be made in the following manner: In the first grade are foremen and other supervisory hands, inspectors, experimental hands, builders, testers, pattern-makers, carvers, turners, assemblers, machinists, blacksmiths in general, temperers, molders, and employees in occupations calling for the

Yarn examiners.
Yarn inspectors.
Inspectors.
Yarn weighers.
Bobbin weighers.

Reelers.
Beamers.
Dresser tenders.
Dressers.
Slasher tenders.
Warpers.
Drawers-in.
Loom fixers.
Designers.
Sample testers.

Weavers.

Harness cleaners.
Reedmen.
Burlers.
Knotters.
Speckers.
Inspectors.
Menders.

Dyehouse hands.
Dyers.
Finishers.
Folders.
Fullers.
Giggers.
Gig tenders.
Sewing-machine operators.
Perchers.
Pressmen.
Sewers.
Packers.

same or similar intelligence and experience. In the second grade are machine workers—both metal and wood—of various kinds, core-makers, forgemen, lathe hands, tinmiths, painters, grinders, and the like. The third grade is made up of sandpaperers, ladle daubers, hemp openers, sackers, sliver pullers, and others who do, in general, the grade of work with which these employees are occupied.

During the busy season in this industry a large number of additional men are usually employed. These are artisans engaged for outside work during the summer months, but their occupations are such that it is difficult to classify them exactly.

Occupations in superintendence include, as in other industries, foremen and their assistants, headmen, and bosses of various kinds.

Branders.
Core carriers.
Handymen.
Heatermen.
General utility men.
Car loaders.
Oilers.

Bending-machine hands.
Body and gear makers.
Blacksmiths.
Hammermen.
Wheelwrights.
Wheel-makers.
Woodworkers.

Boring-machine operators.
Wood-machine workers.
Machine feeders.
Box-makers.
Sawyers.
Sticklers.
Wood turners.
Carpenters.
Sandpaperers.
Painters.

For a description of the occupations of boiler-makers, machinists, boltheaders, bolt threaders, chippers, core-makers, lathe hands, pattern-makers, molders, iron molders, floor molders, bench molders, etc., straighteners, nut tappers, and polishers, see "foundries and metal working," page 1182.

Boiler-makers.
Machinists.
Boltheaders.
Bolt threaders.
Chippers.
Core-makers.
Lathe hands.
Pattern-makers.
Molders.
Iron molders.
Floor molders.
Bench molders.
Straighteners.
Nut tappers.
Polishers.

Forgemen.
Shoring-machine operators.
Oven tenders.
Cupola hands.

Ladle daubers.
Bulldozer hands.
Eye benders.
Upsetters.
Serrators.
Keyseaters.
Knife-makers.
Grinders.

wheels or rolls. Knife-makers make the knives for harvesting machinery. Grinders sharpen cutting faces on a grindstone or emery wheel.

A Babbitt-machine man, or tender, operates the machine in which the axles and other journals of agricultural implements are held in their boxes while he pours the Babbitt metal around them, to give them a nonfriction bearing.

Tinmiths.
Tinners.

Bricklayers, electricians, saw filers, horse-shoers, millwrights, plumbers, and steam fitters are among the auxiliary hands employed to care for buildings, machinery, and equipment.

There are also general hands and laborers, such as branders, core carriers, handymen, heatermen, general utility men, car loaders, and oilers.

For a description of the occupations of bending-machine hands, body and gear makers, blacksmiths of various kinds, hammermen, wheelwrights, wheel-makers, woodworkers, etc., see "wagons and carriages," page 1180.

For a description of the occupations of boring-machine operators, wood-machine workers, machine feeders, box-makers, sawyers, sticklers, wood turners, carpenters, sandpaperers, and painters of various kinds, see "lumber and planing mills," page 1178.

For a description of the occupations of boiler-makers, machinists, boltheaders, bolt threaders, chippers, core-makers, lathe hands, pattern-makers, molders, iron molders, floor molders, bench molders, etc., straighteners, nut tappers, and polishers, see "foundries and metal working," page 1182.

For a description of the occupations of forgemen, shearing-machine operators, oven tenders, and cupola hands, see "iron and steel," page 1184.

Ladle daubers patch and line with refractory metal the hand ladles used in the foundry. A bulldozer hand operates a machine that makes a crook in a straight metal rod; an eye bender bends the rod into an eye. An operator of an upsetting machine upsets, or makes shorter and thicker, any bar of iron or steel; he also uses the machine to shorten and reset the tires of wheels. The serrator machine cuts teeth in metal. A keyseater cuts grooves in the driving shaft of the implement for the insertion of a metallic strip or key which secures the

wheels or rolls. Knife-makers make the knives for harvesting machinery. Grinders sharpen cutting faces on a grindstone or emery wheel.

A Babbitt-machine man, or tender, operates the machine in which the axles and other journals of agricultural implements are held in their boxes while he pours the Babbitt metal around them, to give them a nonfriction bearing.

Tinmiths and tinners make tool and other boxes, tin twine cans, seed cans, seed spouts, and other parts.

Dressers are hand workmen who draw down or dress handles, plow beams, and other parts, with a jack plane. Dressers.

Plow stockers fashion stocks, and equip steel plows with all wooden parts. Plow stockers.

Brush hands are simply painters who work with a brush. Dippers immerse in the liquid paint the part to be painted. Brush hands. Dippers.

Canvas workers, who are generally girls or women, cut and make the canvas aprons for harvesting machines; they may be either hand or machine workers. Canvas workers.

Some agricultural-implement factories have a department in which binding twine is made. A hemp opener opens the bales of fiber for feeding into preparing machines. Sliver pullers run the machines which draw the fiber out into a sliver of many times the original length. For a description of the occupations of spinners, ballers, and winders, see "cotton mills," page 1169.

Hemp openers.
Sliver pullers.
Spinners.
Ballers.
Winders.

Testers or testing-machine operators run the twine over a skeleton frame, in order to examine it for strength and weight. Sackers put the balls of twine into burlap bags. Testers. Testing-machine operators. Sackers.

Assemblers are, in most factories, the men who put together the parts of machines, as harvesters, preparatory to erecting the complete machine; these men are sometimes called bench hands.

In some cases, however, the term assembler is synonymous with builder, the latter being the one who erects the assembled parts into a complete machine. Large machines are sometimes knocked down before shipment and put together in the territory where they are to be used. When machines are set up at the factory for examination and trial, they are given a working test by try-off men.

Assemblers.
Bench hands.
Builders.
Try-off men.

Packers are of two kinds: one kind packs the pots for the annealing ovens, while the other packs the various parts of each agricultural machine, such as a harvester, or other large, complicated apparatus, into a box for shipment. Crate-makers make the framework in which certain of the implements are shipped. Shippers attend to sending out the product of the factory.

Packers.
Crate-makers.
Shippers.

In some establishments printers are employed to print labels and placards to be attached to the various implements manufactured, and sometimes to the cars in which the goods are shipped.

Printers.

The work of every department is under careful inspection. A regular corps of experienced inspectors examines the raw material received, the product while under construction, and the finished implements.

Inspectors.

Some establishments employ experimental hands to improve existing appliances and methods, and to devise new ones.

Experimental hands.

FURNITURE.

Skilled employees of the first grade in furniture factories embrace foremen, assistant foremen, and head hands of various kinds, designers, pattern-makers, carvers, veneer cutters, ivory turners, inlayers, some kinds of finishers, outside men, miter sawyers, grainers, upholsterers, varnishers, trimmers, and the like, and wood machinists—men skilled in all branches of wood cutting and shaping, and competent to operate any woodworking machine. In the second grade may be mentioned dowelers, scrapers, benders, machine hands, chair-makers, bench hands, singers, rubbers, and

the like. The third grade is made up of cleaners, sewers, wrappers, packers, and other employees doing work of the same or similar description.

As in most other industries, employees engaged in superintendence are divided into foremen, assistant foremen, and bosses, or head hands over various machines and processes.

Among the mechanics who repair buildings and machinery in furniture factories are blacksmiths, carpenters, millwrights, masons, and steam fitters. General and particular helpers and laborers, oilers, sweepers, etc., are also employed.

Designers.
Pattern-makers.
Stencillers.
Markers.

Wood-machine tenders.
Wood-machine hands.
Machine hands.
Operators, wood machine.

Mortisers.
Tenoners.
Sawyers.
Carvers.
Veneer cutters.
Veneer gluers.
Hand turners.
Lathe hands.
Sandpaperers.
Machine sanders.
Lumber scalers.
Mill hands.
Planers.
Shapers.
Cabinetmakers.

A whip sawyer operates a thin, narrow saw blade used in following curved lines. A miter sawyer operates a saw in a miter box, by which are cut the ends of pieces to be united in a miter joint. A dovetailer operates a dovetailing machine which makes a peculiar interlacing joint. A doweler makes junctions by means of a pin or peg fitted and glued into adjacent pieces. A scraper runs a machine that scrapes or finely smooths surfaces which are to receive polish.

Benders.

Ivory turners.

A singer, or embossing-machine hand, puts wood through a machine having dies heated to redness, which imprint it with a raised design. Sometimes the same effects are produced by hand.

A bench hand assembles the parts that have been prepared by the machines, and fastens the pieces together with nails, screws, and glue; when he uses glue he is termed a gluer, or glue joiner. Chair-makers are assemblers of chair parts, or they may be cabinetmakers skilled in all branches of chair-making.

Bench hands.
Gluers.
Glue joiners.
Chair-makers.

Inlayers are skilled men who saw out, arrange, and insert various small pieces of wood in the surface of an article according to a design or pattern.

Inlayers.

Outside men are carpenters or cabinetmakers who go outside the shop and set up in place office and saloon fixtures, bowling alleys, etc.

Outside men.

Cleaners.

Finisher is a general term for one competent to perform any operation connected with the improvement of wood surfaces by the use of oils, paints, and varnishes, including also the rubbing and polishing; but in the occupational tabulation for wages, finishers and polishers were kept separate as far as permitted by the original returns.

Finishers.

Dippers.
Brush hands.
Varnishers.
Strippers.
Fillers.
Stainers.

A designer is a skilled employee who conceives and works out new designs for furniture and room fixtures. Pattern-makers are skilled carpenters who, from the designs, prepare patterns for the articles to be manufactured. A stenciler or a marker marks from stencil or pattern the lines to be followed in cutting and shaping the wood.

For a description of the occupations of wood-machine tenders, machine hands (or operators, wood machine), mortisers, tenoners, sawyers of various kinds, carpenters, carvers, veneer cutters, veneer gluers, hand turners, lathe hands, sandpaperers, machine sanders, lumber scalers, mill hands, planers, shapers, and cabinetmakers, see "lumber and planing mills," page 1178.

A bender steams the wood and bends it over a form.

Ivory turners shape billiard balls in a lathe.

A singer, or embossing-machine hand, puts wood through a machine having dies heated to redness, which imprint it with a raised design. Sometimes the same effects are produced by hand.

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Inlayers are skilled men who saw out, arrange, and insert various small pieces of wood in the surface of an article according to a design or pattern.

Outside men are carpenters or cabinetmakers who go outside the shop and set up in place office and saloon fixtures, bowling alleys, etc.

A cleaner removes sawdust and dirt from pieces to be stained or painted.

Finisher is a general term for one competent to perform any operation connected with the improvement of wood surfaces by the use of oils, paints, and varnishes, including also the rubbing and polishing; but in the occupational tabulation for wages, finishers and polishers were kept separate as far as permitted by the original returns.

For a description of the occupations of dippers, brush hands, varnishers, and strippers, see "foundries and metal working," page 1182. For a description of the occupations of fillers and stainers, see "lumber and planing mills," page 1178.

Before furniture is painted, the holes made by nails, etc., are filled with putty by a puttier. A shellacker applies shellac to such articles as require this treatment. Between coats of paint or varnish the rubber smooths the surface by rubbing with pumice or rotten stone. A polisher gives the surface an additional luster after varnishing by rubbing with the palms of his hands.

Puttiers.
Shellackers.
Rubbers.
Polishers.

A grainer is a skilled painter who imitates the grain of some superior quality of wood upon the surface of an inferior wood, by applying paint and using a graining tool.

Grainers.

Woven wickerwork is made by the caner, the cane seater, the rush seater, and the flag seater.

Caners.
Cane seaters.
Rush seaters.
Flag seaters.

A sewer sews coverings, linings, and other upholstering material. A stretcher draws this material tightly over the piece to be upholstered, but this is done also by the upholsterer, after he has put in the springs and filling.

Sewers.
Stretchers.
Upholsterers.

Curtain workers cut out and hem the material for curtains, put on hooks, and in a similar manner prepare draperies for hanging.

Curtain workers.

Cushion-makers prepare the side ledges of rubber for pool and billiard tables. Trimmers attach the pockets to pool tables, cover pool and billiard tables, and affix the customary fittings. A fitter sees that drawers run without sticking, that handles and casters and all similar attachments are in place, that locks work properly, and gives such finishing touches to the work before the furniture goes to the market.

Cushion-makers.
Trimmers.
Fitters.
Fitters-up.

A pad-maker shapes pieces made of india rubber or other material that prevents injury by rubbing or striking against other objects.

Pad-makers.

Wrappers do up small fittings. Packers stuff excelsior around the furniture and cover it with burlap, or pack the goods in crates, boxes, or packages.

Wrappers.
Packers.

LUMBER AND PLANING MILLS.

This industry includes logging camps, sawmills, and planing mills.

Among workmen of the first grade of skill in lumber and planing mills are foremen, assistant foremen, and headmen of the various departments; also sawyers, sorters, markers, edgers, cabinet-makers, layers-out, wood turners, wood carvers, shapers, stair builders, ship carpenters, mill carpenters, veneerers, and grainers. In the second grade, which does not require so much skill, initiative, or originality, may be placed some kinds of sawyers or saw tenders, planers, sash-makers, sash stickers, blind-makers, door claspers, core-makers, lathe hands, glaziers, painters, and others performing similar work. The third grade embraces dry-kiln men, machine tenders and feeders, box-makers, blind boxers, choppers, fellers, hog tenders, loaders, mill hands, yardmen, and the like.

Occupations of superintendence include foremen, assistant foremen, chief sawyers, head sorters, head veneerers, head stair-makers, yard bosses, etc.

There is great need in lumber and planing mills for saw filers, who are employed in considerable numbers. They are skilled men, for the knack of keeping saws sharp and in good condition is not easy to acquire. There are also machinists, masons, stone masons, millwrights, blacksmiths, wagon-makers, etc., who keep the mills and machinery in repair.

Saw filers.

There are general helpers, board pullers, oilers, sweepers, water carriers, and laborers; there are also water slingers—boys in lumbering camps who carry water in buckets slung over their shoulders; boys are also employed to supply machines with material, to carry away refuse (although this is also the work of adult laborers), and to do errands and general work.

Board pullers.
Oilers.
Sweepers.
Water slingers.
Water carriers.

The chopper chops through about one-fourth of the diameter of the standing tree. The crosscut sawyer then cuts through the remainder, and cuts the fallen tree into lengths. Choppers and sawyers alternate in their work and together are called fellers. The peeler removes the bark with an ax.

When logging operations are carried on at a distance from a river, a logging railway is laid by track or section men, and the locomotive with its freight is handled by the engineer, assisted by tram or train men. Swampers or road-makers having cleared away the underbrush, the roller or slipper rolls or slides the logs to a place accessible to the teamster, who hauls them to the river or railroad. At the railroad the grab driver seizes the logs and drags them to the skids. Skidders and loaders load them onto the cars by means of cant hooks.

Unloaders dump the logs into the river or lake in which they are to be floated to the mill. Rivermen or river drivers watch the logs in the river to prevent congestion. Sometimes rafts of logs are towed on the rivers or lakes, in which case tugboat hands manage the towboat.

The boom-man secures the logs at the mill and brings them to the slide, or chute, by which they are drawn into the mill for sawing. The bull-chain man or tender attaches to the logs an endless chain, which draws them up the incline; slide tenders or chutemen, by means of levers, control the movement of the elevating chain.

The log-deck man with a cant hook rolls the log to the saw carriage, to which the dogger secures it by means of hooks.

The sawyer, by means of levers, directs the log while it is being sawed. The block setter adjusts the carriage by gauge to take off the proper thickness. The men who cut the saw logs into lumber are skilled men, and on their judgment as to the cut of the logs frequently depends the profit or loss of a mill.

Rip sawyers operate circular saws which cut with the grain of the wood; crosscut or cut-off sawyers cut across the grain. Band sawyers are skilled men who operate saws in the form of a band, moving continuously in one direction; these are used both in saw-mills and in certain departments of planing mills. A gang sawyer operates several saws set in a frame, thus cutting a log into several boards at one operation. The saw operated by the muley sawyer has a rapid reciprocating motion and has guides set above and below. Picket sawyers saw pickets. Laths are sawed by the lath sawyer. The edger squares the edges of boards; in order to obtain the maximum amount of clear lumber from the board he must possess judgment and experience. The ends are trimmed on a crosscut saw by a tail edger or trimmer. The off-bearer removes the sawed pieces. A hog grinder grinds up waste material for use as fuel, the machine which he tends being called a hog from its omnivorous consumption of scraps of wood that would otherwise be wasted.

In a shingle mill the shingles are sawed out by the sawyer, dressed by the jointer, graded by the sorter, and arranged by the packer in bundles, which are tied up by the binder.

Mill hands do general work about the mill; yard hands work at piling, etc., outside the mill.

The scaler measures the board and indicates its dimensions upon it; the tallyman records these dimensions. Graders, sorters, or distributors inspect the board to ascertain its quality and send it to the kiln to be seasoned, or to the hustlers, laborers, or loaders to be loaded upon a yard car for removal to the proper pile. Stackers and pilers arrange the boards in piles or stacks in such manner as to allow a free circulation of air for seasoning.

A pulp-wood worker tends a macerating machine which grinds wood into pulp for the manufacture of paper.

In this investigation planing mills include not only mills where lumber is only planed, but those, also, where it is sawed into various widths and lengths, and made into sash, doors, blinds, moldings, carved and turned work, and many other kinds of interior finish.

The wood that comes to the planing mill is carefully examined by the lumber inspector, who satisfies himself that it is thoroughly seasoned. The work is laid out as to form, plan, or design, by the layer-out—a skilled man.

Many of the operatives engaged in the processes of remanufacture are machine tenders. A planer or planing-machine tender smooths surfaces by passing the wood through a planing machine fitted with revolving cutter heads. A shaper or shaping-machine tender is a skilled workman who performs the dangerous work of feeding a machine fitted with a vertical spindle, to which cutter heads or blades are attached; against these heads he holds the work, with the patterns fastened on. Among other machine tenders are mortising-machine tenders, who run machines that cut holes or mortises into which other pieces of wood may be inserted, and tenoning-machine tenders, who tend machines which make the tenons or ends that are inserted in the mortised holes.

A sticker runs a machine for making moldings, for cutting moldings on the edges of sash bars, stiles, and rails, and for other small work.

A wood turner shapes wooden articles with a cutting tool while they are revolving in a turning lathe; he thus makes ornaments of various kinds—rounded hitching posts, table legs, etc. A lathe hand also operates a turning lathe. A screw turner, using a lathe, turns a screw thread upon the surface of such products as are to be screwed into other work.

A carver or wood carver carves by hand with gouges and chisels or operates a machine in which the carving is performed by a cutting tool guided by a mechanical guide pin which moves over the surface of the pattern. Hand carvers are skilled workmen.

A polisher, using a sandpaper machine, smooths surfaces by holding the work against a wheel or drum covered with sandpaper. Some surfaces have to be smoothed by hand; this is done by rubbing with sandpaper. Sandpaperers or sanders may do either hand or machine work.

A veneer cutter operates a large, thin saw which slices a layer, or lamina, from the wood. This veneer is applied to the core or underlying material, which has been prepared by a core-maker and then scratched by a scratcher in order to afford a convenient surface for the application of glue by the glue spreader. The veneer is firmly pressed on by veneerers with veneering hammers, so that every part adheres.

Choppers.
Fellers.
Peelers.

Trackmen.
Sectionmen.
Locomotive engineers.
Tram-men.
Tram-men.
Swampers.
Road-makers.
Rollers.
Slippers.
Teamsters.
Grab drivers.
Skidders.
Loaders.

Unloaders.
Rivermen.
River drivers.
Tugboat hands.

Boom-men.
Bull-chain men.
Bull-chain tenders.
Slide tenders.
Chutemen.

Log-deck men.
Doggers.

Sawyers.
Block setters.
Setters.

Rip sawyers.
Crosscut sawyers.
Cut-off sawyers.
Band sawyers.
Gang sawyers.
Muley sawyers.
Picket sawyers.
Lath sawyers.
Edgers.
Edgemen.
Tail edgers.
Tail trimmers.
Off-bearers.
Hog grinders.

Shingle sorters.
Shingle sawyers.
Shingle jointers.
Shingle packers.
Shingle binders.

Mill hands.
Yard hands.

Scalers.
Tallymen.
Graders.
Sorters.
Lumber sorters.
Distributors.
Dry-kiln men.
Hustlers.
Stackers.
Pilers.

Pulp-wood workers.

Inspectors.
Layers-out.

Planers.
Planing-machine tenders.
Shapers.
Shaping-machine tenders.
Mortising-machine tenders.
Tenoning-machine tenders.

Stickers.
Sticking-machine tenders.
Molders.
Molding-machine tenders.

Wood turners.
Lathe hands.
Screw turners.

Carvers.
Wood carvers.
Hand carvers.
Machine carvers.

Polishers.
Sandpaperers.
Sanders.

Veneer cutters.
Core-makers.
Scratchers.
Glue spreaders.
Veneerers.
Clampers.

Clampers adjust screw clamps to hold the surface together evenly and firmly until the glue has dried.

Cabinetmakers.
Bench workers.
A cabinetmaker puts together and finishes the finest kinds of work, such as the highest grades of interior finish, cabinets, and the like. Bench workers are cabinetmakers or carpenters, working at a bench in the mill, and engaged in making, fitting, or assembling the various articles produced.

Stair builders.
Stair-makers.
Stair builders and stair-makers are next to cabinetmakers in skill. They put up stairs, make the rails, get out the treads, risers, etc., and put in the balusters.

Carpenters.
Mill carpenters.
Ship carpenters.
A carpenter or mill carpenter prepares and puts together all kinds of carpenter work for buildings, including interior finish. A ship carpenter is a skilled workman who makes ready material for shipbuilding.

Blind-makers.
Sash-makers.
A blind-maker puts together and finishes window blinds, while a sash-maker does the same with window sashes. If either of these workmen can lay out and make such goods from the beginning or can make odd and difficult pieces, he is a skilled worker; otherwise he may be classed in the second grade of skill.

Door-piece matchers.
Door-makers.
Door clampers.
A door-piece matcher matches the pieces for a door and puts them together loosely; he is the same as the old-fashioned door-maker. A door clumper puts these doors together tightly with clamps, gluing and wedging them.

Trimmers.
Glaziers.
A trimmer in a sash and blind shop puts the trimmings—catches, hinges, etc.—on blinds; this term may apply also to a mill carpenter who gets out the interior finish or trim for buildings. A glazier sets or puts glass into sash doors and window sashes.

Box-makers.
A box-maker makes boxes—an occupation frequent in planing mills, where the stock for boxes can be quickly and economically prepared. Little skill is required for this work.

Woodworkers.
Woodworker is a general term for any employee who has to do with woodworking machinery.

Wood-machine tenders.
Machine feeders.
Machine hands.
Machine tenders.
Wood finishers.
Finishers.
Fillers.
A wood-machine tender or feeder tends or feeds a woodworking machine. The term is general and may apply to any of the machine processes in the mill.

A wood finisher smooths and finishes all kinds of woodwork, whether or not it is to be painted, oiled, or varnished. A filler fills the grain of the wood and hardens the surface by applying a preparation of oil and pigments, either with a brush or by dipping into a tank or vat.

Stainers.
Varnishers.
Painters.
A stainer puts on the stain and a varnisher applies varnish, which is usually the finishing coat.

A painter primes or puts a first thin coat of paint on sashes or other work.

Molding-rack men.
Blind boxers.
Shippers.
A molding-rack man has charge of the stock of moldings, arranged by kind. A boxer prepares doors and other products of the mill for the shipper; a blind boxer boxes window blinds for shipment.

WAGONS AND CARRIAGES.

Workmen included among those in occupations requiring skill in the first grade in wagon and carriage factories are foremen and their assistants, head hands, etc., and also pattern-makers, blacksmiths, wheelwrights, wheel-makers, carvers, axle-makers, assemblers, lamp-makers, carriage-part makers, tire setters, upholsterers, trimmers, fine painters, and the like. The second grade is composed of employees who do parts of what years ago might have

been considered complete processes, as rim-makers, hub borers, most of the machine hands (who now turn out by attendance on machinery parts that used to be made by hand), and also sawyers, mill hands, painters, stitchers, etc. The third grade is made up of helpers and assistants, brush hands, pasters, and the like.

Occupations in superintendence include foremen, assistant foremen, gang bosses, etc.

There are no mechanics engaged exclusively in repairing buildings and machinery, except carpenters and steam fitters. There are saw filers to keep the saws in order, but the regular machinists engaged in essential processes of manufacture can be called upon for the repair of machinery.

There are general hands and helpers known as car loaders, wheel cleaners, wagon washers, porters, roustabouts, sweepers, truckers, yardmen, etc.

After the drawing or draft of the carriage or wagon has been carefully worked out to full size on blackboard or paper, patterns, templets, or templates are made from the draft, and with these as a guide the body of the vehicle is constructed.

It is the duty of the inspector to see that the wood which is to enter into the construction of vehicles is thoroughly seasoned. After being approved the timber is sent to the mill, where, as required, it goes to the sawyers.

For a description of the occupations of sawyers, planers, wood carvers, shapers, wood-machine workers, and bench hands, see "lumber and planing mills," page 1178.

In some parts of the United States, especially in the Pacific states, woodworker is a general term for a person who makes any part of the carriage or wagon body, gear, or wheels. In some sections the men who tend the machines by which the wood for these parts is milled out or prepared in the earlier processes are called mill hands.

In building the body and gear the service of the blacksmith is required to strengthen the parts subjected to great strain, to iron the poles and tongues, and to make or attach such small parts as brakes, steps, plates, rocker plates, etc. As a rule the blacksmiths have helpers, technically known as finishers, who assist in forging and attend to the finishing. If the helper only swings the hammer he is merely a laborer.

There are various kinds of axles, but the ones most commonly used are made of steel. In making axles the bars of steel are heated and the ends drawn out under a steam hammer, after which they are turned to the proper shape in a power metal-lathe, and threaded on the ends for nuts.

A wood-axle maker makes wooden axles, or axletrees, to which steel axles are sometimes affixed. After the axles have been turned the hub box is bored from a solid piece of cast steel, and fitted to the axle arm. This box is a metal tube, fitted into the center of the hub of the wheel, forming the sheath within which is fitted the axle arm about which the wheel revolves.

A wheelwright is a skilled man who makes wheels and running gears, but this term had a more general application some years ago than it has to-day; the work is now divided among gear-makers, wheel-makers, and the like. A wheel-maker makes wheels, but this occupation, too, is now generally divided among several workmen, each making one part or performing one operation only.

An automatic hub-turning machine receives the blocks in the rough state, and at one operation makes hubs of any desired size

Car loaders.
Wheel cleaners.
Wagon washers.
Porters.
Roustabouts.
Sweepers.
Truckers.
Yardmen.
Pattern-makers.

Inspectors.

Sawyers.
Planers.
Wood carvers.
Shapers.
Wood-machine workers.
Bench hands.
Woodworkers.
Hand woodworkers.
Mill hands.

Body-makers.
Gear-makers.
Bottom-makers.
Blacksmiths.
Body ironers.
Gear ironers.
Brake-makers.
Platers.
Pole ironers.
Tongue ironers.
Finishers.
Fireworkers.
Ironworkers.
Hammermen.
Hammer operators.
Axle turners.

Wood-axle makers.
Box-makers (machine hands).

Wheelwrights.
Wheel-makers.

or shape. The hub is then bored—that is, a hole is made through its center. This is accomplished by adjusting the hub within two iron clamps, mounted on a carriage, which presents the wood to a horizontal revolving auger. Iron bands are then

Hub turners.
Hub borers.
Hub banders.
Wheel banders.

forced by hydraulic pressure onto the inner and outer ends of the hubs, after which the middle band, having apertures through which the spokes are to be driven, is forced on in the same manner.

Wheel spokes are made by a spoke-maker, who places the rough wood in a lathe for turning irregular forms.

Spoke-makers. From the lathe the spokes are carried to a tenoning and throating machine, by which they are tenoned and throated or grooved on both sides ready for sanding.

The spokes are driven into the hub either by hand or by a spoke-driving machine. The rim ends of the spokes are then cut off

Spoke drivers. at the proper length and tenoned; the hub is adjusted between two projecting arms, and the spokes are first presented to a concave saw, after which they are brought in contact with a hollow auger.

The periphery of a wheel is sometimes called a rim, and sometimes a felloe or felly. In the preparation of bent felloes, a wood-bending machine is employed. The timber is softened in a steam-box and then placed on the table of the bender, where the movement of a lever causes two arms to force the rim around a block of the desired curvature, holding it in position until a strap or bridle is placed on it, when it is removed and set away to dry. If the felloes are

Wheel rimmers.
Bending-machine hands.

small a number can be bent at the same time. The surface of the rim is smoothed in a planing machine, which automatically cuts the four sides at one operation. After mortising, the felloes are driven onto the spokes by hand and the wheel is ready for the tire.

After the iron for the tire has been cut by power shears to the proper length, it is bent to the desired curvature by being passed by the tire bender between power rollers. The iron is heated,

Tire benders.
Single-tire ironers.
Welders.
Tire welders.
Tire setters.

welded by the welder or tire welder, and set on the wheel by the tire setter, either by hand or by machinery. In the former method the tire, after being heated, is driven on the wheel and

suddenly cooled in water, causing it to contract and firmly set. In the latter process, the wheel is placed within an iron band and the tire is driven on cold; the tire is then contracted by pressure.

Holes for bolts are bored through the tire by machinery, and through the rim either by hand, with an auger and bit, or by machinery. The bolts are inserted and nutted,

Tire bolters.
Wheel truers. and their ends cut off by hand, with chisel and hammer or with shears, by tire bolters. The hub having been bored out sufficiently to allow the hub box to be driven in, the box is wedged in and the wheel made true by a wheel truer.

A pole-maker makes carriage poles, shaping them out of wood, and a shaft-maker makes the shafts.

A spring-maker makes by machine processes any of the many different kinds of springs. In making the common elliptical spring, a hole is punched in each plate by a punching machine for the insertion of the bolt which holds together the plates of the spring. The spring-maker then heats the back plate, adjusts it over a pattern or templet, which bends it to the desired shape, and tempers it in oil or water. In the same

Spring-makers. manner the next plate is heated and fitted to the back plate, and so with the other plates needed to complete the spring. The plates are assembled in a vise-like machine, which forces them together compactly, permitting the bolt to be inserted and nutted.

An iron grinder grinds the plates on a grindstone and finishes and polishes them on an emery wheel. Machine hands, metal, and machine hands, wood, are comprehensive terms, the significance of which requires no explanation.

Iron grinders.
Machine hands, metal.
Machine hands, wood.

For a description of the occupations of machinists, see "foundries and metal working," page 1182.

After the various parts of the body, gear, and woodwork of the carriage have been made they are assembled, fitted together, and fastened with screws, nails, and glue. The various parts of the running gear are assembled and put together by an assembler or hanger-up. Then the body and gear are adjusted, putting the vehicle in running order.

In establishments where coach and carriage lamps are made a lamp-maker does that work.

A lock-maker makes locks and catches for coach and carriage doors.

For a description of the occupations of fillers, sanders, brush hands, painters, varnishers, letterers, strippers, color mixers, polishers, etc., see "lumber and planing mills," page 1178, and "foundries and metal working," page 1182.

For some grades of work the paint is mixed in large vats, into which the vehicle is dipped, thus eliminating the operation of applying paint by hand.

The trimmer makes the seat cushions, curtains, and tops, covers the dasher and whip socket, and adjusts the lamps, etc. Some of these parts are stitched before being put on and some are pasted onto the carriage.

Some carriage shops in which repairing is done report the men employed on that work simply as repair hands. Their occupations of course cover a range as wide as the industry itself.

METAL-WORKING INDUSTRIES.

The industries included under "metal working" are iron and steel mills (which comprise blast furnaces, puddling furnaces, steel works, and rolling mills), foundries and metal-working establishments (including locomotive plants and machine shops), shipyards, and car and railroad shops.

Among employees common to two or more industries of this group are machinists, molders, pattern-makers, core-makers, metal-machine workers, drillers, punch hands, slitters, slotters, riveters, boiler-makers, blacksmiths, fitters, tool-makers, lathe hands, forgemen, hammermen, shearers, furnacemen, heaters, brass finishers, decorators, and painters.

In the first grade of skill are foremen and supervisors—known by many names—and rollers, heaters, molders, journeymen machinists, and other workmen representing a similar high grade of ability. Workmen of the second class include certain machinists, machine tenders, and others of a like degree of skill. In the third class are employees doing manual labor that requires little or no experience or judgment, such as shovelers, loaders, carriers, and general laborers.

Foremen of the several departments and processes supervise the work.

In some cases buildings, machinery, and tools are made and repaired by workmen whose labor is also put directly upon the product. Masons, bricklayers, and carpenters are exceptions.

Helpers are found in all departments. Some are boys, such as door boys or pull-ups, gate boys, messenger or errand boys, rivet boys, and core boys.

CAR AND RAILROAD SHOPS.

The workmen in car and railroad shops may be divided into three general grades of skill, as follows: In the first grade are supervisory employees of various names, all-around machinists, some lathe hands, certain boiler-makers, molders, and brass workers, cabinetmakers, carvers, turners, inlayers, marquetry workers,

Machinists.

Carriage-part makers.
Gear workers.
Gear hands.
Wagon-body makers.
Assemblers.
Hangers-up.

Lamp-makers.

Lock-makers.

Fillers.
Sanders.
Brush hands,
Painters.
Varnishers.
Letterers.
Strippers.
Color mixers.
Polishers.

Dippers.

Trimmers.
Upholsterers.
Dash-makers.
Stitchers.
Pastors.

Repair hands.

inside finishers, car builders, certain decorators, certain carpenters, joiners, and the like. In the second grade are machine hands, certain lathe hands, forgers, hammersmiths, glaziers, engine wreckers, some brass workers, and electroplaters, glass embossers, painters, and the like. The third grade includes brass cleaners, dry-kiln men, hair pickers, castings cleaners, and others doing a similar grade of work.

Occupations of superintendence include foremen, assistant foremen, gang bosses, headmen, and the like.

Belt-makers.
Masons.
Horseshoers.
Millwrights.
Stonecutters.

Iron carriers.
Brass cleaners.
Car cleaners.
Castings cleaners.
Pit cleaners.
Boiler washers.
Dry-kiln men.
Lamp trimmers.
Scrap pilers.
Sand dryers.
Sweepers.
Wipers.

Car builders include framers, platform builders, and truck builders; all these are carpenters working upon the parts indicated by their names. A joiner is a skilled carpenter who does the necessary finishing. An inside finisher is a skilled man who applies the inside finish of a car, usually of mahogany, oak, or other fine wood. Decorators are painters who do ornamental work. Repairers or car repairers are carpenters who repair damaged cars, and strippers are carpenters who dismantle cars that are unserviceable.

Car builders.
Framers.
Platform builders.
Truck builders.
Joiners.
Inside finishers.
Decorators.
Repairers.
Car repairers.
Strippers.

For a description of the occupations of sawyers, carvers, carpenters, door-makers, glaziers, cabinetmakers, wood-machine tenders, and fillers, see "lumber and planing mills," page 1178.

Sawyers.
Carvers.
Carpenters.
Door-makers.
Glaziers.
Cabinetmakers.
Wood-machine tenders.
Fillers.

For a description of the occupations of inlayers or marquetry workers and upholsterers, see "furniture," page 1177.

Inlayers.
Marquetry workers.

For a description of the occupations of machinists, pattern-makers, molders, core-makers, boiler-makers, brass finishers, painters, etc., see "foundries and metal working," page 1182.

Machinists.
Pattern-makers.
Molders.
Core-makers.
Boiler-makers.
Brass finishers.
Painters.

For a description of the occupations of furnacemen, heaters, shearmen, and hammersmiths, see "iron and steel," page 1184.

Furnacemen.
Heaters.
Shearmen.
Hammersmiths.

For a description of the occupations of blacksmiths and locksmiths, see "wagons and carriages," page 1180.

Blacksmiths.
Locksmiths.

Trucksmiths are blacksmiths who shape and fit the metallic parts of trucks. Templet-makers are skilled metal-pattern makers who make gauges or templates for standardized products.

Trucksmiths.
Templet-makers.

Engine wreckers are metal workers who dismantle engines unfit for service.

Engine wreckers.

A metal-machine worker operates an ordinary metal-working machine or lathe. Axle cutters cut axles. An axle centerer makes a depression at the exact center of the axle, in order that it may be turned in the lathe. Pipe or flue cutters cut pipes or flues to length. Screw cutters tend screw-threading machines.

Metal-machine workers.
Axle cutters.
Axle centerers.
Pipe cutters.
Flue cutters.
Screw cutters.

Brass workers include finishers and platers of brass. Electroplaters or silver platers deposit a plating of metal by means of an electric current. White-metal workers form articles from a white alloy; their work resembles that of the brass worker.

Brass workers.
Brass finishers and platers.
Electroplaters.
Silver platers.
White-metal workers.

Tinsmiths and coppersmiths do all the tin and copper work about cars. Sheet-iron workers do all necessary work in sheet iron. A bronzer applies bronzing paint to metallic surfaces. Plumbers fit lead pipes for the closets and the gas-lighting apparatus of passenger cars. Valve setters adjust valves. A washstand-maker makes washstands for passenger cars. Screen-makers make screens for car windows.

Tinsmiths.
Coppersmiths.
Sheet-iron workers.
Bronzers.
Plumbers.
Valve setters.
Washstand-makers.
Screen-makers.

Bevelers cut a bevel on glass. Mirror platers coat one side of glass. Glass embossers stamp figures on glass by molding.

Bevelers.
Mirror platers.
Glass embossers.

Marble cutters hammer out marble for decorative purposes.

Marble cutters.

Dyers clean and recolor the textile furnishings of renovated cars. Hair pickers sort hair to be made by the mattress-maker into mattresses for sleeping cars; the mattress-maker may be either a hand or a machine workman.

Dyers.
Hair pickers.
Mattress-makers.

Batterymen care for the cells which supply currents of galvanic electricity for bells, etc., in the cars.

Batterymen.

Inspectors examine the work and testers give working trials to parts that are to be tested.

Inspectors.
Testers.

FOUNDRIES AND METAL WORKING.

Foremen and assistants, some molders and core-makers, temperers, boiler-makers, such machinists as tool-makers, test hands, erectors, pattern-makers, blacksmiths, and forgemen may be placed among workmen of the first grade; in the second grade are melters, tappers, chippers, pourers, grinders, dippers, paint mixers, the various metal-working-machine hands, blacksmiths' strikers, holders-on, bolters, rivet heaters, and core-makers on small plain cores; among those of the third grade are sand shovelers and mixers, castings and pattern carriers, scrap sorters, castings washers, and laborers.

Foremen, heads of departments, and bosses, with assistants, oversee the work of the several shops, as in iron and steel plants. Workmen engaged in construction and repair work on buildings, machinery, and tools are also essentially the same as in iron and steel mills.

Boys are employed as gate tenders, helpers, and rivet passers, in messenger and errand work, and in other capacities, such as core-makers and spindle heaters.

Pattern-makers make wooden patterns; they are skilled men, proficient in the use of wood-working machinery, such as lathes, and also in carving. Metal-pattern makers make metal patterns and are first-class machinists. When not in use the patterns are in the care of the pattern storekeeper, or custodian of patterns.

Pattern-makers.
Wood-pattern makers.
Metal-pattern makers.
Pattern storekeepers.
Custodians of patterns.

The raw material of the foundry is pig iron or scrap, and to melt it requires the employment of the cupola, with the same occupations as those described in Bessemer mills under "iron and steel," page 1184. One large foundry also operated a blast furnace; the fillers and helpers were simply laborers.

Cupola chargers.
Cupola tenders.
Melters.
Tappers.
Fillers and helpers.
Blast furnace.

The molten metal from the cupola is poured into molds prepared by the molder. Molders are either bench, floor, or machine molders. Bench molders, often termed snap molders, make molds for small castings; floor molders make large ones; both are skilled workmen, while machine molders possess less skill, their work being principally to throw sand into molds. Stove-plate molders, although classed by themselves, differ little in skill from the ordinary molder.

Molders.
Bench molders.
Snap molders.
Floor molders.
Machine molders.
Stove-plate molders.

Molders are sometimes classified according to the material from which they make their molds, as loam molders, green-sand molders,

and dry-sand molders. Loam molders and green-sand molders possess about the same degree of skill, while the dry-sand molder is more highly skilled. Molders may also be designated according to the metal which is cast in the molds which they make, as iron molders, brass molders, and molders of other metals. Rammers are molders' helpers, who ram sand around the pattern in the mold with tools called rammers.

Core-makers prepare the cores that fill out spaces intended to be hollow in the casting; they ram specially prepared sand into the forms required, which are afterwards dried or baked in an oven by the oven tender. A flask-maker who makes the flasks or boxes within which the molds are built up is either a carpenter or a molder, according as the flask is made of wood or metal.

Generally the molder himself pours the metal into the molds he has made, but sometimes this work is done by pourers. Skimmers, with a piece of wrought iron, remove the impurities floating on the surface of the hot metal in the ladle; this work is generally done by the molder's helper or rammer.

Shakers or shake-outs shake the loose sand from the castings; this is usually done by molders' helpers. The rattling-machine tender, tumbler, or rumbler removes more of the sand from small castings by means of a rattling box. Superfluous metal on larger castings is sometimes removed by chippers, trimmers, or snaggers with a hammer, or hammer and chisel; but it is often ground off on an emery wheel by a grinder, emery-wheel man, or castings cleaner.

Cranemen or crane runners handle heavy articles, such as ladles of molten metal with the crane; their skill varies from that of the skilled runner of the electric crane to that of the workman who operates a crane by a hand windlass. The tackle and ropes are adjusted and kept in order by riggers; see "shipyards," page 1186.

Boiler-maker and tank-maker are general terms for workmen who make any part of a boiler or tank. The layers-out are skilled workmen who with chalk mark the steel or iron where cuts and holes should be made. The flangers or flange turners make flanges on boiler plate where two pieces are to be joined, by striking the hot metal with hammers. Flange planers are planer hands who bevel the edges of boiler plate; the same result is accomplished by scarfers, who beat out a heated edge with hammers.

Strappers or butt fitters make the joints where a strap of metal is riveted over a seam formed by bringing the edges of two plates flush together. Boiler rollers or rolling-machine operators pass the plates through a machine which gives them the proper degree of curvature.

Rivet drillers drill rivet holes on a radial drill or a drill press. Punchers or punch-press men run machines that punch rivet holes, cut out washers, form articles out of sheet metal under dies, etc.

Fitters-up, shell fitters-up, assemblers, or erectors put the different parts of the boiler together. They place the rivets in position, but do not head them, the heading being done by the riveter, either by hand or by machine. Assembler, erector, and fitter are terms used also in other departments besides the boiler shop and apply to the work of putting together or setting up engines, machinery, etc. The men who do this are generally machinists of a fair degree of skill.

The hand riveter holds against the rivet head a piece of metal which is struck by a driver or tapper wielding a sledge hammer. Machine riveters head the rivet with steam, hydraulic, or pneumatic riveting tools, while a holder-on or boiler-maker's helper holds a heavy hammer or pneumatic holder-on against it. These riveters are of about the same degree of skill; hand riveters, however, are generally of a higher grade than machine riveters.

The calker (or chipper and calker) is a skilled worker who tightens the seams of a boiler by driving in small pieces of metal. Bracers or brace fitters fasten in place the rods or braces that strengthen the various parts of the boilers. Tube setters fit the tubes in the boiler shells.

Heaters heat the rivets and rivet boys carry them back from the forge and place them in position.

A dome setter sets up the dome of a locomotive, bending and lap-welding it and attaching it to the ring of forged steel fitted to the shell of the boiler.

A cab-maker builds the cab of a locomotive and a tinsmith tins it. In other kindred factories tinsmiths or sheet-metal workers do various work in sheet metal, either by hand or with more or less complicated machines. A woodworker builds the frame of the locomotive tender of oak, bracing it with wooden braces and trusses, and flooring it with heavy plank. Occasional woodworkers are also reported by other factories.

For a description of the occupation of sawyers, see "lumber and planing mills," page 1178.

Stove mounters assemble the parts of stoves. Annealers or furnace tenders regulate the heat of the oven in which iron is annealed, usually to make it malleable. Dumpers empty the pots in which the castings are annealed.

Machinist, in its highest application, means a skilled worker who thoroughly understands the use of metal-working machinery (such as the lathe, planer, and other machines), as well as fitting and work at the bench with hand tools. These are the qualifications necessary for a first-class or journeyman machinist. But a skilled machinist is sometimes named according to the sort of work on which he is usually employed, or in which he is especially expert; as a result, many employees who are really skilled or first-class machinists are included in the general class of machine hands. A tool-maker also is an expert machinist. A tool hand is a machinist who works with machine tools. A jobber is a machinist who installs new machinery and does repair work outside the shop.

Machinists of inferior skill, or those who are able to run only a single machine or perhaps do a little bench work, are classed as second-class machinists and grouped with machine tenders or machine hands. Of the lathe hands, those who operate turret lathes are counted the most skillful. Automatic turret lathes, however, after being adjusted by a skilled machinist require only the services of a tender to fill the magazines. Among machine hands are drillers or drill hands, drill-press hands, borers, gear cutters, planers or planer hands, bolt cutters, threaders or threader hands, bolt and other cutters, threaders or bolt threaders, nut tappers, shavers (who finish the heads of bolts and nuts), milling-machine tenders, polishers, nail-makers, reamers, press

Riveters.
Rivet drivers.
Rivet tappers.
Holder-ons.

Calkers.
Chippers and calkers.
Bracers.
Brace fitters.
Tube setters.

Heaters.
Rivet boys.

Dome setters.

Cab-makers.
Tinsmiths.
Sheet-metal workers.
Sheet-iron workers.
Woodworkers.
Bench woodworkers.

Sawyers.

Annealers or furnace tenders.
Stove mounters.
Mounters.
Annealers.
Furnace tenders.
Dumpers.

Machinists.
Journeyman machinists.
Tool-makers.
Tool hands.
Jobbers.

Second-class machinists.
Machine tenders.
Machine hands.
Lathe hands.
Drillers.
Drill hands.
Drill-press hands.
Borers.
Gear cutters.
Planers.
Planer hands.
Bolt cutters.
Threaders.
Bolt threaders.
Nut tappers.
Shavers.
Milling-machine tenders.

Loam molders.
Green-sand molders.
Dry-sand molders.
Iron molders.
Brass molders.
Rammers.

Core-makers.
Flask-makers.

Pourers.
Skimmers.

Shakers.
Shake-outs.
Rattling-machine tenders.
Tumblers.
Chippers.
Trimmers.
Snaggers.
Grinders.
Emery-wheel men.
Castings cleaners.

Crane runners.
Riggers.

Boiler-makers.
Tank-makers.
Layers-out.
Flangers.
Flange turners.
Flange planers.
Scarfers.

Strappers.
Butt fitters.
Boiler rollers.

Rivet drillers.
Punchers.
Punch-press men.

Fitters-up.
Shell fitters-up.
Erectors.
Assemblers.
Fitters.

hands, straighteners, pointers, benders, slitters, slotters, and others. It may be noted, however, that those who grind and straighten spindles for textile machinery become especially skillful at the work, so that their occupation constitutes a distinct trade. A spinner runs a machine that shapes malleable sheet iron into a hollow form.

Machine setters adjust the machines, after which workmen of less skill can attend to keeping them in operation.

Bench hands are machinists who work at the bench with tools, fitting, assembling, or finishing small instruments or parts of machines. They are sometimes called vise hands, from the fact that their work is usually held in a vise.

A millwright keeps the machinery in order or does certain repair work about the factory.

The skill demanded of a tool grinder varies according to the character of the tools he grinds; the grinder of fine tools must be a skilled workman.

A diesinker sinks a design upon a die, either with a hammer and chisel or by forcing in a piece of hot metal.

A brass finisher is as skilled as a first-class machinist. Like the machinist's, his work is done on lathes, planers, drills, and similar machines, or at the bench, but he adds the work of buffing and polishing the brass. Other materials also are smoothed and polished on the buffing wheel, and round surfaces may be polished by holding emery against them while they are revolving rapidly in a speed lathe. Where a polished surface is desired on articles of cast or wrought iron they are usually first ground on large grindstones, then buffed on emery wheels.

Other workers found in a machine shop are gaugers (whose skill varies from comparatively little to that of the workman who works out the minute proportions of intricate machinery), and inspectors, testers, or test hands, who examine machinery for imperfections, and whose skill differs as widely as that of gaugers. Floor hands are general laborers.

In the blacksmith shop the tool dresser, who possesses a high degree of skill, points and sharpens tools. Spring-makers and temperers are blacksmiths of more than ordinary ability. Blacksmiths forge chains and other articles, and do welding and general repair work; they are assisted by helpers, often termed strikers from the character of their work.

Heavy forging is done with power hammers, involving the employment of forgemen, hammermen, hammer drivers, and forge heaters, whose occupations are described under "iron and steel," page 1184. Spindles, boltheads, etc., are usually formed from bar iron in special forging machines.

Letterers are skilled painters who letter machinery; strippers, who are not so highly skilled, do striping and other ornamental work; after these in point of skill are the ordinary painters or brush hands; and then the dippers, who simply dip or immerse articles in vats of paint. Japanners apply varnish called "japan"; varnishers are generally brush hands, although they may be dippers. Enamellers put a glossy surface on metal ware to prevent corrosion. Paint or color mixers must possess some experience and good judgment.

Coppersmiths do whatever work in copper is required. Some goods are plated with nickel by platers. Electricians attend to all electrical work, such as winding dynamos, where these are made, and

wiring electrical machines. Pipe fitters and steam fitters fit up steam connections, and valve-men pack and set valves. Browners brown gun barrels. Gas-makers or gas producers manufacture gas. Reelers or winders operate machinery that coils wire. Solderers do the necessary soldering.

Packers wrap, box, or otherwise prepare finished articles for shipment. Shippers attend to sending them out.

IRON AND STEEL.

Among the most skilled iron and steel workers, in addition to the foremen and assistants, may be named rollers, heaters, roughers, stranders, finishers, puddlers, chemists, and forgemen. The various metal-working-machine hands, tablemen, ladle-men, levermen, liners and patchers, chargers, hookers, and crane and hoist men may be given position among those of the second class. In the third class are barrowmen or buggymen, cleaners, coal heavers, wheelers, sledgers, and sweepers.

A foreman has charge of each department or process. In the rolling mill the roller is responsible for the care of the roll train and the character of its product; under his direction are the rougher, the strander, the finisher, and others. A similar subdivision of responsibility is found in the different operations of the several departments throughout iron and steel mills.

Construction and repair work about the buildings, machinery (including the cranes), and tools is performed by bricklayers and masons, machinists, blacksmiths, riggers, carpenters, millwrights, and others, usually hired for these special purposes.

About the blast furnace and other departments of iron and steel plants certain railway employees are engaged in handling the heavy products on railroads, in yards and shops. Trackmen lay new track and keep the old in repair. Towermen, stationmen, or switchmen switch cars from one track to another.

Signalmen set signals for the guidance of the engineers. Couplers or hook-ups couple cars to one another and to the locomotive. The metalman has charge of the cars of molten metal. The hostler cares for locomotives in the engine house. A car checker is a tallyman who records the numbers of the cars arriving with material and being sent away with the finished product.

Laborers or general hands include carbonmen, filterers, handymen, wheelers, levelers, doggers, care takers, metal mixers, floormen, stranglers, and stuffers.

In a blast furnace the necessary chemical work is done in the laboratory by chemists, under the direction of the chief chemist. Chemists' helpers are sometimes termed laboratory men. In a locomotive boiler shop the plates are carefully analyzed before use. Coke, ore, and limestone, as well as the iron, spiegel, ferro-manganese, and slag are sampled and prepared for analysis by samplers.

Weighers weigh and record the weight of all material coming to the furnace or shipped away. (See also page 1185.)

Hoist engineers operate the engines used for hoisting the material to the top of the stack and for raising and lowering the belts to permit the ingress of stock and test the height of stock in the furnace stack; pig-machine engineers run the engines that move the string of molds; pump engineers are in charge of the pressure pumps at the boilers; blast or blowing engineers supply the blast to the furnace; and locomotive engineers run the ladles containing the molten metal from the furnace to the Bessemer converter, open

Steam fitters.
Valvemmen.
Browners.
Gas-makers.
Gas producers.
Reelers.
Winders.
Solderers.

Packers.
Shippers.

Trackmen.
Towermen.
Stationmen.
Switchmen.

Signalmen.
Couplers.
Hook-ups.
Metalmen.
Hostlers.
Car checkers.

Carbonmen.
Filterers.
Handymen.
Wheelers.
Levelers.
Doggers.
Care takers.
Metal mixers.
Floormen.
Strangers.
Stuffers.

Chemists.
Laboratory men.

Weighers.

Hoisting the material to the top of the stack and for raising and lowering the belts

Engineers.
Hoist engineers.
Pig-machine engineers.
Pump engineers.
Blast engineers.
Blowing engineers.
Locomotive engineers.
Firemen.

hearth furnace, or pig machine, and the slag to the dump. Firemen are required to keep up steam in the boilers of the various engines.

The hot blast which passes through the stoves to the furnace is regulated by the hot-blast men, stove tenders, gas tenders, or air-furnace men; but the last term usually applies to the men who run a reverberatory furnace.

Boiler blowers or flue cleaners clean flues with a steam jet, and scalers clean the scale from boiler tubes. Water tenders supply the boilers with water, and inspectors inspect the condition of the boilers.

Unloaders unload the ore, coke, and scrap from cars and dump them into the proper bins; dockers and stagemen unload ore from vessels. Coke screeners screen coke to remove the dust. A breaker or sledger breaks up large pieces of scrap. A barrowman, buggyman, or buggy puller wheels the material, loaded into barrows by the helpers, binmen, stockmen, or stock-house men, to the scales for weighing by the weighers. Cagers place the barrows on the hoist. A skipman or hoistman elevates the charge. Chargers, top fillers, or dumpers receive the barrows at the top of the hoist and dump the contents into the furnace.

Sweepers, scrappers, scrapmen, or clean-ups sweep and pick up the scrap around the furnace.

Furnace keepers have general charge of the furnaces. They tap out the iron and cinder, supervise the running of the same into sand molds, chills, ladles, or machines, stop the iron and cinder notches at the end of the cast of iron or flush of cinder, and regulate the lengths of dam and skimmer, so as to insure the proper separation of cinder from iron when casting. They also take all precautions to guard against a break-out of iron through the side of the furnace, and regulate the supply of water to the tyers, coolers, taps, bosh plates, coils, sprays, etc., except that at large furnaces; the last is done by a water tender.

At furnaces equipped with pig-casting machines, crannemen lift the ladles when full and swing them to the ladle pourers, who pour the material into the molds of the casting machine. Hot-metal ladles are now usually mounted on cars on trunnions, and can be revolved like a Bessemer converter to pour iron over the track to the pig-machine molds or the mixer. For a description of the occupations of riggers, see "shipyards," page 1186.

Ladle scrappers are laborers who clean up the scrap from the ladles. Other laborers, sometimes called pig stickers, knock loose the pigs that stick to the molds.

At plants where no casting machine is used the metal is run along a runner into open molds of sand on the casting floor.

Casting-house men, sand-house men, or foundrymen are general laborers about the cast house. Iron carriers break and rack up the iron while hot; when the pigs are nearly cold they carry them by hand or with overhead conveyors to the cars at the side of the cast house.

Cinder snappers, slagmen, cindermen, or runnermen break slag or cinders and load it into cars, or run it when molten into ladles, slag cars, or cinder machines.

Graders determine the grade of the pig, and stockers pile and keep a record of the stock for which there is no immediate demand.

Wheelmen or wheelwrights keep the buggies or barrows in repair.

Some of the operatives occasionally reported in this industry are as follows: Cinder tappers who assist the furnace keepers and attend to drawing off the slag; dynamitemen who explode dynamite in the stack, to dislodge skulls or hardened masses of ore; a pull-up who raises and lowers certain furnace doors; and pig-bed men who break the pigs out of the beds with iron crowbars.

The foreman of the Bessemer mill, by which iron is converted into steel, supervises everything about the plant. There are two of these foremen, one of whom works during the day and the other during the night. In many establishments the iron, after it is drawn from the blast furnace, is made directly into steel without being allowed to cool; but where pig iron is purchased it has to be melted in a cupola before it can be made into steel in a Bessemer converter. In those mills to which the raw material comes in the shape of cast pig instead of molten metal, the metal weigher weighs all the material received before it goes to the cupola.

The yard foreman has charge of the unloaders, who unload from cars the pigs, scrap, limestone, and coke; and of the coke, limestone, and metal wheelers, who, with the assistance of the barrow loaders, load their barrows and wheel them back to the hoist. Here the barrows are raised by the hoist engineer to the top of the cupola, and their contents dumped into the cupola by the dumpers, or top fillers.

The cupola is run under the direction of the cupola foreman, or tapper, who draws off the iron into immense ladle cars. These cars are pushed to the Bessemer vessel by a narrow-gauge engine run by a locomotive engineer, or drawn by a wire rope.

Levermen and regulators handle the converter vessel by means of levers, while a blower regulates the blast.

At the completion of the blow the steel is poured out into ladles, which are swung by the ladlemen to a platform where a steel or ladle pourer, or teemer, pours the steel into cast-iron molds. A dispatcher or distributor directs the movement of the hot-metal ladles. A mold sander sands, caps, and keys up the mold.

After the ingot has cooled somewhat, a stripper or stripper leverman strips the mold from it by hydraulic machinery.

Refractory material for linings, which has been wheeled from the bins to the mixing house by mixing-house men and ground in large grinding pans by mixing-house panmen, is used by liners and patchers to line the Bessemer vessel, the furnace hearth, and the metal ladle.

Stopper-makers make the refractory stoppers, which the stopper setter carefully inserts in the ladle to close the hole from which the metal is tapped. Vessel-bottom makers make the refractory bottoms to the Bessemer vessels.

Yard-crane engineers run the steam cranes used in handling the molds and in loading and unloading ingots and scrap.

In the open-hearth process a first helper, in some mills, has immediate charge of two furnaces; under the supervision of the open-hearth or furnace foreman he gets the heat ready for tapping and is responsible for the repair of the furnace hearth. The second helper acts as assistant to the first helper, is responsible for the condition of the tap hole, and also taps the heat into the pit ladle from the back of the furnace. A sampler takes samples of the heat and carries them to the laboratory for analysis.

Hot-blast men.
Air-furnace men.
Stove tenders.
Gas tenders.

Boiler blowers.
Flue cleaners.
Scalers.
Water tenders.
Inspectors.

Unloaders.
Dockers.
Stagomen.
Coke screeners.
Breakers.
Sledgers.
Barrowmen.
Buggyman.
Buggy pullers.
Binmen.
Stockmen.
Stock-house men.
Cagers.
Skipmen.
Hoistmen.
Chargers.
Top fillers.
Dumpers.

Sweepers.
Scrappers.
Scrapmen.
Clean-ups.

Furnace keepers.
Furnace tenders.
Tappers.

Crannemen.
Ladle pourers.
Riggers.

Ladle scrappers.
Pig stickers.

Casting-house men.
Sand-house men.
Foundrymen.

Cinder snappers.
Slagmen.
Cindermen.
Runnermen.

Graders.
Stockers.

Wheelmen.
Wheelwrights.

Cinder tappers.
Dynamitomen.
Pull-ups.
Pig-bed men.

Weighers.

Coke wheelers.
Limestone wheelers.
Metal wheelers.
Barrow loaders.

Cupola tenders.
Cupola tappers.

Levermen.
Regulators.
Blowers.

Ladlemen.
Teemers.
Steel pourers.
Dispatchers.
Distributors.
Mold sanders.

Strippers.
Stripper levermen.

Mixing-house men.
Mixing-house panmen.
Liners.
Patchers.

Stopper-makers.
Stopper setters.
Vessel-bottom makers.

Yard-crane engineers.

First helpers.
Second helpers.

A charging-machine man charges the furnaces. A soaking-pit craneman charges the ingots into and draws them from the soaking pit. Where artificial gas is used in the open-hearth process it is made by gas producers.

Charging-machine men.
Gas producers.

Pitmen have charge of the pits. They set the molds properly, and cap, sand, and key them up. Cinder-pit men act as helpers and remove slag or cinders from the pits.

Pitmen.
Cinder-pit men.

The pots of fire-clay in which the materials for crucible steel are melted are made by pot-makers and dried and burned by kiln tenders.

Pot-makers.
Kiln tenders.

The crucible is filled by hand by the pot filler and is then lowered into the melting hole. The covers over these holes are handled by the telegrapher, who operates an overhead conveyor running on a rail. The bottom of the melting hole is covered with a layer of coke dust by the bottom-maker. The melting of the contents of the crucible is conducted by the melter.

Pot fillers.
Telegraphers.
Bottom-makers.
Melters.

The puller-out, swathed in sacking which has been wet to prevent ignition, lifts out the crucible with a pair of tongs. The pourer then raises it and pours the contents into the mold. This work requires much strength, skill, and care, for the stream must be continuous, and in falling must not be allowed to strike the sides of the mold.

Pullers-out.
Pourers.

The work of the maker of molds for casting crucible steel involves a knowledge of the work of both the machinist and the molder.

Mold-makers.

Wrought or malleable iron is made from cast iron in the puddling furnace by the puddler. He stirs the mass of iron with a long iron tool, and at the proper time works up a ball of it in order that the admixed slag may be removed under a hammer by a shingler, or in a sort of rotary press operated by a squeezer-man. If the mass is heated in a forge fire, the workman is called a knobbler.

Puddlers.
Shinglers.
Squeezermen.
Knobblers.

In the forge department are hammermen or hammer drivers, who control the power hammers under the direction of the forgemen, who manipulate the work under the hammers. Set in the faces of the hammers by die setters are dies that have been made by die-makers, who are skilled machinists. Assisting the forgemen are forge heaters, who see that all work for the hammer is brought to the proper welding heat.

Hammermen.
Hammer drivers.
Hammersmiths.
Forgemen.
Die setters.
Die-makers.
Forge heaters.

In a rolling mill the steel ingot or the iron bloom is shaped into marketable form, such as rails, beams, plates, etc. This is done by the roller who has general charge of the train of rolls and is responsible for the quality of the product. The rolls are turned on a lathe by a roll turner; the roll necks that fit into the housings are trued by the roll necker, a lathe hand; and notches are cut in the grooves of the roll by the roll ragger.

Rollers.
Roll turners.
Roll neckers.
Roll raggars.

Before rolling, the ingot of steel is reheated by the heater, a workman of skill and experience; or, if not too far cooled, it is brought to working temperature by placing in a soaking pit, the bottom of which has been made up with coke dust by a bottom-maker.

Heaters.
Bottom-makers.

Guides to direct the work on the ingot are placed in front of the rolls by guidemen or guide setters. Screwmen, under the supervision of the roller, regulate the distance between the rolls.

Guidemen.
Guide setters.
Screwmen.

A roll engineer runs the engine that rotates the rollers of the roll table, which is raised and lowered by levers in the hands of tablemen. The ingot is handled while on the table, turned over, and guided to the different passes by the manipulator, an apparatus which the roller works by means of levers; if the ingot is out of reach of the manipulator, this work is done by the forkman. The stamper beats the heat number on the work.

Roll engineers.
Tablemen.
Manipulator men.
Forkmen.
Stampers.

The iron bloom goes from the shingler or squeezer to the rougher or muck roller, who lifts it with tongs to the first pass through the rolls. On the other or back side of the rolls stands another workman. If the rolls are non-reversing two-high, the workman is called a passer and passes the work back over the rolls to the rougher; if the rolls are two-high reversing, or three-high, he passes it back through the next pass of the rolls and is called a catcher.

Squeezers.
Roughers.
Muck rollers.
Passers.
Catchers.

A strander is a roll tender in charge of intermediate passes. When the heated iron has cooled sufficiently after leaving the roughing rolls, shearmen cut it to short lengths, and workmen termed pilers pile it into bundles for reheating. The heater must possess skill in order to be able to tell when the proper degree of temperature has been reached.

Stranders.
Pilers.
Pile heaters.

The drag-out removes the heated pile from the furnace by means of tongs; when the work in the rolls is too heavy to be lifted by a single workman, he is assisted by hookers, who lift the material by means of bars suspended from chains.

Drag-outs.
Hookers.

The workman in charge of the last set of rolls is called the finisher. Bars coming from the finishing rolls are straightened by two tongers, tongsmen, or straighteners, who seize the bar, one at each end and pull it out, thus effecting a rough straightening.

Finishers.
Tongers.
Tongsmen.

Catchers, finishers, roughers, and stranders are all included under the general term roll tenders.

Roll tenders.

In the rolling of plates the process followed is similar to that used in rolling rails, except that the rolls used have smooth faces.

The rolled product is cooled on cooling beds in charge of cooling or hot bed men, or coolers, and passed through straightening rolls by a straightener, assisted by a gagger. Next a gauger measures the plate under the direction of the marker, and a line drawer indicates where the shearing is to be done. The shears that cut the steel to size are in charge of the shearer; edgers trim the edges of the plates under the shears. Shipping marks and dimensions are put on by painters. Inspectors look the piece over for surface defects, and to see that it has been cut to proper size.

Cooling-bed men.
Hot-bed men.
Coolers.
Straighteners.
Gaggers.
Gaugers.
Markers.
Line drawers.
Shears.
Edgers.
Painters.
Inspectors.

Preparatory to galvanizing, iron is dipped in acid by a pickler or dresser, after which it is placed in a drying oven by the oven tender, to dry the acid on. The galvanizer immerses the iron in a bath of molten zinc.

Picklers.
Dressers.
Oven tenders.
Galvanizers.

In a tin-plate mill a doubler doubles the sheet over while it is being rolled. Matchers match the edges of two sheets intended for tin plate, which are passed through the rolls one after the other.

Doublers.
Matchers.

Bolt makers and headers, nailers, spikers, and nut-makers or nutters operate machines that produce the articles implied in the name. Machine hands include these and other operators of machines of various sorts.

Bolt-makers.
Boltheaders.
Nailers.
Spikers.
Nut-makers.
Nutters.
Machine hands.

For the occupations of other employees, such as molders, rattling-machine men or tumblers, annealers, machinists, operators of the various metal-working machines, drillers, punch hands, slitters, slotters, riveters, boiler-makers, blacksmiths, fitters, holders-on, tool-makers, strikers, lathe hands, pattern-makers, and others, see "foundries and metal working," page 1182.

Molders.
Rattling-machine men.
Tumblers.
Annealers.
Machinists.
Drillers.
Punch hands.
Slitters.
Slotters.
Riveters.
Boiler-makers.
Blacksmiths.
Fitters.
Holders-on.
Tool-makers.
Strikers.
Lathe hands.
Pattern-makers.

SHIPYARDS.

Ship carpenters, carvers, molders, machinists, fitters or iron-workers, and ship joiners are among the most skilled workmen in the shipyard. The riveters, riggers, and various machine workers

belong, according to the method of classification employed, in the second grade. In the third class are general helpers, laborers, etc.

Occupations not directly concerned in the work on the ship are found, but they are similar to those described under "iron and steel" and "foundries and metal working."

Of the occupations found in shipyards, those of molders, boiler-makers, blacksmiths, machinists, and the various metal-working-machine hands are identical with occupations of the same name described under "foundries and metal working." (See page 1182.)

A loftsmen, under the supervision of the foreman of the loft, strikes out upon the mold-loft floor the full-size plan of the vessel to be built. Bevelers make the bevels or angles for joining one surface to another, as where the end of the beam joins another beam, and for shaping the ribs to the outline of the vessel.

In shipyards devoted to the construction of iron and steel vessels, a fitter or fitter-up, from the ship's frames, lays out or marks the shape of the plates which are to form the covering for the vessel, making wooden templets when necessary; usually he also inspects the assembled work to see that it has gone together as he laid it out. From the templets, or according to the marks on the plates, other workmen cut, drill, and machine the plates to prepare them for their proper positions in the vessel. Erectors place the plates in position and bolters-up fasten them securely. Iron-

workers are workmen employed on any process in the construction of an iron ship. The work of putting in place the metal plates is similar to that performed on a boiler in a boiler shop. For a description of the occupations of riveters, heaters, holders-on, etc., see "foundries and metal working," page 1182.

The parts of a wooden vessel are sawed or hewn to shape by sawyers or hewers, respectively. The hewers shape the form by cutting away the superfluous wood with an adz; with the same instrument dubbers smooth the hewn surface.

Ship carpenters on wooden vessels, corresponding to the iron-workers or fitters in an iron and steel ship yard, put up the frame of the ship and cover it with plank. The well-trained ship carpenter is a skilled workman.

The fastener or driver of tree nails drives pins of oak or locust to serve as fasteners for planks below the water line.

As the work proceeds the stage builder erects rough staging about the hull; the boss stage builder is usually an expert ship carpenter who shores the members in proper line and is responsible for keeping the ship in shape. The inside of a ship is sheathed by a liner.

Ship joiners are skilled carpenters who do the finer kinds of carpentering about the vessel. Inboard joiners do the inside work, and outboard joiners, working with a plane, smooth down the exterior surface of a wooden vessel. A ceiling worker is a skilled joiner who finishes the ceilings of the cabins and saloons.

Calkers render the seams of the vessel water-tight by driving tarred oakum between the planks with a small iron and wooden mallet or a hammer, and, after the openings have thus been filled, smear the oakum with melted pitch.

Spar-makers round and draw masts, beams, and spars down to size with ax and jack plane.

For a description of the occupation of wood carvers, see "lumber and planing mills," page 1178.

Riggers raise the masts and adjust the necessary ropes and rigging. From analogy to this work, the men who, by means of tackle, etc., move heavy weights are also called riggers; their distinctive work is to adjust the ropes and fastenings of cranes.

A tinner or tinsmith does the necessary tin work, and painters and varnishers are employed to finish the surface of the various parts of vessels.

MISCELLANEOUS INDUSTRIES.

BAKERIES.

In the first grade of skill among occupations in bakeries are foremen and their assistants, oven tenders, general bakers, cake and pie bakers, machine mixers, doughnut hands, and spongers; in the second are bench workers, peelers, roller hands, and the like; and in the third are pie slippers, pie fillers, fruit-room hands, labelers, and pan greasers.

Occupations of superintendence include foremen and forewomen, assistant foremen and forewomen of various kinds, and second and third hands, who are also assistant foremen. The subdivisions of superintendence cover not only departments and rooms, but also the processes by which goods are made and the kinds of products; thus there were reported foremen mixers, foremen cake-makers, forewomen icers, etc.

There are mechanics of various sorts, such as carpenters, engineers, machinists, and millwrights, who repair buildings and machines and keep the machinery moving.

Helpers and laborers of all kinds abound to do the heavy carrying and sweeping up; there are also boys who assist in the various occupations and do errands. In many bakeries there are wagonmen, deliverymen, or drivers, who deliver the bakery products to customers or to railroad and other stations to be shipped away.

In a small bakery, bakers make not only bread, but cake, pie, and whatever other products are turned out by the shop; in larger shops there are bread bakers, cake bakers, pie bakers, pastry bakers, cracker bakers, doughnut-makers, etc.; these are all considered skilled men. A further division of labor delegates parts of the process to certain men or groups of men, as dough-makers, oven tenders, bench hands, spongers, etc.

Where the division of labor is minute a sponger makes or sets the sponge of flour and yeast for bread; dough-makers knead the bread by hand, or machine mixers mix it with a machine. These men are considered equal to bakers in skill. The term mixers often includes both the makers and the kneaders of dough.

When the dough has risen, a bench worker or bench hand takes it to a table where he cuts it into pieces, weighs it, shapes it into loaves, and puts these loaves into pans; he also forms rolls, cakes, and crullers.

Roller hands roll out the dough for crullers or doughnuts into a sheet of even thickness and cut it into forms with a die or cutter. These forms are placed on perforated iron screens having handles at either end, which are let down into hot fat and kept there until the doughnuts are sufficiently cooked. Doughnut-makers are equal to bakers in skill.

Fruit-room hands are unskilled women or boys who pare and slice apples and other fruit for pie filling.

Riggers.
Tinners.
Tinsmiths.
Painters.
Varnishers.

Errand boys.
Wagonmen.
Deliverymen.
Drivers.

Bakers.
Bread bakers.
Cake bakers.
Pie bakers.
Pastry bakers.
Cracker bakers.

Spongers.
Dough-makers.
Machine mixers.
Mixers.

Bench workers.
Bench hands.

Roller hands.
Doughnut-makers.

Fruit-room hands.

After the pie dough has been cut into small pieces, rolled out, and laid in the bottoms of pie plates, pie fillers put into each pie the required amount of filling. This is unskilled work. A pan greaser greases pans in which the different kinds of goods are to be baked.

**Pie fillers.
Pan greasers.**

An icer is one who prepares and places the icing or frosting on cakes.

Icers.

An extra hand is one who takes the place of anyone in his line who is absent on account of sickness or for any other cause.

Extra hands.

The foreman of the ovens devotes his personal attention to the baking. Those who tend the fires, regulate the temperature of the ovens, and, under the foreman, do the baking, putting the loaves of bread or cake or the pies into the oven and removing them when

baked, are called oven tenders or oven workers; they are among the most skilled workers in a bake shop.

**Oven tenders.
Oven workers.**

Peelers place pies in the oven with a shovel or peel, which is dexterously withdrawn, and also remove the pies when baked. Pie slippers remove the pies from the tin plates on which they are baked and place them on wooden or paper plates.

**Peelers.
Pie slippers.**

Labelers paste paper labels on loaves of bread. A bread counter counts the loaves of bread after they have been baked.

**Labelers.
Bread counters.**

In a large bakery there are coopers and assistants who put together the barrels in which crackers and other goods are shipped, and packers who pack the goods.

**Coopers.
Packers.**

BREWERIES.

To a greater extent than in some other industries, the first grade of skill of employees in breweries is made up of foremen and their assistants in departments and rooms and others who oversee men and processes. All-around maltsters and brewers may be added to the list. The second grade includes grain dryers, millers, kettle-men, cellar-men, rackers, bottlers, coopers, and corking-machine operators. In the third grade are keg fillers, washhouse men, daubers, cork wirers and stampers, labelers, packers, and the like.

Occupations of superintendence include foremen and forewomen of departments, rooms, and processes, with their assistants of various kinds, head maltsters, night maltsters, head bottlers, boss coopers, boss wheelwrights, master mechanics, etc.

Among mechanics employed to attend to the repairing of brewery buildings and machinery and to care for the horses and wagons, are brick masons, carpenters, electricians, stablemen, horseshoers, machinists, painters, pipe fitters, plumbers, pattern-makers, repairers, faucet grinders, and bar-pump men. Drivers deliver the beer, ale, etc., to bottlers and to saloons.

**Stablemen.
Bar-pump men.
Drivers.
Pitch-yard men.
Oilers.
Porters.
Wagon washers.
Machinery wipers.
Whitewashers.
Yard hands.
Wood haulers.
Bottling-room boys.**

General hands, helpers, and laborers include drivers' helpers, beer-peddlers' helpers, pitch-yard men, oilers, porters, wagon washers, machinery wipers, whitewashers, yard hands, wood haulers, etc. Sometimes boys are employed as general hands, bottling-room boys, boy bottlers, etc.

A flayman flays or separates the chaff and foreign substances from the grain. A grain dryer dries the grain in a malt kiln or malt dryer.

**Flaymen.
Grain dryers.**

A maltster is a skilled man who supervises the preparation of the malt from grain. A miller, malt miller, or gristmill man bruises or crushes the malt between iron rollers.

**Maltsters.
Millers.
Malt millers.
Gristmill men.
Grain-machine men.
Machine operators.**

A brewer is a skilled employee who oversees or performs all the

operations in the brewing of malt liquors. A kettleman tends the kettle or malt tub, in which at a high temperature the crushed malt is boiled into wort. A cellarman, fermenting-room man, or fermenting-cellar man tends the fermenting vats or tuns, into which the boiled wort is run, and adds the yeast. A racker racks or draws off the wort into hogsheads, that it may ferment more.

**Brewers.
Kettleman.
Cellarman.
Fermenting-room men.
Fermenting-cellar men.
Rackers.**

A washhouse man or hand cleans the various utensils or vessels used in the manufacturing process, or the barrels, bottles, etc., in which the product is marketed. A boiler or kettle cleaner cleans the boilers in which the malt mash is boiled.

**Washhouse men.
Washhouse hands.
Boiler cleaners.
Kettle cleaners.**

A bottle sorter is an ordinary hand who sorts new or old bottles into kinds and sizes. Both new and returned bottles are washed by bottle washers.

**Bottle sorters.
Bottle washers.**

Fillers or keg fillers fill kegs or barrels with malt liquor from the hogsheads into which it has been racked.

**Fillers.
Keg fillers.**

A bottler is the operator of a bottling machine, with which corks are forced into the mouths of filled bottles. Sometimes he merely fills the bottles, while a corking-machine operator or man operates the bottling or corking machine. A cork wirer wires the corks of the filled bottles.

**Bottlers.
Corking-machine operators.
Corking-machine men.
Cork wirers.**

A labeler or label boy labels the bottled malt liquor. Sometimes he also puts tin-foil over the cork, in which case he is called a labeler and tin-foiler.

**Labelers.
Label boys.
Labelers and tin-foilers.**

A packer packs the bottled malt liquors into boxes or cases for delivery or shipment.

Packers.

A stamper puts the revenue stamps on filled kegs or barrels into railway cars for shipment.

**Stampers.
Car loaders.**

A cooper makes the barrels, half-barrels, and kegs into which the brewed liquor is put, and a dauber daubs them on the inside with pitch, so that the wood may not absorb the beer and become sour.

**Coopers.
Daubers.**

For a description of occupations of ice-machine men, ice-machine hands, or icemen, see "distilleries," page 1191.

CANDY.

Occupations in candy factories may be classed, with regard to skill required, as follows: In the first grade are foremen, forewomen, head workers, pan workers, ornamenters, specialty men, cream-makers, crystal-sirup makers, and others doing work of like nature; in the second are candy-makers in general, hand and machine dippers, grain workers, cream casters, marshmallow runners, and the like; and in the third are lozenge cutters, soda-tablet punchers, and cocoanut rollers.

In superintendence there are foremen and forewomen, head pan-workers, cream-dippers-in-charge, etc.

Carpenters, electricians, engineers, firemen, and machinists are employed to care for the repair and lighting of the factories and the repair and operation of the machinery.

The horehound plant, a decoction of which is used in making horehound candy, is macerated with knives in a machine or roller, generally by boys, who are called horehound breakers.

Horehound breakers.

Candy-maker is a comprehensive term covering the occupations of all employees who make the various sorts of candy. The manufacture of some candy is a comparatively simple process, the successive stages often being performed by the same workman. In the tabulation, there-

Candy-makers.

fore, the boilers, makers, ornamenters, panmen, etc., were all combined as candy-makers.

A cooker cooks the sugary mixture used for hard candy. A candy boiler boils sugar for either hard or soft candy, and a hard-boiled-candy maker boils hard candy. Stick candy is made by a stick puller or stickman, who pulls the hard candy after it has been boiled; boiling and pulling are generally done by the same man. Hard candy is sometimes spun by hand into spun sticks by a stick-candy spinner.

A lozenge cutter tends a machine by which lozenges are cut into shape, and sometimes also stamps them at the same time with the legend by which they are to be known, or with mottoes; in other cases the printing is done on a separate machine, operated by an employee called a machine printer.

A puncher of soda tablets runs a machine that makes tablets of soda mixture.

Cocoanut openers are helpers who break open cocoanuts; the meats are then prepared for the cocoanut boiler or candy-maker by cocoanut workers, who grate them, or cocoanut rollers, who macerate them by rolling. These are unskilled operatives.

A cocoanut boiler tends the boiling of cocoanut and sugar to be made into cocoanut candy or cakes or used for ornamental purposes. Sometimes, however, he does all the work of a cocoanut-maker. A cocoanut-maker, or cocoanut-candy maker, makes cocoanut candy; his occupation is equivalent to that of a soft-candy maker.

A caramel-maker makes caramels of all kinds.

Chocolate creams and bonbons—except those made by hand, in the old way—are cast. A starch boy or starchman stirs up the starch and gets it ready for the making of the cast. The starch is put into a large bin, and a boy called a starch printer places forms across its surface; these leave their imprint in the starch, and the candy is poured into the molds thus made.

A cream-maker is one who melts up or prepares the cream to be cast into the molds; he has a boy helper, who stirs the cream and does the general work. Generally the cream is beaten into the proper consistency by hand, although a recently invented machine, operated by a machine cream beater, is sometimes used.

A cast-cream maker runs the cream through a funnel into the molds. When the creams harden they are ready to be dipped, except that any starch which may have adhered is removed by a machine starch cleaner. Sometimes a bellows is used for this.

A chocolate-maker has for his specialty the making of chocolate candy in its various forms.

A dipper dips all kinds of candy which require coating with chocolate, cream, etc., as chocolate creams and bonbons. A chocolate dipper dips the cream centers into warm chocolate by hand; when taken out the creams are shaped with the fingers into various designs. This work is generally done by girls, who sometimes dip from 25 to 100 pounds in a day. Sometimes

the man who casts the cream also does the dipping; he is then known as a chocolate-cream maker, the term describing the combined occupation.

A handmade-cream dipper dips handmade creams. This is the old style of cream making. A cream dipper—generally a girl—dips the bonbon centers, which have been cast in some special shape, into the cream, in order to put on the outside coating. She uses a dipper consisting of an oval loop of wire attached to a rather long handle. After being dipped the creams are laid on slabs to harden and are sometimes crystallized.

A crystal-sirup maker boils the sugar used for crystallizing, generally to 232°, and cools it in the kettle until it is lukewarm. He then pours it over the confections to be crystallized, leaving them overnight in a warm room. In the morning he drains off the superfluous sirup, the candy remaining covered with shining particles of crystallized sugar.

A selector of gums is a buyer of gum arabic, of which the gum drops are made. A gum-drop maker makes not only gum drops, but such goods as pastes of all kinds, jellied candies, etc. Gum drops are rolled in sugar by a gum-drop sander, or put into sirup and crystallized. A fig-paste helper is a general assistant in the gum-drop department.

Marshmallow runners cast the material for marshmallows into molds similar to those used in casting cream and bonbon centers.

A grain worker boils, grains, and drops old-fashioned peppermints or dry candy.

A pan worker does all sorts of dragée or sugar-plum work, using revolving kettles in which nuts, caraway seeds, etc., which form the centers of the candies to be made, become incrustated with the sirup they collect.

The employee who can make all kinds of fancy goods is called a specialty man.

An ornamenter puts the frosting or other ornamental work on candies of various descriptions; this is skilled work.

A tray carrier is a boy who carries trays of candy from the place where it is made to the packers. A paper cutter cuts the papers in which caramels, lozenges, etc., are wrapped. Candy wrappers do up all kinds of goods in wrappers; they are often known, according to the goods they wrap, as caramel wrappers, soda-tablet wrappers, etc.

Candy packers put up various kinds of candy in boxes and cases; they are known, according to the kind of goods they put up, as bonbon packers, chocolate packers, cocoa packers, mixed-goods packers, penny-goods packers, and the like.

CHEMICALS.

In chemical factories the number of different occupational designations reported was almost as great as the number of workmen; but the names returned refer rather to separate processes in the manufacture of different chemical products than to real differences in the character of the work. No statistical purpose would be served by an enumeration of all these terms, and consequently none are given here except such as appear in the wage tables for this industry.

In many establishments skilled work is required only of the superintendent and foremen, the laborers following routine work requiring little skill. In other factories some manual dexterity is required on the part of the workmen; consequently men in such positions may by long practice in a specified line of employment attain to the rank of skilled laborers.

The term chemical worker is a self-explanatory designation for a comprehensive class of workmen engaged in chemical processes.

In the manufacture of sulphuric acid, chamber and furnace men feed the pyrites or the sulphur into the furnace and tend the leaden chamber in which the sulphur dioxide is combined with steam and acted upon by the oxides of nitrogen.

Oxide-makers are engaged in making litharge and red lead. The pig lead is melted in rotating retorts and oxidized to litharge; for red lead it is further oxidized. The product is then ground, dried, and sifted.

Cookers.
Candy boilers.
Hard-boiled-candy makers.
Stick pullers.
Stickmen.
Stick-candy spinners.

Lozenge cutters.
Machine printers.

Soda-tablet punchers.

Cocoanut openers.
Cocoanut workers.
Cocoanut rollers.

Cocoanut boilers.
Cocoanut-makers.
Cocoanut-candy makers.

Caramel-makers.

Starch boys.
Starchmen.
Starch printers.

Cream-makers.
Machine cream beaters.

Cast-cream makers.
Machine starch cleaners.

Chocolate-makers.

Dippers.
Chocolate dippers.
Chocolate-cream makers.

Handmade-cream dippers.
Cream dippers.

Crystal-sirup makers.

Selectors of gums.
Gum-drop makers.
Gum-drop sanders.
Fig-paste helpers.

Marshmallow runners.

Grain workers.

Pan workers.

Specialty men.

Ornamenters.

Tray carriers.
Paper cutters.
Candy wrappers.
Caramel wrappers.
Cream wrappers.
Soda-tablet wrappers.

Packers.
Candy packers.
Bonbon packers.
Chocolate packers.
Cocoa packers.
Mixed-goods packers.
Penny-goods packers.

Chemical workers.

Chamber and furnace men.

Oxide-makers.

Varnish is made by varnish-makers by melting the gums and mixing them with oil, turpentine, or some other thinner, and finally filtering them to make them smooth.

Varnish-makers.

Feeders.

Feeders tend machines of various sorts, supplying them with material as needed.

Packers.

Packers prepare the finished product for shipment and sale.

The general occupations include beltmen, blacksmiths, boiler-makers, brickmakers, brakemen (on railroad), carpenters, coopers, printers, cooks, electricians, engineers, folders, binders, pressmen, and presswomen (in printing office), steam fitters, gas-makers, teamsters, molders (in foundry), painters, plumbers, tinsmiths, machinists, etc.

Beltmen.
Carpenters.
Coopers.
Teamsters.
Machinists.

CIGARS.

The first grade of skill in cigar factories includes superintendents and foremen of all kinds, selectors of wrappers, all-around cigar-makers, bunch-makers, rollers, and packers; the second grade, strippers, casers, bookers, dryers, stockmen, fillermen, pressmen, and branding-machine operators; and the third grade includes head banders, labelers, and pasters.

In superintendence, a large cigar factory has its general or factory foreman, and its foreman or forewoman and assistant foreman or assistant forewoman for each department and room, and for nearly every process.

Machinists are sometimes employed as part of the regular force to repair the machinery. Laborers, general hands, helpers, and boys and girls, who, however they may be classified, are used in part for messenger and carrier service in and between the departments, are found in cigar as in other factories.

Machinists.

Casers open bales and remove the tobacco; they then dip it in water to moisten it, withdrawing it again immediately.

Casers.

Strippers or stemmers take hold of the stem near the point of the leaf, and strip it from the leaf, which splits off readily. Strippers are divided into wrapper strippers, binder strippers, and filler strippers. The wrapper strippers are among the most skillful, great care and delicacy of touch being required in order to avoid tearing the thin and friable leaf; the binder stripping requires somewhat less skill, and filler stripping least of all, since the leaf of the filling may be torn without impairing its value.

Strippers.
Stemmers.
Wrapper strippers.
Binder strippers.
Filler strippers.
Leaf-department workers.

Bookers book wrappers—that is, spread them out perfectly smooth over a semicircular block and lay the stripped leaves one upon another in the form of a book or pad. The tobacco goes to the cigar-maker or roller in this form, so that he has no straightening out to do, but sees at once the exact size and form of each leaf.

Bookers.

A wrapper selector or classer, or shader, sorts the wrappers into classes to be given to the makers of the various grades of cigars.

Wrapper selectors.
Wrapper classers.
Shaders.

A dryer takes from the strippers the tobacco intended for filler and spreads it out on the floor of the drying room. When it has been dried to the proper degree it is gathered into bins in the stock room, where a stockman gives it out to the cigar-makers as required, charging each man with the amount he receives. When one man takes charge of and gives out the filler he is called the fillerman.

Dryers.
Stockmen.
Fillermen.

Cigars are made either by the all-hand or by the part-machine process. The hand cigar-maker rolls the filler into a bunch in his hand, puts a binder around it, cuts the wrapper into the proper shape, and wraps it neatly around the bunch.

Cigar-makers.

One end is fastened by being tucked in as the wrapping begins, while the other end is brought to a point and a little gum tragacanth applied to hold it together. The end at which the wrapping started is then cut off square.

In the part-machine process a bunch-maker makes the bunch and wraps the binder loosely around it; a pressman puts this into a wooden form and presses it into shape, and a roller puts on the wrapper and finishes the cigar just as in the first process. Both the bunch-maker and the roller are also called cigar-makers.

Bunch-makers.
Bunch-machine operators.
Pressmen.
Rollers.
Cigar rollers.

The foreman inspects the cigars as they leave the cigar-makers. A branding-machine operator then puts them through a machine in which a metal stamp, heated by gas, impresses a name or trade-mark on the cigar.

Branding-machine operators.

Sometimes head banders or taggers paste around each cigar a paper band bearing a trade-mark or name.

Banders.
Head banders.
Taggers.

Before putting the cigars in the boxes the packer sorts them carefully according to the color and shade of the wrapper, in order that all in a box shall be alike.

Packer sorts them.
Packers.
Packers and sorters.

Labelers and pasters paste on the labels, stamp or stencil on the box the name and color, and attach and cancel the revenue stamps.

Labelers.
Pasters.

A pouch-maker makes the pouches in which tobacco is sometimes packed.

Pouch-makers.

CLOTHING.

In clothing factories employees of the highest skill are superintendents and foremen, designers, sample-makers, finishers, and those of similar ability. In the second grade are pattern cutters, spongers, bushelmen, hand sewers, basters, sergers, pressers, paders, machine operators generally, etc.; and in the third are pasters, turners, ticket sewers, and operatives of corresponding ability.

In superintendence the divisions are as in factories generally. Mechanics, such as carpenters, machinists, and wire-workers are employed to do the necessary repairing and other work about the factories.

Carpenters.
Machinists.
Wire-workers.

Boys and girls are attached to many departments; they do carriers' work and help generally. Many sewing-machine operators, pressers, cutters, etc., have their helpers, by whose aid the processes are expedited.

In large clothing factories labor is minutely subdivided, each operation, even the simplest, being undertaken by a separate class of employees.

A sponger or shrinker dampens the cloth so that when made up into garments it will not shrink. In the large establishments this is now done by means of a steam sponging machine.

Spongers.
Shrinkers.

Folders or cloth spreaders carefully fold the sponged cloth perfectly smooth, and afterwards spread it out upon the cutting table.

Folders.
Cloth spreaders.

The work of designers, who are men of great skill, includes the adaptation or invention of styles, and also the drafting of the patterns according to which the cloth is cut into form for the garments.

Designers.
Assistant designers.

Sample-makers make sample suits to be exhibited to the trade; the best workmen are usually employed upon this work. Modelers fit the garments upon various human models, representing types of men in the sections where the garments are to be marketed.

Sample-makers.
Modelers.

Cutters are divided into several classes. Pattern cutters usually cut the paper patterns for garments; when they cut patterns for uniforms they are sometimes called uniform cutters; or if they cut patterns for all kinds of garments for civilian use they may be called cloth cutters. A cloth cutter is also one who cuts the cloth, according to the pattern; in large factories he usually works with a cutting machine, operated by steam or electricity, with which he can cut

Cutters.
Pattern cutters.
Uniform cutters.
Cloth cutters.
Pocket cutters.
Trimmers.
Pants trimmers.
Trimmers, pants department.

Uniform trimmers. through many thicknesses of cloth at the same time. Those who cut trimmings—known generally as trimmers—use a knife and slotted table. They are often specially designated by the material they cut or the use to be made of it. Trimmers also match up the outer linings, buttons, etc., with the color of the garment. **Leather cutters** cut leathers for pants bottoms.

Buttonhole markers. A buttonhole marker indicates with chalk the places where the buttonholes are to be made; the measuring is sometimes done on the machine, which also cuts the buttonhole.

Bundlers. A bundler puts the different pieces of the garment, with the linings, into a bundle and sends them to the sewing room.

Sorters. A sorter selects the patterns after they have been cut for the various garments, a machine sorter being one who lays out the goods for the various machine processes. A fitter puts the parts together, the process being called "fitting-up." **Machine sorters.** **Fitters.** **Basters.** **Coat basters.** **Vest basters.** **Hand basters.** **Tackers.** **Seamers.** **Hand sewers.** **Runners.** **Seamstresses.** **Sewing-machine operators.** **Machine hands.** **Machine sewers.** **Banders.** **Binders.** **Bottomers.** **Cross-slit workers.** **Lining-makers.** **Stitchers.** **Machine operators.** **Machine operators, heavy sewing.** **Machine stitchers.** **Machine-makers of overalls.** **Pocket-makers.** **Sleeve-makers.** **Cross-stitchers.** **Buttonhole-machine operators.** **Collarers.** **Collar-makers.** **Fellers.** **Coat fellers.** **Sewers of findings.** **Button hand sewers.** **Sewers-on of buttons.** **Sewers of pants hooks.** **Sewers, leather.** **Riveters, overalls.** **Pressers.** **Pressmen.** **Ironers.** **Turners.** **Pasters.** **Sergers.**

A seamer, runner, or seamstress is one who, either on a machine or by hand, sews up the various seams of garments.

A sewing-machine operator, machine hand, or machine sewer is known variously, according to the kind of work done, as a bander (one who sews bands onto pants), binder (one who binds garments), bottomer (one who sews up the bottoms of pants), cross-slit worker, lining-maker, stitcher, machine operator, machine stitcher, machine operator, heavy sewing (i. e., one who sews on heavy goods), machine-maker of overalls, pocket-maker, sleeve-maker, cross-stitcher, and the like. Buttonhole-machine operators run machines on which buttonholes are made.

A collarer or collar-maker is an operative who makes coat collars exclusively.

A feller is an operative who, either on a machine or by hand, fells—that is, turns over, flattens down, and stitches seams level with the cloth.

Sewers of findings are operatives who, either on machine or by hand, sew on buttons, hooks, leathers, etc. They are known according to the kind of trimmings they attach, as sewers of pants hooks, button hand sewers, etc. In some factories buttons are now sewed on by a machine operated by foot power. A machine is used also to rivet a special button onto overalls.

A padder pads a coat at the shoulders or elsewhere when necessary for fashion's sake or to improve the fit of the garment, by introducing canvas, cloth, or shoddy. He sews this together and puts it in position.

A presser or pressman presses the garment with hot irons to remove wrinkles, flatten the seams, etc.

In some of the larger factories the sleeves of coats and the legs of pants are turned up by a turner so as to give each its indicated length. Sometimes a paster pastes pants-leg bottoms, this process taking the place of sewing; if there be a bottom leather introduced, that also is sometimes pasted. In the better class of work, after the legs of the pants have been turned up, the edge of the cloth is sewed by sergers to prevent unraveling.

A busheler, bushelman, or alteration hand alters garments to make them agree with the pattern or better fit the customer to whom sold.

In some factories tailors are variously known according to the garments they make. A coat-maker makes coats; a vest-maker, vests; a pants-maker, pants, etc. A backer or vest backer puts the backs into vests.

A bastings puller is a boy or girl who pulls out basting threads.

A finisher is one who examines the garment for defects, after it has apparently been completed, and remedies any he finds. He is depended upon to see that the garment is really finished. Finishers are variously known as coat finishers, general finishers, button sewers, pants finishers, vest finishers, and hand finishers of buttonholes, according to the work they do.

The examiner thoroughly inspects the work in every particular. His criticism, which is the final one, sometimes results in further changes.

A brusher picks off the threads and carefully brushes the garments. Ticket sewers sew on descriptive tickets, packers put the garments into cases, and shipping clerks ship them to dealers.

DISTILLERIES.

Skill of the first order is required for the superintendence and oversight of distilleries, and for the work of foremen in most departments. In the same class are the chemists, distillers, rectifiers, and yeast-makers. In the second grade are mashmen, mixers, skimmers, slop runners, stillmen, and the like. The third grade includes plate cleaners, pump tenders, scrubbers, slop dryers, slop feeders, etc.

Occupations of superintendence include superintendents and foremen of various departments, houses, and processes, head mash hands, heads of the meal rooms, head millers, head rectifiers, head teamsters, etc.

In addition to the employees necessary to conduct the various processes of distillation, the mechanical force includes carpenters, copper-smiths, electricians, machinists, painters, and pipe fitters. Each department has its helpers and general hands, including weighers of both coal and grain.

A chemist determines the necessary chemical processes and tests their development.

A miller grinds or crushes the grain as it is needed. Meal-room hands have charge of the meal, which is placed where the government revenue officer can weigh it.

A masher or mashman, sometimes called a skimmer, tends the vat into which the material is put to ferment. While the water is being poured in, a beer plunger stirs or plunges the mass continually, beating it in every direction, to prevent the formation of lumps and to wet thoroughly every portion of the flour. A yeast-maker makes the yeast which is added to the mash to promote fermentation. Some distilleries also make yeast for sale. After the fermentation of the mash into beer a beer runner runs it through its first distillation.

A slop runner draws off the spent liquor or swill and stores it in hogsheds or in a cistern, where the solid matter is deposited as a sediment. The slop-tub tender cooks the slop, a slop dryer dries it, and it is often fed to cattle, which are kept by distillers for the purpose of consuming this by-product.

Bushelers.
Bushelmen.
Alteration hands.

Tailors.
Coat-makers.
Vest-makers.
Pants-makers.
Backers.
Vest backers.

Bastings pullers.

Finishers.
Coat finishers.
General finishers.
Button sewers.
Pants finishers.
Vest finishers.
Hand finishers of buttonholes.

Examiners.

Brushers.
Cleaners.
Ticket sewers.
Packers.
Shipping clerks.

Carpenters.
Coppersmiths.
Electricians.
Machinists.
Painters.
Pipe fitters.
Weighers, coal.
Weighers, grain.

Chemists.

Millers.
Meal-room hands.

Mashers.
Mashmen.
Mash hands.
Skimmers.
Beer plungers.
Mixers.
Yeast-makers.
Beer runners.

Slop runners.
Slop-tub tenders.
Slop dryers.
Slop feeders.
Cattle feeders.

A distiller is a skilled man who superintends the processes of distillation. A stillman passes the first distillation into the low-wine receiver, and then into the No. 1 or low-wine still, to undergo a second distillation. A rectifier pours into the water bath of a still the liquid already distilled, and adds to it a certain quantity of water, which causes the excess of volatile oil to collect in globules on the surface of the spirits.

Distillers.
Stillmen.
Rectifiers.

Plate cleaners cleanse the wire-gauze plates in the distilling column. Sheet-metal plates when movable are taken out and cleansed one by one; when fixed they are cleansed by passing steam through the column.

Plate cleaners.

Many distilleries make their own ice, and the men who attend the ice machines are known as ice-machine hands.

Ice-machine hands.

FLOUR MILLS.

Among the most skilled employees in a flouring mill are the miller (who is the foreman of the entire plant); the foremen of the various departments and processes; and bolters, hull grinders, corn millers, oatmealmen, roller men, stone dressers, and the like. In the second grade are included inspectors, smutters, wheat cutters, dry-kiln hands, machine hands, and those in similar branches of the work. In the third are spouters, helpers of various kinds, fillers, grainmen, labelers, sackmen, and others of similar ability.

In a large flour mill mechanics are employed not only to repair the buildings and machinery, but also to make the barrels and cases used in packing the products. These employees include belt-makers, blacksmiths, box-makers, brush-makers, carpenters, case-makers, coopers, electricians, engineers, firemen, steam fitters, machinists, masons, millwrights, painters, planer men, and tanners. Inside and outside the mills are oilers, sweepers, mill hands, floor men, laborers, teamsters, and the like. Boys are employed in the running of errands from department to department, or wherever wanted.

Belt-makers.
Blacksmiths.
Box-makers.
Brush-makers.
Carpenters.
Case-makers.
Coopers.
Electricians.
Engineers.
Firemen.
Steam fitters.
Machinists.
Masons.
Millwrights.
Painters.
Planer men.
Tanners.
Oilers.
Sweepers.
Mill hands.
Floor men.
Teamsters.
Errand boys.

If the mill is small, one miller is able to supervise all the operations; as the size of the mill increases, it becomes necessary for him to delegate part of his authority to others. But whether in a large mill or in a small one, a miller must be an experienced man, thoroughly familiar with every step in the manufacture of flour. The head miller is usually known by that name, but is sometimes designated simply as the miller, while his assistants are second, third, or fourth millers. He must see that the grain is in proper condition, the temperature properly regulated, lack or excess of moisture remedied, the speed of the machinery governed, the materials properly fed from the hoppers, and the grade of the product uniformly good.

An inspector examines the quality of the grain as it arrives at the mill. If he inspects only barley, he is called a barleyman.

A wheat inspector is sometimes called a wheat cutter-in, or wheat cutter, from the use of a long brass double cylinder, called a wheat plunger, with which samples are drawn from all parts of the grain, so that allowance can be made for foreign or unclean substances. A weigher—sometimes called a weigher and handler—weighs the grain.

Inspectors.
Wheat inspectors.
Barleyman.
Wheat cutters-in.
Wheat cutters.
Weighers.
Weighers and handlers.

In some of the smaller mills, unloaders or wheat shovelers, who are hand operatives, are employed to unload the wheat from the cars and place it in basements for storage.

Unloaders.
Wheat shovelers.

In large mills, steam-shovel men guide the huge automatic steam scoops by which grain is transferred from the cars to hoppers or bins under the tracks; from here it goes into the elevators. An elevator man has charge of the grain stored in the elevators.

Steam-shovel men.
Elevator men.

Smutters or cleaners operate separator machines, fitted with iron plates or sieves, which remove foreign substances from wheat, and also scouring machines, which brush the dust from it; operators of separator machines are sometimes called separator hands or separator tenders. A wheat washer attends the wheat-washing machine, used whenever the wheat is black or smutty.

Smutters.
Cleaners.
Plate hands.
Separator hands.
Separator tenders.
Wheat washers.

A miller supervises the reduction of the grain to flour by rolls and stones. Some millers are called, according to the particular process or part of a process to which they attend, hull grinders, hand grinders, oatmealmen, etc. Those who mill by the roller process are called roller men, barley rollers being men who work only in barley. Rollers' helpers are called roll tenders.

Hull grinders.
Hand grinders.
Oatmealmen.
Roller men.
Barley rollers.
Roll tenders.

A purifier or purifier hand operates a middlings purifier for the separation of the flour, the middlings, and the bran or tailings; he is sometimes called a machine hand, but that term applies to tenders of all kinds of machines. A feed-mill tender operates a machine in which grain is ground for feed.

Purifiers.
Purifier hands.
Machine hands.
Feed-mill tenders.

A bolter has charge of the long silk-covered reels through which the flour is bolted or sifted.

Bolters.

Wheat-roasting-machine hands and dry-kiln hands are employees who attend to the roasting machines and kilns in which grain is cooked in the manufacture of breakfast foods; they are sometimes called panmen.

Wheat-roasting-machine hands.
Dry-kiln hands.
Panmen.

A spouter is a general hand who tends the spout from which the barrels or sacks are filled with flour. A packer is an operative who attends to the filling of barrels or bags with flour. A header and nailer puts in the barrel heads and nails them. A sack sewer sews up sacks, and a stenciler stencils the brand upon barrels and sacks. A sackman repairs worn sacks.

Spouters.
Packers.
Headers and nailers.
Sack sewers.
Stencilers.
Sackmen.

A shell-maker makes the pasteboard shells or boxes in which breakfast foods and similar preparations are packed. A carton folder folds these boxes or cartons, a cereal packer fills them, a shell paster pastes on the tops, a wrapper wraps them with colored or printed wrappers, and a labeler labels them.

Shell-makers.
Carton folders.
Cereal packers.
Pasters.
Wrappers.
Labelers.

A trucker wheels the flour, in either barrels or sacks, into the cars, where the car loader arranges them to the greatest carrying advantage.

Truckers.
Car loaders.

A stone dresser or stoneman dresses or picks the grinding stones of the mills to keep them in proper condition. A roll grinder grinds the corrugated rolls used in grinding the flour in roller mills, and a roll cutter recuts this roll when a new corrugation is necessary. All these are skilled men.

Stone dressers.
Stonemen.
Roll grinders.
Roll cutters.

In water-driven mills a rackman keeps free from sticks and brush the racks or frames through which the water passes into the flume.

Rackmen.

GLASS.

Among skilled employees of the first grade in glass factories are foremen and assistant foremen, bosses, gaffers, gatherers, window-glass blowers, liners or pressers, ring-makers, blockers, finishers, painters, pot-makers, mold-makers, cutters, stopper-makers, stopper

grinders, and the like. In the second grade are servitors, footmen, lehrsmen, bit gatherers, polishers, decorators, fillers-in, and those of similar skill; and in the third grade are batch mixers, ground layers, roughers, washers, wrappers, rubbers, and employees having corresponding duties.

In superintendence there are foremen and assistant foremen of many departments and processes, gaffers, bosses of shops (or groups of workmen), master teasers, master shearers, and the like.

Mechanics of various kinds are constantly employed to repair buildings and machinery, or to make articles necessary in the packing department. They include blacksmiths, carpenters, coopers, and steam fitters. Sometimes the factory foreman is a millwright or general mechanic who keeps the machinery in repair.

Helpers and laborers are employed in and about the factories, as assistants in various inside departments or in the yards. They include sand wheelers, wood sawyers, runners-out, sandbagmen, etc. Boys and girls are employed generally as carriers between the groups of workmen, or in the wrapping and packing departments.

Occupations in the making of window glass by blowing are described first.

A batch mixer with a shovel and coarse sieve, thoroughly mixes the silica with the other ingredients, the proportion being determined by weight. The furnaceman heats to a white heat the furnace containing the pots. A pot filler shovels the mixture into the heated pots. A foot benchman charges fresh material into the furnace, and attends to general work.

A teaser or melter keeps the furnaces at their proper heat, and carefully watches them to determine the condition of the glass for working; in the East, except in pressed-ware houses, this workman is sometimes called a shearer.

A skimmer or skim cutter removes the thick scum of uncombined salts called anatron or sandiver, which accumulates on the surface of the mixture.

At the proper time, a gatherer or second footman dips the blowpipe into the molten glass; the pipe is then withdrawn, and the glass adhering to it is allowed to cool until sufficiently rigid. This process is several times repeated so that the glass is gathered to the pipe in several layers, then the whole is held in the ring flame long enough to heat the superimposed layers into a homogeneous mass that can be blown evenly by the blower. A bit gatherer, usually a boy, gathers but a small piece or bit.

A snapper or snapper boy is a workman between the gatherer and the blower, who acts as assistant to both, and keeps the blowpipe cool.

A blower, taking the pipe with the gathered glass, blows the ball into a cylinder of the desired length and thickness, cuts it from the blowpipe, and fractures it lengthwise along one side. A knocker-off is a boy who knocks from the end of the iron or pipe the glass remaining after the article has been taken off.

A rollerman or roller boy carries the cylinder to the flattening house. Car wheelers are sometimes called roller boys because, prior to the introduction of cars, boys carried the rollers or cylinders of glass, one under each arm.

A flattener places the cylinder in the oven with its split side up, where from its own weight it sinks flat upon a flattening stone. With a piece of hard wood attached to a long handle he further flattens the sheet and rubs it smooth. An annealer, lehrman, lehr tender, or kilnman, anneals it in a kiln, or lays it flat and anneals it in a lehr (also spelled leer, lier, and lear).

An inspector examines the sheets as they are sent to the cutting room, and a cutter cuts them with a diamond and rule, into as large dimensions as possible. The wages of the blower depend upon the size of perfect glass the cutter is able to cut from the sheet.

Plate glass is made by casting. The occupations in melting the ingredients are the same as in the manufacture of blown window glass, except that a crane-fill man fills the pots.

A pot-wagon man removes the pot with a fork mounted on wheels, the axle of the wheels acting as a fulcrum while the workman bears down upon the outer end of the fork. The pot is placed on a truck and conveyed to the casting table.

A hoister lifts the pot of molten glass from the truck by means of a crane suspended over the table. A teemer or pourer and tableman tilt the pot, and the liquid glass flows out in front of the roller, which, passing over it, flattens it into a sheet of uniform thickness. A ladler, in some factories, dips and pours the molten glass with a hand ladle. A gun boy attends the contrivance by which the sheet of glass is gauged to the required width. A rollman operates the roller under the supervision of the rough-glass foreman. A sword boy loosens the sheet from the table with a long flat tool called a sword.

A bogeyman attends the bogey, or car, on which the glass is conveyed from the iron casting table to the lehr. A hot-push man receives the glass at the hottest part of the annealing oven. In the room at the end of the lehr, the stick boy places sticks between the sheets of glass in order to prevent them from rubbing each other.

A grinder or layer grinds the rough plate, which is cemented for the purpose by plaster of Paris to a large cast-iron table having a rotary movement. A grinder is also one who removes pouty marks from glassware by grinding on a stone wheel. The emery used in this process is prepared by emery washers in a machine which, by means of a stream of water of diminishing velocity, sorts the particles according to size.

A polisher polishes the surface, which the grinding leaves with a milky appearance. The abrasive material used in polishing is rouge (peroxide of iron) which is prepared by rouge burners by calcining iron sulphate. The plates are carefully examined for quality and finish, and any defect is cut out.

Flint glass includes a wide variety of articles, among which are tumblers, goblets, lamps, lamp chimneys, and prescription bottles. The occupations involved in the making of a lamp chimney may be taken as representative of this class of ware.

As in the making of window glass, a gatherer or second footman gathers the molten glass from the pot. A ball-maker, ball holder, or first footman brings the molten ball to a conical shape by rolling it upon a block or plate, and a blocker continues the process by hand with a small block of wood kept constantly wet.

After the blower has blown the mass to the approximate diameter required, he inserts it in a hinged iron mold, which is then closed, shaping the inclosed mass in the required form. A boy called a mold holder or mold boy, sitting before the mold, shuts and opens it as the ball is brought to the mold and subsequently removed after shaping. These molds are made by a mold-maker who is a skilled machinist, and are cleaned by a mold cleaner.

A chimney-maker finishes the end or fitting part of the chimney. In some factories chimneys are blown without the use of the mold.

Inspectors.
Cutters.

Crane-fill men.

Pot-wagon men.

Hoisters.
Teemers.
Pourers.
Tablemen.
Ladlers.
Gun boys.
Rollmen.
Sword boys.

Bogeymen.
Hot-push men.
Stick boys.

Grinders.
Layers.
Emery washers.

Polishers.
Rouge burners.

Ball-makers.
Ball holders.
First footmen.
Blockers.

Chimney blowers.
Mold holders.
Mold boys.
Mold-makers.
Mold cleaners.

Chimney-makers.

Blacksmiths.
Carpenters.
Coopers.
Steam fitters.
Millwrights.
General mechanics.

Sand wheelers.
Sawyers.
Runners-out.
Sandbagmen.
Carriers.

Batch mixers.
Furnacemen.
Pot fillers.
Foot benchmen.

Teasers.
Melters.

Skimmers.
Skin cutters.

Gatherers.
Second footmen.
Bit gatherers.

Snappers.

Blowers.
Knockers-off.

Rollermen.
Roller boys.
Car wheelers.

Flatteners.
Annealers.
Lehrsmen.
Lehr tenders.
Kilnmen.

In the interior of many molds are engraved plates bearing a trade-mark or the manufacturer's name. These are made by a skilled workman, and are cleaned by a plate cleaner who is unskilled.

Engravers.
Plate-makers.
Plate cleaners.

Although the blowers of the various articles of flint glass are engaged in much the same kind of work, they acquire skill in blowing but a single sort of goods; thus a blower of lamp chimneys does not blow bottles, and a paste-mold blower does not make lamp chimneys.

After the blower has blown the glass to the size of the mold the article is cut from the nose of the pipe by the cutter-down.

Cutters-down.

Before being handled by the finisher, each article has to be reheated in a warming-in furnace, the opening to which is called the glory-hole. Glory-hole tenders are the workmen who insert and remove the articles to be warmed up.

The finisher is a skilled workman who performs the final step in the shaping of a blown-glass article; in making lamp chimneys, he forms a flaring top with a tool shaped like a pair of sugar tongs, and also makes a depression where the chimney is to be broken from the pipe. A crimper finishes the top of the chimney in a crimping machine, which flares and crimps it. A cracker-off, working on lamp chimneys or any similar cylindrical articles, by applying friction, generates heat at the place required to be broken, and then cracks off the glass by a touch of his moistened finger.

Finishers.
Crimpers.
Crackers-off.

Servitors.

A servitor is a blower who prepares articles for the finishing operations of the gaffer.

A gaffer is usually the boss of the shop—two or more skilled men, with boys to help—in a glass factory, and is held responsible for the quality of the ware and the conduct of the shop. In finished-paste-mold shops, the finisher is boss; in unfinished-paste-mold shops and also in handmade-chimney departments of glass factories west of the Alleghenies, the blower occupies that position.

Gaffers.

A carry-in boy or carrier-in takes the chimneys in iron pans to the annealing kiln or lehr. In bottle shops a carry-up boy carries bottles from the mold to the gaffer and a carry-in boy carries them from the gaffer to the lehr. A cleaning-off boy cleans the glass from the end of the blowpipe after the bottle blower has blown the bottle.

Carry-in boys.
Carriers-in.
Carry-up boys.
Cleaning-off boys.

A stopper-maker is a skilled hand workman who makes stoppers for decanters, etc. A stopper grinder is a skilled man who grinds stoppers to fit the necks of decanters, etc., in a lathe. A stopper chipper is a boy who chips off the rough edges of stoppers before they are finished.

Stopper-makers.
Stopper grinders.
Stopper chippers.

Snapping-up boys.
Stickers-up.

A snapping-up boy or sticker-up puts the bottle or other article in the snap or holder so that the gaffer can finish it.

Banders.

In making bottles a band is formed around the neck by a bander.

Ring-makers.

A ring-maker is a glassworker employed occasionally to make rings; his skill is equal to that of a finisher.

Paste-mold blowers.

A paste-mold blower blows glass into shape in a paste mold.

Footmen.
Topmen.

A footman makes the lower part of bottles and such ware at a bench. A topman, who is a more skilled worker, makes the tops.

A presser or liner makes pressed glassware. He, or sometimes a shearer or cutter-out, drops a sufficient quantity of the molten glass into a mold, where it is given its form by pressure from a metal plunger. His skill consists mainly in using just enough material; the article is spoiled if too much or too little glass is put into the press. Cutter-out is also the name given to a girl who cuts out paper patterns for decorating purposes.

Pressers.
Liners.
Shearers.
Cutter-outs.

Glassworker is a general name for a worker in glass of any kind.

Glassworkers.

A decorative cutter cuts glass tableware by holding it against a wheel of iron upon which sand and water are constantly fed from an overhead trough. Smoothers operate a wheel of fine sandstone upon which water only is poured and which smooths the glass. A polisher polishes the surface with emery and putty powder on the surface of a wooden wheel. A press finisher finishes pressed glassware, polishing it, and putting it into shape after reheating.

Decorative cutters.
Smoothers.
Polishers.
Press finishers.

A printer or sticker-on is an unskilled hand who sticks paper impressions or decalcomania on glass. Rubbers or rubbers-down rub them down to insure the adherence of every part to the glass. The article is then exposed to cold air which causes the ink to transfer readily to the glass, and permits the paper to be removed without impairing the design.

Printers.
Stickers-on.
Rubbers.
Rubbers-down.

Acid painters and etchers either brush hydrofluoric acid over the glass, or dip it into an acid bath, the acid attacking the surface not protected by the design. Markers of chemical ware, or graduate markers, etch the divisions with hydrofluoric acid.

Acid painters.
Etchers.
Markers of chemical ware.
Graduate markers.

A sand-blast marker etches articles by holding them against a blast of sand, which occupation requires but little skill.

Sand-blast markers.

A filler-in is one who fills in by hand the outlined pattern on decorated glassware.

Fillers-in.

Painters and decorators decorate opaque glassware by painting designs by hand upon its surface; painters are highly skilled workmen.

Painters.
Decorators.

Sorters, or matchers, select the ware according to quality.

Sorters.
Matchers.

In factories where fruit jars are made, stampers are employed to operate the punch machines by which the metal caps for the jars are stamped from metal sheets.

Stampers.

A bench boy works at a bench, at many kinds of low-grade work.

Bench boys.

After the blown window glass is inspected, the packer carefully packs it in boxes and the shipper sends it out. The packer puts plate glass in large boxes, made by the box-maker; when ready for shipment these are stenciled and shipped by shippers. Wrappers wrap flint glassware in paper and pack it in straw, after which it is ready for shipment.

Packers.
Shippers.
Box-makers.
Wrappers.

A cullet, or broken-glass, cleaner washes broken glass which is to be remelted.

Cullet cleaners.
Culletmen.

A block fixer is a mechanic who fixes or repairs the blocks used by the gatherers and blockers.

Block fixers.

A lime burner burns lime for lime glass.

Lime burners.

The clay-stone maker and the brickmaker make the material for the furnaces in which the glass is melted; the bricklayer and the mason build the furnaces. A kiln burner tends to the burning of the bricks in the brickkilns.

Clay-stone makers.
Brickmakers.
Bricklayers.
Masons.
Kiln burners.

A shell picker picks off the pieces of glass that adhere to old clay pots; the pots are then ground up. A clay worker, or pothouse hand, mixes finely sifted clay with the clay from the old pots, and this material is used by the pot-maker, a skilled workman, who fashions the thoroughly kneaded material into pots.

Shell pickers.
Clay workers.
Pothouse hands.
Pot-makers.

PAPER MILLS.

Among employees of the first grade in paper mills are superintendents, foremen and assistant foremen, tour bosses and assistants, machine tenders, beating engineers, calendermen, acid-makers, and others with like duties. In the second grade are back tenders, platermen, calendermen's helpers, trimmers, wet-machine tenders,

boilermen, cookers, etc.; in the third are finishers, sorters, counters, washers, drainermen, screenmen, joggers, pullers, wood-pulp grinders, cutting-off men, sheet liners, plater girls, and the like.

Occupations of superintendence include superintendents, foremen, assistant foremen, tour bosses (those who in alternate weeks change from day to night work), and their assistants, and headmen of various departments, rooms, machines, and processes.

Carpenters.
Electricians.
Engineers.
Firemen.
Machinists.
Blacksmiths.
Millwrights.
Masons.
Painters.
Steam fitters.
Drivers.
Teamsters.

As in other mills, there are carpenters, electricians, engineers, firemen, machinists, blacksmiths, millwrights, masons, painters, and steam fitters to keep the buildings and machinery in repair, heat and light the mill, and keep the motive power going, and drivers or teamsters to convey materials and products. Helpers and boys do heavy work and errands.

Occupations in the making of paper from rags are considered first, because they involve all those known to the manufacture of paper, except the preparation of wood pulp and similar materials.

A weigher weighs the bales of rags as they are received, a bale opener opens them, and threshermen or feeders feed them into large wooden boxes or machines, which free them from some of the dust and heavier particles of dirt.

Weighers.
Openers.
Threshermen.

A rag or stock sorter, or shredder, is a woman who works at a table on which are fixed upright scythe blades; she sorts the rags according to quality and color and, by drawing them over the scythe blades, opens up seams, removes all buttons, hooks, eyes, and other hard substances, and cuts the cloth into pieces. Table girls or overlookers inspect this sorting.

Rag sorters.
Stock sorters.
Shredders.
Table girls.
Overlookers.

In the cutter room, cutters feed the rags into machines equipped with revolving knives, which cut them into smaller and still smaller pieces, each machine delivering the rags which have passed through it onto a traveling apron, which feeds them to the next cutter, until they are finally delivered in the duster room. A dusterman there feeds them into a dusting machine, which removes the remaining dust and dirt.

Cutters.
Shaving sorters.
Dustermen.

A rotary filler throws and presses the rags into a rotary boiler or rotary, where for some hours they are cooked in a bleaching solution. When the cooking is finished, a rotary dumper takes the cover off and pulls out the rags with poles or forks.

Rotary fillers.
Rotarymen.
Kettle hands.
Rotary dumpers.

A washerman has charge of the washing engine. This is an oval tank, containing a rotating cylinder and a bedplate fitted with knives, by which the rags are opened up and torn apart, giving the water free access to every part. When the water flows away clear, a solution of bleaching powder is introduced, and the process of agitation continued until the rags are thoroughly saturated with bleach. A bleach mixer, or bleach-alkali maker, makes the bleaching liquor, by putting the ingredients into a tank where a wooden stirrer or agitator, moved by power, does the mixing.

Washer-men.
Bleach mixers.
Bleach-alkali makers.

The washed and bleached rags, now called half stock, are dropped through traps in the bottoms of the washers into the drainers, where they remain for a week or more, until they become perfectly white; then drainermen or stock lifters, pitchers, or fillers throw the half stock into trucks, and it is carried to the beating engines, into which it is thrown by the beatermen.

Drainermen.
Stock lifters.
Stock pitchers.
Stock fillers.
Beatermen.

A beating engineer has charge of the beating engines, by which the fibers are torn apart and drawn out to their full extent; on the length of the fiber, other things being equal, will depend the strength of the paper. A clay-maker or clay mixer makes or mixes clay, ground wood, or whatever filling is to be introduced into the

Beating engineers.
Clay-makers.
Clay mixers.

pulp in this beating process. Sizing material and body coloring also may be added. A screenman or screen tender removes coarse material which collects on the screen through which the pulp is afterwards drawn.

Screenmen.
Screen tenders.

A paper-machine tender is a skilled man who has charge of the entire paper-making machine; his second hand is called a back tender. The paper machine manufactures the fluid pulp into finished dry paper, or wet sized paper, if it is to be loft dried. The machine tenders usually have merely to see that the machine is properly working.

Paper-machine tenders.
Machine tenders.
Back tenders.

A size-maker mixes the ingredients for the size, and makes it, usually by boiling scraps of hide, hoofs, and horns in water.

Size-makers.

Paper intended to be loft dried is cut by the paper machine; immediately after sizing and while still wet, the sheets of wet sized paper are hung squarely and evenly over poles in a loft by hangers or loftsmen, who work very rapidly and with great deftness. When the loft is filled, a draught of hot air is turned on, or steam is admitted to pipes in the loft, and the temperature kept at 100° Fahrenheit for several days. This slow drying gives to the paper a texture which can not be obtained by a rapid process. A stick boy keeps the stick boxes full

Hangers.
Loftsmen.
Stick boys.
Pullers.
Joggers.

of sticks for festooning surface-coated paper on racks to dry. A puller removes the bunches of sheets or spurs from the poles, and opens them up so that the air can get between the sheets. A jogger jars a bunch of sheets by striking their edges on a table, so as to bring all the edges to the same level.

High-grade paper for which a smooth surface is desired is generally calendered or plated. A calenderman and his assistants have charge of a number of calenders, each consisting of several metal, paper, or cotton rollers, arranged in a stack one above another. Each machine is tended by two calender boys or girls—a feeder, who feeds the sheets one by one into the machine and must work very quickly, and another operative who has only to receive the sheets; the two change places from time to time, usually every hour.

Calendermen.
Calender boys.
Calender girls.

A plater finishes paper by plating, instead of by calendering. A woman arranges a number of sheets of paper into a book-like packet, the sheets of paper alternating with sheets of zinc. The packet is then introduced by a platerman between heavy rollers and rolled back and forth. Plating is so expensive that it is done only on the finest quality of paper.

Plater girls.
Platermen.

Occupations in the manufacture of the cheaper grades of paper are reported under essentially the same names as in the manufacture of fine writing paper.

A sorter or flat sorter (usually a woman) sorts the sheets, after calendering, and throws out all the imperfect ones. A counter counts them into reams, and a trimmer trims off the uneven edges and cuts the paper to the desired size in a machine. Some paper is folded by folders, either by hand or by machine, and then pressed in a hydraulic press—usually in charge of a trimmer, who trims the paper after it is pressed. Folded papers are sometimes embossed with an embossing stamp.

Sorters.
Flat sorters.
Counters.
Trimmers.
Folders.
Stampers.

A finisher wraps the paper and seals the package; a roll finisher wraps news and other papers which are shipped in rolls.

Finishers.
Sealers.
Roll finishers.

A labeler pastes on a descriptive label or stamps it with a stamp; and the goods are then packed and shipped.

Labelers.
Stampers.

Some papers are packed in wooden frames, or crates, the maker of these frames being called a frame-maker; his work requires little skill.

Frame-makers.

The cheaper grades of writing paper are run over more drying cylinders and thoroughly dried on the paper machine instead of being loft dried. They are then wound upon a reel by a reel boy.

Reel boys.
Winders.
Rewinders.

From the reel the paper is wound or rewound on iron rods to form rolls. Calendermen and their helpers run these rolls of machine-dried paper through supercalenders—a series of cylinders like a sheet calender, though usually larger. Tending these calenders is heavy work.

A cutter man or girl arranges sheets of writing paper in piles as they fall from the web-cutting machine, which slits the web of paper longitudinally and cuts the strips into sheets.

Cuttermen.
Cutter girls.
Cutter hands.

Rulers.
Ruling-machine tenders.

A ruler or ruling-machine tender operates a machine by which writing paper is ruled.

Sheet liners.

A sheet liner runs a machine by which lining paper is pasted onto box board.

Wood pulp, of which wood-pulp paper is manufactured, is made by either a mechanical or chemical process.

The logs are first sawed into blocks by a sawyer. A splitter tends a power-driven wedge, which quarters the log or block with one blow. A barker holds the bark-covered surfaces against the side of a revolving disk set with knives, which removes the bark. A knot borer operates a machine that bores out knots; knots too large to be bored out are sawed out with a circular saw.

Sawyers.
Splitters.
Barkers.
Knot borers.

In making chemical pulp, a chipperman tends a chipping machine, in which the sticks of wood are speedily reduced to small, uniform chips; these drop from the machine onto a traveling apron and are carried to storage bins.

The chips are next dropped into boilers—either rotaries, like those in which rags are boiled, or stationary uprights called digesters—tended by boilermen, or cookers, and cookers' helpers. Into these is pumped a liquor—in the sulphite process, a solution of an acid sulphite, and in the soda process, of caustic soda—and the wood is cooked by live steam. A cooker's helper fills the boilers with wood and does other necessary work.

Chippermen.

An acid-maker has charge of the preparation of the liquor in which the wood is cooked, and is responsible for its proper composition and strength, and for the proper working of the sulphur burners, pumps, and all other apparatus used in making it.

Boilermen.
Cookers.

A blow-pit man handles the wood in the pits, into which the contents of the boilers are blown off, and washes it. A pit boy washes down the alkali liquor by squirting fresh water into the pits after the pulp has been blown out of the digesters. Screenmen put the wood through screens to remove any hard masses which have not been sufficiently disintegrated.

The stock is then taken to beating engines and reduced to a pulp as rags are; then to washing engines. Engineers, beatermen, and washermen have charge of these machines, as in the making of rag pulp. A bleacherman draws the pulp from the washing engines into vats, where it is mixed with a solution of bleaching powder.

Blow-pit men.
Pit boys.
Wood-pulp screenmen.

A wet-machine tender operates a machine by which the pulp is partially dried. From the cylinder of this machine it is taken by a felt apron and pressed between rollers. The felt passes over the lower one and the pulp accumulates on the upper. When it has attained the desired thickness, the cutting-off man pushes a pointed stick under the layer of pulp and across the roller; the pulp is thus torn through and leaves the roller as a thick, moist sheet, which is folded and tied up ready to be shipped.

Wet-machine tenders.
Cutting-off men.

In the mechanical process a grinder grinds the blocks of wood with an upright millstone, against the side of which they are pressed. This quickly reduces the wood to a pulp, which is carried away into a tank by water constantly running over the stone. The pulp thus formed is usually run through a wet machine, and is shipped in thick sheets to a paper mill as raw paper stock.

A yaryan-machine tender operates the pump of a machine which concentrates the alkali liquor used in the manufacture of soda pulp.

Yaryan-machine tenders.

A pulp drawer is a common laborer who draws wood pulp from the storehouse to the beaters, or from the cars to the same.

Pulp drawers.

Where a factory uses natural gas, piping it from its own wells, pipe-line men keep open the gas-pipe line.

Pipe-line men.

A wire straightener straightens the steel wire with which bales of straw are bound when received at a mill where they are to be made into strawboard. The wires are returned to the shipper, to be used again.

Wire straighteners.

POTTERIES.

Skilled men of the first class in the various branches of work in potteries include foremen, head workers, casters, pressers, jiggermen, dish-makers, engravers, hand painters, and the like. Of somewhat less skill are dippers, placers, mold-makers, turners, sagger-makers, decorators, fillers-in, liners, slip-makers, kiln dressers, pressmen, puggers, etc. In the third grade are selectors, ware brushers, ware dressers, pin-makers, spongers, stampers, and helpers generally.

Carpenters are among the mechanics employed in addition to those essential to the manufacture of pottery. Employees generally have helpers who, by helping, are taught the trade. Many of these helpers are boys.

A slip-maker breaks up and mixes clay in an agitator or disintegrator, called a blunger. A pressman attends the long, longitudinal presses, composed of many frames, in which the water is extracted and the clay pressed into blocks. A pugger attends a pug mill in which the dough is kneaded to blend it thoroughly and render it plastic.

Carpenters.

As the mass is forced from the pug mill a clayman cuts it with a heavy cord into uniform lengths and carries it to the press room for the pressers, to the jiggermen, or wherever needed.

Claymen.

A mold-maker makes the plaster molds in which some large hollow ware is pressed by hand on a whirler by potters who are called pressers. A sanitary-ware worker presses sanitary ware. Handles are placed on pitchers and the like by the presser, who mixes a little slip and uses it for adhesive material, but sometimes this work is done by a handler. A handle-maker is generally a boy who is learning the presser's trade.

Mold-makers.
Pressers.
Sanitary-ware workers.
Handlers.
Handle-makers.

A thrower is an old-fashioned potter who works with the potter's wheel—still occasionally used—since hand-finished ware is less liable to break and can be finished off to better advantage after shrinking.

Throwers.

A jiggerman is a modern potter who operates a jigger—an improved potter's wheel in which there is a pulldown to do the work of fashioning. The old-fashioned potter fashioned the vessel with a rib held in his hand; the rib is now of steel, affixed to the jigger. A jigger dish-maker makes dishes on a jigger. A dish-maker makes dishes of a larger and better sort—as platters—by hand without the jigger. After the moisture has sufficiently evaporated from the green ware, a finisher smooths off the shrunken surfaces on a whirler.

Jiggermen.
Jigger dish-makers.
Dish-makers.
Finishers.

A turner turns off the rough edges of cups in a lathe. A sponger or cup sponger sponges them, as well as the other dishes, so that they may be worked more easily.

Turners.
Spongers.
Cup spongers.

A caster, by pouring fine slip into plaster of Paris molds, casts fine ware such as belleek, which is neither pressed nor turned.

Casters.

A sagger-maker makes the clay box in which the green ware is placed in the kiln to be baked or fired, or ware once baked is re-fired for glazing. A glaze-kiln sagger used in re-firing biscuit ware has in its interior sides holes into which clay pins are inserted for supporting dishes one above another. Three-branched clay stilts are also made by the pin-makers, and placed between dishes in the saggings when pins are not used.

Sagger-makers.
Pin-makers.

A placer puts the ware in the saggings. A wad-punch man tends a wad mill or wad punch, in which are made ropes of clay to be placed between the saggings to keep out the smoke and protect the ware from irregularities of heat.

Placers.

Wad-punch men.

Kilnmen place the loaded saggings in either the biscuit or the glaze kiln. Kilnmen, kiln drawers, kiln workers and oddmen can be included in the same class—all being employed in removing the ware after firing.

Kilnmen.
Kiln drawers.
Kiln workers.
Oddmen.

Firemen.

A bisque or biscuit-ware brusher, usually a girl, after the ware is removed from the biscuit kiln, brushes off the sand which the sanded saggings have left clinging to it.

Bisque brushers.
Biscuit-ware brushers.
Ware brushers.

A selector sorts the ware as to quality, and a stopper stops any cracks or holes with slip.

Selectors.
Stoppers.

A glaze grinder grinds the enamel or glaze made of frit—a translucent glass, composed of silica, lime, soda, borax, and lead—into a mixture resembling slip, and in this the biscuit ware is dipped by hand by a dipper of biscuit ware. He works rapidly, having a helper to hand him the pieces, which he himself puts on crates to dry; his occupation requires considerable skill. A dresser or ware dresser is usually a girl who knocks off the marks left by the pins or stilts. A polisher, using a buffing wheel, polishes off any rough places in the glaze.

Glaze grinders.
Biscuit-ware dippers.
Dippers.
Dressers.
Ware dressers.
Polishers.

Decorator is a generic term for one who decorates ware. A decorator is sometimes the head decorator and skilled; in other cases he is an ordinary hand doing a variety of incidental work. A ground layer puts on by hand a large body of select color, which is afterwards edged with designs. Hand painters are among the most skilled men in a pottery; they decorate ware in colors by hand.

Decorators.
Ground layers.
Hand painters.

An engraver engraves designs upon a steel plate. A printer transfers these designs to tissue paper and then to the ware, either after the first firing, when it is in the biscuit, or after the second firing, when it is in the glaze; sometimes the design is in outline only, and is filled in by hand with colors.

Engravers.
Printers.
Fillers-in.

A liner of either biscuit or glaze ware draws a line of gilt or color around the piece, near its edge, with a brush. This is usually done by a girl. A gilder touches the ware near the edges, here and there, with a cloud of gold dust.

Liners.
Gilders.

A cutter is a girl who cuts out decalcomania pictures from large sheets; a decalcomania transferrer transfers them to the ware. A rubber is a girl who rubs the decalcomania picture upon the ware so that the outline may be uniformly imprinted upon it when the paper is removed.

Cutters.
Decalcomania transferrers.
Rubbers.

When trade-marks and other legends are not stamped in the biscuit, a stamper places them on the glaze.

Stampers.

Packers pack goods in hogsheads, barrels, or crates for shipment, and are usually skilled in their line.

Packers.

PRINTING.

Among skilled employees of the first grade in printing establishments are foremen, chiefs, and heads of the different departments and processes, with their assistants, fancy-advertisement setters, hand compositors, pressmen, machine compositors, all-around binders, forwarders, finishers, stampers, proof readers, electrotypers, engravers, etchers, photo-engravers, lithographers, and the like. In the second grade are type distributors, objectionable men, press feeders, routers, gatherers, stitchers, gilders, gold layers, copyholders, and those of similar occupations. In the third grade are machine feeders, machine boys, dump boys, paper wetters, office boys, helpers, oilers, etc.

The division of superintendence is similar to that in other industries. There are also helpers, assistants, messengers, carriers, boys, and girls. Much of the work now done in the composing rooms is at weekly rates of pay, instead of, as formerly, by the thousand ems.

In defining occupations in printing establishments, those of a large newspaper office are first described.

A copy cutter takes the copy or written article as it comes from the editorial department into the composing room and cuts it into portions called takes, which he distributes among the compositors who set the type.

Copy cutters.

A hand compositor sets type by hand, in a composing stick; a book compositor sets matter for books; an ad. setter or displayman sets advertisements; a job hand does job work; a head setter sets heads of newspaper articles; and a distributor of type heads distributes these heads. A type distributor distributes body type.

Hand compositors.
Book compositors.
Ad. setters.
Displaymen.
Job hands.
Head setters.
Distributors of type heads.
Type distributors.

A fat man, found in some offices, is a hand compositor who pays to the other compositors a bonus for the privilege of setting the display heads of articles, which being quickly set, are therefore more profitable—or fatter—to a pieceworker than other typesetting; he also bids off such articles as market reports, the only changes in which, from day to day, are the figures; and in some book or job offices he bids off the advertisements.

Fat men.

An objectionable man is a hand compositor who is paid a bonus by the other compositors for distributing small heads, dashes, and other unpopular work, which would otherwise occasion the loss of valuable time to compositors paid by the thousand ems. Neither fat men nor objectionable men are found in an office where employees are paid by the week, or where there is much machine composition.

Objectionable men.

A machine compositor operates a typesetting or type casting and setting machine. A machinist repairs and adjusts typesetting or type casting and setting machines. Where several machinists are employed, a linotype engineer—if linotype machines are used—acts as their foreman.

Machine compositors.
Linotypers.
Machinists.
Linotype engineers.

A metal mixer mixes in the proper proportions the various ingredients for type metal; and a metal handler keeps the melting pots supplied with type metal. Both these may be employed either in the linotype room or the stereotype room.

Metal mixers.
Metal handlers.

A bankman or dumpman arranges the takes of each article in proper sequence on the bank or dump where they are deposited as they are set up; he also has general charge of the breaking up and distribution of type. The proof or impression of the type thus arranged is made usually by a dump boy.

Bankmen.
Dumpmen.
Dump boys.

A proof reader reads this proof and marks or corrects the errors. A copyholder reads the copy aloud, or follows it while the proof is read.

Proof readers.
Copyholders.

A corrector or correct man, who is a compositor, corrects the proof, if it be of hand-set matter or matter set on some typeset-

ting machine. In the case of linotype matter the lines in which errors occur, together with the corrected proof, go back to the operator who set them, and the lines have to be set anew to take the place of the lines in which the errors were found. A ringman is a hand compositor who corrects all changes marked in the proof that are not based on copy. A circle or ring is drawn around each by the proof reader, with a pen or pencil. A plate corrector corrects errors in stereotype, electrotype, and other plates.

A reviser is a second proof reader whose duty it is to read a second proof and see that the corrections indicated on the first proof have been made.

A make-up man, form-man, or stoneman arranges the corrected matter in page form in a metal frame called a chase, in which it is firmly locked by wedges. A form setter is, specifically, one who sets or justifies the form.

A stereotyper and his assistants place a sheet of moist papier-maché over the face of the type, firmly pressing it down under a heavy roller, and then dry the resulting matrix, still over the type, in a press, the face of which is a hollow metal plate heated by steam. The mold is placed in a metal form or casting box—flat or curved, according to the style of press on which the plate is to be used—and molten type metal is poured in, forming a stereotype plate. A router or stereotype finisher cuts down the edges and other excrescences in a routing machine, so that nothing but the type will be impressed on the paper in the printing press.

An electrotyper makes an electrotype which gives a finer impression than that from a stereotype, and is used for magazines and books. A molder makes a wax cast of the type; this cast is suspended in a solution of a copper salt from which the copper is electrically deposited upon it. When the coating of metal has reached a sufficient thickness the mold is removed from the bath and the deposited copper stripped from it in a thin layer which exactly reproduces the type. A batteryman has charge of the battery used in the making of the electrotypes. A backer places on the back of the electrotype a thin sheet of soldering metal, over which he pours molten type metal to form the body of the plate. An electrotype finisher cuts down the edges and other portions which must not give an impression in printing, planes off the plate to the thickness required, and does other work to prepare the plate to give correct results in printing.

A photo-engraver by a photographic process transfers sketches or pictures for illustrations to a copperplate covered with material sensitive to light; he then etches the figure on the copperplate with an etching solution. A lithographer or transferrer makes lithographs, and a stone grinder grinds the stone used in the processes of lithography.

A pressman has charge of a printing press, overseeing its operation and being responsible for it; he makes ready the forms, cuts, overlays, etc. A cylinder or job press man may be either one who operates a large job or cylinder press, or one who adjusts the smaller presses for the feeders. A pressman's helper mounts the plates on the press cylinders, introduces the web of paper, and attends to other necessary details. Cleaners and oilers clean and oil the presses.

A brakeman stands with his hand constantly on the lever which controls the power, ready to stop the press instantly if a fold or break should appear in the web of paper, or if an accident of any kind should happen.

A fly boy removes the printed sheets as they are deposited in a pile at the end of the press by the action of a long-fingered mechanism called a fly.

A feeder or press feeder is an operative who feeds paper into a press by hand. A job-press feeder, tending a small job-press, feeds the sheets of paper one by one onto a bedplate alternately pressed against the type and withdrawn, and removes the printed sheets. Carriers remove the folded papers as they pile up at the front or side of a newspaper press and carry them from the press room. Mailers attend to sending out the mail copies.

An ink-maker mixes inks to the desired shade. A roller-maker makes the composition rollers used in the presses.

Bindery hands is a general term for all the employees of the bindery department. A binder is an all-around man who can do all or any of the processes required in binding a book or pamphlet.

A cutter in a bindery cuts the sheets as they come from the press. A folder folds the sheets so that the pages are brought into proper sequence, sometimes working by hand and sometimes feeding a folding machine. Pastors fasten sheets together with glue or paste. A gatherer gathers the signatures—or groups of folded sheets—to make the book or pamphlet. Stitchers or wirers stitch or wire a gathered book. The stitcher works either by hand or by machine, but the wirer's work is always with a machine.

The outward curve shown on the back of the finished book is produced by warping; this is done by the forwarder by hand, or by a warper either by hand or on a machine.

A stamper puts the book covers through a machine that stamps or prints the title on both the side and the back. An embosser embosses—i. e., raises or depresses—designs on the covers of books, either by hand or with a machine.

A book finisher puts on the cover and finishes the book.

A ruler is a skilled man who has charge of a machine that rules blank paper; ruling-machine feeders are boys or girls of little skill. A pager or operator of a numbering machine, usually a boy or girl, runs a machine that pages blank books.

Correctors.
Correct men.
Ringmen.
Plate correctors.

Revisers.

Make-up men.
Form-men.
Stonemen.
Form setters.

Stereotypers.
Routers.
Stereotype finishers.

Electrotypers.
Molders.
Batteryman.
Backers.
Electrotype finishers.

Photo-engravers.

Lithograph engravers.
Lithographers.
Transferrers.
Stone grinders.

Pressmen.
Cylinder-press men.
Job-press men.
Pressmen's helpers.
Cleaners and oilers.

Brakemen.

Fly boys.

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Occupations of the greatest skill in shoe factories are those of foremen, overseers, and other headmen and their assistants in the different departments and processes, and also cutters, stock sorters, Goodyear welters, rough rounders, edge trimmers, and operatives doing the same grade of work. In the second grade are skivers, closers, seam rubbers, gore and gusset seamers, top stitchers or corders, fancy stitchers, rounders, edgers, heel compressors, shankers, fair stitchers, prick stitchers, bottom finishers, ironers, pegging-machine operators, and the like. The third grade embraces punchers, eyeleters, hookers, perforators, tip fixers, table workers, stock wetters, channel cementers, machine loaders, edge blackers, stringers, and similar occupations.

Superintendence is divided as in other industries; there are foremen and assistants, overseers and headmen for the various departments, rooms, machines, and processes, and floorwalkers, and the like.

Carpenters, machinists, painters, etc., are occupied in repairing buildings and machinery. General helpers in the factories are designated as lumpers, off-bearers, utility hands, last pickers, etc.

SHOES.

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Carriers.

Mailers.

Ink-makers.

Roller-makers.

Feeders.

Press feeders.

Job-press feeders.

Carriers.

Mailers.

Bindery hands.

Binders.

Bookbinders.

Cutters.

Folders.

Pastors.

Gatherers.

Stitchers.

Wirers.

Forwarders.

Warpers.

Stampers.

Embossers.

Book finishers.

Rulers.

Ruling-machine feeders.

Pagers.

Operators, numbering machine.

Carriers.

Mailers.

Ink-makers.

Roller-makers.

Bindery hands.

Binders.

Bookbinders.

Cutters.

Folders.

Pastors.

Gatherers.

Stitchers.

Wirers.

Forwarders.

Warpers.

Stampers.

Embossers.

Book finishers.

Rulers.

Ruling-machine feeders.

Pagers.

Operators, numbering machine.

Carpenters.

Machinists.

Painters.

Lumpers.

Off-bearers.

Utility hands.

Last pickers.

Dinker boys.
Last boys.
Taker-off boys.
Packer boys.

Boys are employed to help and carry, with such designations as dinker boys, last boys, helper boys, taker-off boys, and packer boys.

The occupations are described, by rooms, in the following order: The cutting room, where the parts which form the uppers are cut out; the fitting room, often called the stitching room, where these parts are stitched together to form a complete upper; the sole-leather room, where the parts which form the bottom of a shoe are cut; the making or bottoming room, where the bottoms are joined to the uppers and the shoes are bottomed or made; the bottom-finishing room, where the bottoms of the shoes are finished; and the upper-finishing and packing room, where the uppers are finished and the shoes packed.

In the cutting room the parts which form the upper are cut out. For the best goods this is done with a hand knife and a metal or metal bound leather board pattern. For the less expensive classes of body leather, for tips, stays, facings, and other small leather parts, and for linings and gussets—which are usually cut from cloth—a die is used. These are hand occupations, but sometimes the leather and the die are set under the beam of a dieing-out machine, and the die driven through the leather by the descent of the beam, which is moved by power. These die cutters are also called block hands, dinkers, and clickers. The skill of the cutter is exercised in placing his die

or pattern so that the least leather shall be wasted. A good cutter is one of the most skillful men in a shop.

A skiver works in the fitting or stitching room, and skives or cuts to a bevel in a skiving machine the edges of the pieces for the uppers. Cementers or pasters put cement on the skived surfaces which folders fold over and stick together by pressure either in a machine or by hand, thus producing a finished instead of a raw edge.

Upper stitchers include all workers on sewing machines in the fitting room, whether on leather or linings. All stitchers work with power machines, which run very rapidly; they follow carefully the lines of the pattern, adjusting the edges of the pieces exactly. A good stitcher possesses considerable skill.

An eyelet-row stitcher puts stitching on the quarter, just outside the place where the row of hooks and eyelets will be. A closer stitches or closes the quarters together at the back, and a seam rubber or seam pounder smooths this seam by rubbing or pressing it out as flat as possible on a machine. A gore or gusset stitcher stitches in gores or gussets such as appear in congress boots.

A lining stitcher, lining-maker, or liner sews together the different pieces of the lining, and a closer-on or in-seamer stitches the lining into the quarters. When the lining is closed on, the quarters are wrong side out, and the lining is stitched on outside. Later the quarters are turned right side out, bringing the lining inside. When the vamps are lined separately a vamp liner does the work. On fine work a facing stitcher binds the lining with a facing of leather.

A beader operates a machine of the same name which presses together the seam made around the top of the quarters by closing on. A top stitcher or corder runs stitching around the quarters just below this seam, through the quarter and lining; this is top stitching, stitching around, or cording.

Cutters.
Upper leather cutters.
Top cutters.
Quarter cutters.
Vamp cutters.
Tip cutters.
Lining cutters.
Stay cutters.
Facings cutters.
Foxing cutters.
Yestling cutters.
Odd-shoe cutters.
Fancy cutters.
Block hands.
Dinkers.
Clickers.

Skivers.
Cementers.
Pasters.
Folders.

Eyelet-row stitchers.
Closers.
Seam rubbers.
Seam pounders.
Gore stitchers.
Gusset stitchers.

Lining stitchers.
Lining-makers.
Liners.
Closers-on.
In-seamers.
Vamp liners.
Facings stitchers.

Beaders.
Top stitchers.
Corders.

A buttonhole-machine operator puts the quarters for button shoes through her machine, which makes a cut, lays a heavy cord around the edge, and stitches over the cord and through the edge, making a buttonhole. The buttonhole-finisher's machine sews down that part of the heavy cord which passes from buttonhole to buttonhole. The buttons are sewed on by hand or by machine, or are fastened on with wire staples.

A gang-punch operator punches the holes for eyelets in laced shoes, with a machine called a gang punch. An eyeleter or fastener setter sets in the eyelets with an eyeleting machine. A hooker puts in the hooks with a hooking machine.

A marker or tip marker marks on the vamp the place where the tip is to go, and a tipper or tip stitcher stitches it on; sometimes a tip paster pastes or gums the tips onto the vamp before they are stitched. A perforator perforates the edges, and a tip fixer glues down or otherwise adjusts them.

A vamp closer stitches the two ends of the vamp together behind, usually stitching a small leather welt into this seam.

A vamer sews together the quarters and vamps. This operation is called vamping. A barrer or stayer stitches back and forth through the edges of the two quarters, immediately above where they meet in the vamp, making one very heavy stitch or bar of thread, which takes the strain when the quarters are pulled apart, as in putting on the shoe.

A heel-stay stitcher and an eyelet-stay stitcher put on heel stays and eyelet stays, respectively, after the lining has been closed on. A fancy stitcher is employed on some work to do stitching, which serves merely as decoration. A foxing stitcher sews to the back of the vamp of some shoes a piece of leather called a foxing.

On fine work, a tongue binder binds the edges of the tongues with cloth or leather; the tongues are stitched into place by tongue stitchers.

A strap-maker makes leather straps for ladies' slippers, or straps by which shoes are pulled onto the foot.

Table workers are unskilled operatives who do such work as gumming or pasting, tip marking, and sewing on buttons, by hand, at tables in the stitching room.

In the sole-leather room, the parts which are to form the bottom of the shoe are made. These parts are: Outsoles, half soles, and inner soles; heels, composed of heel lifts and top lifts; and shanks. Each of these parts is cut by a cutter designated by the particular part he cuts, the work being done with dieing-out machines like those used in the cutting room. The outsole cutter takes a side of sole leather and cuts the best parts of it into outsoles; what can not be used for these goes to the half-sole cutter, then in turn to the inner-sole, top-lift, and heel-lift cutters. Sole cutters and top-lift cutters have to use good judgment in deciding what parts of a side of leather are fit for the different soles and for the top lifts. In some factories the sides of leather are first cut into strips by a machine called a racer; these strips then go to the dieing-out machines.

A stock sorter selects the stock which is to go into the various orders, an occupation requiring skill acquired only by long experience.

Buttonhole-machine operators.
Buttonhole finishers.
Button sewers.

Punchers.
Gang-punch operators.
Eyeleters.
Fastener setters.
Hookers.

Markers.
Tip markers.
Tip stitchers.
Tipppers.
Tip pasters.
Perforators.
Tip fixers.

Vamp closers.

Vammers.
Barrers.
Stayers.

Heel-stay stitchers.
Eyelet-stay stitchers.
Fancy stitchers.
Foxing stitchers.

Tongue binders.
Tongue stitchers.

Strap-makers.

Table workers.
Table hands.

Outsole cutters.
Half-sole cutters.
Inner-sole cutters.
Top-lift cutters.
Heel-lift cutters.
Racers.

Stock sorters.

A rander makes the rand—a horseshoe-shaped piece of leather used to make the heel fit the curve of the shoe bottom.

Randers.

A splitter runs the soles through a splitting machine, which reduces them to a uniform thickness by splitting a thin slice from the flesh side. A rounder rounds them in a rounding machine, in which a rapidly revolving cutting tool, following a steel pattern, cuts the edge of the sole flush with the pattern's edge.

Sole splitters.
Rounders.

A channeler cuts a groove or channel in the outsoles and inner soles a short distance inside the edge—in some cases all the way around the sole; in others around all but the heel. A stock wetter or damper, by immersing the leather in water for a short time, brings it to the temper required for the successful cutting of the channel. The stitching of the soles is done through the floor of this channel, the leaf of leather made in cutting the channel having been turned back out of the way of the needle by a channel turner.

Channelers.
Stock wetters.
Dampers.
Channel turners.

A sole skiver, working with a skiving or scarfing machine, skives the back edges of the half soles, which are to lie between the outsoles and the inner soles, so that they shall fit the angle where these come together. A feather-edger skives the shanks of the outer sole.

Sole skivers.
Feather-edgers.

Stock fitter is a general term for an operative who does any of several operations in fitting the soles and heels. A half-sole fitter cements the half sole to the outsole.

Stock fitters.
Half-sole fitters.

A sole molder places the soles one at a time on the metal form of a molding machine, molding them into the shape required for the finished shoe. A roller passes the soles between heavy steel rollers, which compress and level them.

Sole molders.
Rollers.

A heel-maker or tacker assembles the several heel lifts, with the exception of the top lift, presses them together in a heel-building machine, and drives a few tacks through them. A heel compressor molds them into shape in a powerful machine. In the best shoes each lift is a solid piece of leather; in the poorer grades the heel is made of scrap leather and leather board or pulp, finished with a solid leather top lift. The composite material, called pancake, is made by an operative, usually a girl, called a pancake-maker; it is used sometimes for soles as well as heels.

Heel-makers.
Heel tackers.
Heel compressors.
Pancake-makers.

These heels are built up in a die, which is set, cutting edge up, in a block. The heel-maker puts a leather-board lift in the bottom of the die, and then lays a piece of scrap leather over the die and strikes it with a mallet. The leather is cut by the die edge and the piece cut from it driven into the die. He repeats this operation until the die is full, when another leather-board lift is placed on top, two or three tacks are driven through the heel, and the maker sends it to the compressor.

Haverhill-die heel-cutters.

A counter cutter cuts out on a machine the counters which keep the back of the vamp in place, a counterskiver skives their edges, and a counter molder with a powerful machine shapes them between steel forms.

Counter cutters.
Counter skivers.
Counter molders.

A shank cutter cuts with a die that part of the shank which is composed of leather or leather board. The shank is sometimes strengthened with steel or wood.

Shank cutters.

The uppers and the several parts which form the bottoms are brought together in the making or bottoming room.

A bottomer is any operative occupied with any of the operations in the bottoming of a shoe.

Bottomers.

A puller-over fastens an inner sole with one or two tacks to the bottom of a last. Then, taking an upper, he inserts the counter and box toe in their places under the lining and draws the upper over the last, pulling it snugly over the edge of the inner sole with a pair of pinchers, and securing it in several places with tacks.

Pullers-over.

A laster is a skilled man who, with the aid of a lasting machine, pulls the upper down over the inner sole evenly and firmly, and tacks it all the way around the sole. A shanker tacks the shank in place, cuts away the superfluous upper leather gathered under the toe, beats the edge of the upper out as flat as possible wherever it is gathered, and draws out the tacks which hold the inner sole to the last.

Lasters.
Shankers.

If a shoe is to be made by the Goodyear or welt system, a Goodyear welter or welt sewer sews on a welt around the bottom of the shoe, usually as far back as the heel on both sides, and in a few cases all the way around, the stitches passing through the channel in the insole, the edge of the upper, and the welt; this sewing is done with a curved needle on a Goodyear machine. The welt sewer and the welt stitcher are among the most skillful men to be found in a shoe factory. Eppler welters do the same work on an Eppler machine.

Goodyear welters.
Welt sewers.
Eppler welters.

A welt butter butts or joins welts on Goodyear and hand-sewed shoes. The ends of the welts at the heel are tapered. A joiner joins the ends of the welt when it is run around the heel. A sole filler fills the space inclosed by the welt, which would form an air space if the outsole were put on immediately, with a piece of tarred felt, or with a paste of ground cork and cement.

Welt butters.
Joiners.
Sole fillers.

A sole layer or stocker lays the outsole in cement on the bottom of the shoe and firmly presses it in a machine.

Sole layers.
Stocker.

A Goodyear stitcher sews the outsole to the welt.

Goodyear stitchers.

A rough rounder operates a machine of the same name, which cuts down the outsole to the shape of the last. This machine is comparatively new, having come into extensive use during the last ten years; it makes a radical improvement in shoemaking, since the hand method of rough rounding was tedious and inaccurate. A good rough rounder is a very skilled man.

Rough rounders.

After the stitching a channel cementer brushes cement into the channel. A leveler or beater-out then presses down the leaf of the channel by rubbing over it a piece of steel and, by pressing out or leveling the bottom in a machine, gives the sole the shape it is to take in the finished shoe.

Channel cementers.
Levelers.
Beaters-out.

The McKay-sewed shoe passes from the shanker through the hands of the filler and sole layer, and then to a last puller, who removes the last; it next goes to the McKay stitcher, who sews on the outsole with a straight-needle McKay machine, his stitches passing through the inner sole, the edge of the upper, and the outsole. A fair stitcher or fakir puts a row of stitching around the forepart of the shoe, through the edge of the half sole and outsole, giving the appearance of a welt.

Last pullers.
McKay stitchers.
Fair stitchers.
Fakirs.

A heel-seat nailer nails the heel seat or back part of the sole around its edge after the forepart has been sewed. A machine loader or nail sticker, usually a boy, keeps full the magazine for nails in the heeling machine, and supplies any nail which the magazine fails to produce.

Heel-seat nailers.
Machine loaders.
Nail stickers.

A heeler, heeling-machine operator, crowner, or lapper puts a heel in one part of the machine, a top lift in another, and a shoe underneath the heel. The machine with one blow drives the set of nails which hold the heel in place through the heel and into the heel seat, and with another movement attaches the top lift.

Heelers.
Heeling-machine operators.
Lappers.
Crowners.

A boot bender then puts the boot in shape or springs it; his work is sometimes called springing the boot.

Boot benders.

In making a McKay shoe, after the shoe has been heeled, the last, which was pulled by the last puller before the stitching of the sole, is replaced, or a follower inserted, by a relaster.

Relasters.

In the case of pegged shoes, a pegging-machine operator operates a machine which makes its own pegs from a strip of wood, drives them into the shoe, cuts them off inside, and smooths off their ends; or a standard-screw-machine operator tends a machine which drives the end of a piece of threaded wire through the shoe bottom, cuts it off and clinches it, thereby making a screw peg.

Pegging-machine operators.
Standard-screw-machine operators.

Turn workmen and turn teams last and stitch the soles of shoes that have a single flexible sole, and are made inside out; they then turn them right side out.

Turn workmen.
Turn teams.

The shoe now has all its parts. The rest of the work in the making room consists in trimming the edges of the soles and heels and preparing them for the finishing. For the sake of clearness, the operations on the soles will be considered consecutively, then those on the heels.

An edger or edge trimmer trims smooth the forepart edges or edges of the sole on a revolving cutter. This occupation requires a great deal of skill.

Edgers.
Edge trimmers.

A prick stitcher brings into prominence the stitches on the surface of the projecting sole, using a small machine with which little grooves are impressed between the stitches.

Prick stitchers.

A heel slugger drives into the heel a row of steel or brass nails. A heel trimmer or shaver trims or shaves the curved edge of the heel. A heel scourer sands papers the heel, the sandpaper being attached to the circumference of a wheel. A heel breaster cuts smooth the front of the heel with a knife driven by a foot lever.

Heel sluggers.
Heel trimmers.
Heel shavers.
Heel scourers.
Heel breasters.

In the bottom-finishing room a bottom sander, buffer, scourer, or cuffer sands, buffs, or scours the bottoms of the soles and heels with a revolving roll covered with sandpaper. Naumkeag-machine operators, with a Naumkeag machine, treat the shanks in the same way.

Bottom sanders.
Buffers.
Scourers.
Cuffers.
Naumkeag-machine operators.

Blackers include all who blacken, paint, or stain the top, edges, or bottom of shoes in the final processes.

Blackers.

An edge blacker, a boy, applies blacking or ink to the edges with a brush. An edge setter sets the edges with a block of steel cut to fit the edge and heated by gas or by friction. The edge setter is to be counted among the more skilled operatives.

Edge blackers.
Edge setters.

A heel blacker blacks the edge of the heel; the blacking is then set with a revolving roller, friction giving the necessary heat.

Heel blackers.

A bottom or shank blacker or painter blackens or paints the soles, the bottoms of the heels, and the shanks. A burnisher, shank burnisher, or shank fakir burnishes the better class of blacked bottoms by rubbing them with a heated hand iron.

Bottom blackers.
Shank blackers.
Bottom painters.
Burnishers.
Shank burnishers.
Shank fakirs.

A bottom finisher polishes both painted and blacked surfaces with revolving, cloth-covered rolls and revolving brushes. On some shoes, bottom gummers place a thin coat of gum solution before the last polishing, thus giving a smooth hard finish.

Bottom finishers.
Bottom gummers.

Stamping-machine operators, with a machine having a steel die, impress a name, trade-mark, or design of some kind on the soles of many shoes.

Stamping-machine operators.

A wheeler runs a small cogged wheel around the upper edge of the heels of most shoes and the soles of many, thus leaving the imprint of its cogs.

Wheelers.

In the upper-finishing and packing room a treer puts the shoe on a horizontal form and applies a paste dressing to the upper, rubbing it in thoroughly with a stick. A dresser, brusher, or polisher dresses and polishes the shoes with revolving power brushes. A cleaner cleans the kid uppers of men's and women's fine shoes with water on a revolving brush, and then nearly all are ironed while on a tree by an ironer who rubs a hot iron over them, in order to make them stand up and give them form. All these operatives are collectively called finishers.

Trees.
Dressers.
Brushers.
Polishers.
Cleaners.
Ironers.
Finishers.

A sock liner puts in the sock and heel linings, which are pieces of thin leather or cloth gummed to the inside of the shoe bottom.

Sock liners.

A stringer or lacer laces the shoes, or a buttoner buttons them.

Stringers.
Lacers.
Buttoners.

Inspectors look over the finished shoes, and wrappers wrap them in paper and place them in paper boxes or cartons. Labelers paste on the carton labels, packers put the goods in cases, and they are shipped by shippers.

Inspectors.
Wrappers.
Labelers.
Packers.
Shippers.

A bench hand is a hand sewer at a bench, or one who does any hand mending or repairing that is necessary. In this category are cobblers, toe repairers, hand heel-shavers, etc.

Bench hands.
Cobblers.
Toe repairers.
Hand heel-shavers.

TANNERIES.

Employees of the first grade of skill in tanneries include foremen, assistant foremen, the bosses who oversee various machines and processes, beamers, unhairers, fleshers, refleshers, fine unhairers, purers, slaters, grainers, boarders, shavers, skivers, splitters, buffers, certain kinds of mill stuffers, certain dyers, certain finishers, and the like. Among employees of the second grade are ordinary tanners, rippers, retanners, stuffing-mill hands, glazers, colorers, seasoners, backers, dyers, oilers, leather pressmen, and others of like order. Third-grade workmen include soakers, washers, limers, stringers, hangers-up, hardeners, and others having similar duties.

Numerous mechanics, such as blacksmiths, carpenters, electricians, pipe fitters, steam fitters, machinists, masons, millwrights, molders, plumbers, and tinsmiths, are employed to keep in repair the buildings, lights, heating apparatus, machinery, etc. There are also helpers and laborers, yardmen, etc., and boys to do errands and light carrying. In some tanneries women, and girls and boys are largely employed to do machine feeding or light work on skeins, such as seasoning.

Blacksmiths.
Carpenters.
Electricians.
Pipe fitters.
Steam fitters.
Machinists.
Masons.
Millwrights.
Molders.
Plumbers.
Tinsmiths.

A laborer, called a soaker or blooder, puts the hides to soak in vats in the beam house, to soften them and to remove dirt and blood; if they were received as dried hides, a millman softens them further by passing them through a mill, which plies them back and forth.

Soakers.
Blooders.
Millmen.

A ripper slits each hide down its back, ripping it into two sides. A trimmer trims off corners, loose pieces, têtes, etc.

Rippers.

A flesher, cutter, or machine cutter, puts the sides through a fleshing machine to remove adhering flesh. A filer is an employee in the machinists' room who files the blades of the rolls used for fleshing skins.

Fleshers.
Cutters.
Machine cutters.
Filers.

A limer is a laborer who puts the fleshed hides in a solution of slaked lime, by which the hair sheaths are softened and in part dissolved, so the hairs can be removed readily. An unhairing-machine operator operates a machine that pulls out the hairs.

Formerly the work of unhairing and fleshing was extensively done by hand. Spreading the hide over a semicylindrical beam and bending over the top, so that the pressure of his body held the hide in place, the workman—called a beamster, beamsman, or beam slater—scraped the hair or flesh from the hide with a heavy, two-handled knife; in the edge of the knife used for unhairing was set a piece of slate. From the beam on which the work was done came the terms beamster and beam house.

Beam-men.
Beamsters.
Beamsmen.
Beam slaters.

A washer or wash-wheel man washes the hides several times, usually by throwing them into a large revolving drum, where water is kept pouring over them.

Washers.
Wash-wheel men.

After being washed, the hides are refleshed. Refleshing is a repetition of the fleshing process and takes the place of the green shaving or hand skiving, which, in the old process, accomplished the same thing by hand.

Refleshers.
Skivers.

A bater, purer, or puresman removes all traces of lime and the looser tissues from hides intended for the manufacture of all morocos, chrome tanned leathers, and many other upper leathers, especially the lighter weights. This is usually accomplished by immersing the hide in a bath of putrid material, thus inducing bacterial action; the bacteria consume the looser tissues, leaving only the coarse fiber bundles to be tanned. To know when to remove a hide from the puring requires much experience. A drencher works at a drench in which sole leather is bated to remove traces of lime. He may also be one who puts hides into a drench after fleshing.

Baters.
Purers.
Puresmen.
Drenchers.

Some sheepskins come to the factory unpulled, in which case a wool puller pulls off the wool.

Wool pullers.

A tanner either supervises or performs several operations in a tanyard, and is known by various names descriptive thereof.

Tanners.

A bark grinder is a laborer who tends a mill in which the tan bark, unloaded from the cars directly into the hopper, is reduced to a coarse powder.

Bark grinders.

Leach-house men, under the supervision of a tanner called a leachman, make the tan liquor by leaching tan bark in water. Tanners having charge of the distribution of this liquor and of the replenishment of the pits are known as liquormen, liquor changers, or liquor runners.

Leach-house men.
Leachmen.
Liquormen.
Liquor changers.
Liquor runners.

A tacker or stringer tacks one edge of the hide to a stick and hangs or throws it into a pit of tanning liquor.

Tackers.
Stringers.
Stock movers.
Yardmen.
Yard hands.

A stock mover or shifter moves the hides from pit to pit, from the weakest through all the grades to the strongest liquor. A yardman is a laborer who lifts the leather from the vats in the various processes.

When the tanning is completed, the hides are pulled off the sticks and hung on poles in the open air to dry. This method applies to all vegetable tanning processes. The method of tanning by artificial chemical processes is similar, chemicals being used instead of tan bark.

Pullers-off-sticks.
Stock hangers.

Currier is a term covering those who do all or any of the operations in a currying shop, where the tanned hides are prepared for use.

Curriers.

The leather is immersed in water by a damper or dampener, and immediately withdrawn. A scarrer or fitter-up, using a hand knife, then frees it from bunches or marked variations in thickness, and trims its edges. A sorter selects or sorts the skins.

Dampers.
Dampeners.
Scarrers.
Fitters-up.
Sorters.

A stoner-out, stoning-jack man, or striker-out passes every part of a piece of leather under the arm of a stoning jack, a machine which draws the rounded edge of a piece of stone or steel over the surface, with firm pressure, thus smoothing out all wrinkles and stretching it.

Stoners-out.
Stoning-jack men.
Strikers-out.

A splitter or splitting-machine operator splits a hide by passing it between rollers which push it against the edge of an endless steel band knife. By splitting, the thickness of the hide is diminished and the area increased. The grain side is stretched, so that it becomes larger than the original hide, and is called theskin, while the part taken off is called the split. If the hide is split into three thicknesses, the outer part is called the skin, the flesh side is called the split, and the middle, which is of little value, is called buff. Splitting was formerly done by a hand splitter or knifeman and, like the machine splitting, required great skill.

Splitters.
Splitting-machine operators.
Hand splitters.
Knifemen.

As the split has not been fully penetrated by the tanning liquors, it is sent back to the tanyard and retanned. It often happens that the grain itself is insufficiently tanned in spots, and a retanner or retanning-mill man, to complete the process, throws it into a retanning mill, a large, hollow, revolving drum, containing tan liquor.

Retanners.
Retanning-mill men.

A hardener or hanger-up hangs the retanned leather in a heated room, where it is thoroughly dried or hardened.

Hardeners.
Hangers-up.

A stuffer or mill stuffer puts the leather, together with a mixture of grease and oil, into a machine by which the liquid is thoroughly worked into the leather. A mill stuffer, who prepares the mixture with which the leather is stuffed, is a man of considerable skill; while one who simply fills the mill with unstuffed leather and stuffing, sets it going, and removes the stuffed leather, is unskilled.

Stuffers.
Mill stuffers.

A setting-out-machine operator tends a machine in which leather is set out or stretched, straightened, and smoothed; superfluous stuffing being removed. A setter or setter-out completes the process by placing the leather on a smooth surface—usually a slab of marble—scraping and stretching it, and removing superfluous stuffing with a blunt steel blade. At the same time he presses it down firmly and evenly on the marble slab, causing it to adhere, and thus removing all wrinkles. After this the leather is again dried.

Setting-out-machine operators.
Setters.
Setters-out.
Table hands.

Up to this point employees have given the same treatment to grains or skins, and splits; now the occupations differ, and those working grains are called by one name; those working splits by another.

A buffer or slicker buffer, working with a small, sharp, steel blade, shaves from the hair side of the grain a sheet of the epider-

mis as thin as tissue paper; this is sometimes removed by an emery-wheel man or wheel buffer, with an emery wheel. In still other cases a machine like the splitting machine is used to accomplish the same result, and the work is called skiving. This shaving process, whether done by hand

Buffers.
Slider buffers.
Emery-wheel men.
Wheel buffers.
Skiving-machine operators.

or by machine, removes all dirt lodged in the skin pores, and some fine hairs which have escaped the unhairing process, leaving a clean, uniform surface for the finish.

A fine unhairer or hairer works upon fancy leathers which must not be buffed because the natural surface of the grain is to be preserved and finished. He removes fine hairs with a hand tool in the manner in which all unhairing was formerly done.

Fine unhairers.
Fine hairers.

A blacker, black-machine operator, or colorer, blacks the skin (or dresses it with some other color), either by hand or in a machine, with a revolving brush. Some leather is afterwards smutted, or cleaned of dirt and lumps of blacking, by a hand brusher.

Blackers.
Black-machine operators.
Colorers.
Hand brushers.

An extractor makes the extract of logwood used in the currying of goatskins and the finishing of grain upper leather.

Extractors.

A staker, softener, or operator of a staking or softening machine works with a machine like a jack, but having a mechanical contrivance for gripping and releasing the leather at the edge of the operating table. He softens the leather and takes out some of the stretch.

Stakers.
Softeners.
Machine stakers.

A jacker finishes the leather. If the jack is a pebbling or a printing jack, which uses as a tool a roller which embosses on the leather a pattern impressed on its surface, he is known as a pebbler or a printer; if the jack has a smooth roller, which gives a plain, smooth finish, he is called a roller; if it has a piece of agate or glass for glazing the surface, he is called a glazer or a glasser.

Jackers.
Pebblers.
Printers.
Leather pressmen.
Rollers.
Glazers.
Glassers.

A grainer or hand boarder folds together the grain or finished side of the leather and rolls it under a polished wooden tool or board attached to his forearm. Only the unfinished side comes in contact with the smooth tool, and small creases and ridges are formed on the finished surface of the leather, and the sameness of the pattern impressed in the jacking is broken. A soft boarder folds together the unfinished sides, and thus softens the leather with a smooth finished surface.

Grainers.
Hand boarders.
Soft boarders.

An oiler oils leather by hand, and a finisher or finishing-machine operator passes it through a finishing machine, which brushes upon its surface a coat of wax, glue, or some other size.

Leather oilers.
Gummers.
Glyceriners.
Finishers.
Finishing-machine operators.

A measurer or measuring-machine operator feeds a measuring machine, which registers the area of the leather. After being finished a second time, oiled a last time, and sorted, it is tied into bundles.

Measurers.
Measuring-machine operators.
Tiers-up.

In the treatment of splits after they have been set out and dried a whitener or whitening-machine operator puts them through a whitening machine, which shaves off a thin layer, leaving a better surface for finishing. This was formerly done by hand.

Whiteners.
Whitening-machine operators.

In some factories the flesh side of oak-tanned leather, which has upon it a slight deposit of acid, forming a fawn-colored bloom, is whitened by a bloomer, who removes the bloom.

Bloomers.

After splits have been blacked, a glasser smooths them in a jack with a glass tool, and a paster puts on a dressing of pasty consistency in a machine like the blacking or finishing machine. They are then glassed again by a reglasser.

Pasters.
Reglassers.

A shaver shaves instead of splits leathers, removing the rough, uneven surface of the flesh side, either with a hand knife or in a machine. Some split leathers—particularly those tanned by the chrome process—are also machine shaved. Shaving by hand was formerly done on the flesh side of all grains, and on splits, but it is now done only on a few of the rougher skins.

Shavers.

Clearing and sweetening hands remove iron stains and other dark spots from leathers which are to be finished in light colors, by bleaching them in a solution of sulphuric acid and then rinsing them in clear water until all the acid is removed.

Clearing and sweetening hands.

A seasoner coats the surface of a skin with a preparation of albumen, blood, milk, or some other greasy preparation, which prevents the glazing agate from pinching or drawing the surface of the skin. The final finish on glazed leather.

Seasoners.

Glazing puts the

An enamele performs the finishing processes by which enameled leather is made, and a varnisher puts on the varnish. A patent-leather worker makes the peculiar lustrous finish on patent leather.

Enamelers.
Varnishers.
Patent-leather workers.

An ironer irons off dull-finished leather with a smoothing iron; a Dongola ironer irons Dongola leather.

Ironers.
Dongola ironers.

An inspector inspects the hides, skins, and leather at various stages of the processes.

Inspectors.

A belt-maker is an operative in a leather-belting shop or department, who makes belts for use on machinery.

Belt-makers.

In some shops attached to tanneries, harnesses are made by harness-makers.

Harness-makers.

Among morocco workers a somewhat different nomenclature obtains. If the leather is too weak to stand much stretching, a crutcher or arm staker, fixing one edge of a skin in a clamp and grasping the other with his hand, gently stretches and softens it by pushing across its surface a blunt steel blade mounted on the end of a short stick which fits under the shoulder like a crutch. Sometimes this work is done by a knee staker, who smooths the leather by knee-crutching it—drawing it, extended in both hands, over a blade set upright in a post by pressing one side down with the knee. Leathers which will not bear so much strain are smoothed by a percher with a similar blunt steel blade held in the hand and having no stick reaching under the arm. In a morocco shop the process of setting out is performed by a putter-out.

Crutchers.
Arm stakers.
Knee stakers.
Perchers.
Putters-out.

A dyer dyes many of the skins which are made into morocco. One who can make dyes and oversee dyeing is a very skilled man, but the actual dyeing is unskilled work. Those who apply color or dye with a hand brush to the backs of morocco are backers.

Dyers.
Dye preparers.
Colormen.
Backers.

In tanning morocco leather a former practice was to sew the skin into a bag which was filled with tan liquor or tanning material. This method of tanning is seldom used now.

Sewers of skins.

A journeyman currier of morocco is called a morocco dresser.

Morocco dressers.

TOBACCO.

Employees of the first grade of skill in tobacco factories include superintendents, foremen (who are managers of their respective departments) and their assistants, other head hands or bosses, and inspectors; in the second grade are box prizers, rehandlers, assorters, selectors, rollers, wrappers, lump-makers, shapers, potters, twisters, snuff grinders, and others of like occupation; in the third are wringers, machine feeders and operators, job hands, taggers, branders, and persons having similar duties.

Occupations of superintendence include, as in other industries, foremen of the various rooms, machines, and processes and their assistants.

Mechanics, such as carpenters, are employed continuously to do new work and repairing. Laborers and general helpers, and also boys and girls, who do light carrying and assist in the processes, are found among the employees.

Stemmers.
Strippers.
Bunch-makers.
Cheroot rollers.
Banders.

For a description of the occupation of stemmers, strippers, bunch-makers, cheroot rollers, and banders, see "cigars," page 1190.

A rehandler rehandles new-crop tobacco, grades it, places it in a dryhouse, and after the curing packs it in hogsheads. A tobacco hanger or shaker-out hangs bundles of leaf tobacco on sticks to dry.

Rehandlers.
Tobacco hangers.
Shakers-out.

A leaf picker sorts leaf tobacco into the various grades required for the different brands of goods to be manufactured, removing foreign substances.

Leaf pickers.

A steam-box hand works around a steam box, where the leaf is steamed in order to soften it for handling by the stemmers.

Steam-box hands.

A job hand removes tobacco from hogsheads, steams it, puts it in bulk; carries tobacco from the picker to the wringer, puts it through the sweetening process and through the dryers, and takes it from the dryers to the bulks or boxes for ordering, and from the bulks, after ordering, to the lump-makers.

Job hands.
Chargers, drying machine.
Dryers.
Dryroom hands.
Dryhouse hands.

Weighters.

A weigher weighs out the various kinds of tobacco in the quantities required for manufacture.

A picker selects the different grades of fillers, which are the leaves that go into the body of the plug, and a classer selects or sorts the wrappers; both may be called selectors. Casers put licorice and flavoring on tobacco to be made into plug, and machine wringers operate a machine which presses out any superfluous part of the flavoring matter in which the tobacco has been dipped.

Pickers.
Classers.
Selectors.
Casers.
Machine wringers.
Dippers.

A roller forms the lump or plug ready to be capped or wrapped with the leaf; in some factories he works by hand, in others with a machine.

Rollers.

A capper or nip wrapper puts the leaf wrapper on the lump or plug of tobacco.

Cappers.
Nip wrappers.

A lump-maker takes the fillers from the job or ordering room and makes the same into lumps preparatory to prizing or pressing. A shaper or prizer hand presses the lumps flat and solid in a heavy iron press; this is the first stage of prizing or pressing and is called shaping. A potter next puts the lumps through the hydraulic pots, or pot presses; in this operation the plugs are flattened and given a finish. A box prizer then prizes or presses the tobacco into boxes for the market; his work requires nice handling, and commands better pay than that of the other press hands.

Lump-makers.
Shapers.
Prizer hands.
Potters.
Box prizers.

A tagger, usually a woman, attaches the paper or metal tags to plugs of tobacco. A brander labels, stencils, or brands boxes with name, weight, etc., and otherwise prepares the goods for the market.

Taggers.
Branders.

A twister rolls tobacco into twists, which are afterwards pressed; a twist boy packs twisted tobacco into boxes. A granulator operates a machine that granulates certain brands of smoking tobacco. A snuff grinder grinds tobacco into snuff of various kinds.

Twisters.
Twist boys.
Granulators.
Snuff grinders.

In many factories a cutting machine is used to cut plug or other tobacco ready for the smoker's use. Women are mostly employed to cut and pack other kinds of tobacco, cigarettes, cheroots, etc., into paper and tin-foil packages, cloth bags, or tin boxes, after which the labels and revenue stamps are pasted on; the goods are then ready for the packing or shipping room.

Cutting-machine operators.
Cutting-machine feeders.
Packers.
Labelers.
Stampers.
Carton packers.
Shippers.

A bag-maker makes the bags in which smoking tobacco is packed. A cigarette-book maker puts cigarette wrappers into books.

Bag-makers.
Cigarette-book makers.

An inspector inspects the tobacco at the various stages of its manufacture, to ascertain its quality.

Inspectors.