GLOSSARY.
GLOSSARY.

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 manufactures 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 Introduction 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. Annularers 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 new bands on trusses; 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 xxii.

(1167)
MANUFACTURES.

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 receivable 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, exercises it in a lower, routine manner; they have 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, assistants, 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 his work, when the work is engaged 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, linemen, 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, bricklayers, masons, bricklayers, painters, steam fitters, pipe fitters, blacksmiths, belt-makers, electricians, batterymen, cooper, saw fitters, 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 Carrieage factory is engaged in a process essential to the manufacture of carriage, 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 confused 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 artist in wood who repairs, at all times and places, damage to work 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 bums 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 fitters are very necessary to keep saws sharp, and have much knack in their work. Wagon-builders 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
EMPLOYEES AND WAGES.

CARPET MILLS.

The grades of skill in carpet mills are generally found in 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 dying and finishing printed textiles.

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.

Among winders there are single winders, who wind single yarn; double winders, who double a thread of one color; moreau 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 cup winders, who are named for the kind of material they use. A jute winder winds the fragments or bits remaining on spools or cops which have been dosed. There is also an operative who redoubles yarn, winding three or more threads together for certain kinds of warp.

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 fused up. They are then used in the loom as filling, taking the place of yarn.

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

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

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 mixed pile, but for Brussels, plain wires are used. 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.

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 bales, yarn or other, from department to department; filling and roving carriers bring supplies of yarn or roving for the different machines.

There are also bolt-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 batterymen are employed. Roll covers or rollers are employed to cover the rolls of the drawing, roving, and spinning frames.

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, weavers, seamstresses, sample and fancy weavers, and smash pieces; in the second are lapmen, slubbers, frame tenders, frame spinners, spoolers, twistiers-in, harness makers, and weavers of common cloth; in the third, picker hands, chain splitters, beam fixers, and handiers-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 shaves 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.

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 through two or three pickers, called first and second breaker pickers and finisher pickers. The hands that 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 man who feeds and watches these machines are called carders or card hands, and sometimes card doublets 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. This refuse is taken away by waste hands, and is afterwards removed from the yard by wasters. The wiring or clothing of the cards is done by card clothers.

Incidental to carding are card stripping and card grinding. After a cotton card has been operated for three or four hours, its teeth become chocked 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 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 yarn 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 laid together and formed into a lap by a lap-head or ribbon-lap machine.

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. 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 case containing card slivers 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 been removed, or undrawn supplied, or a broken sliver pieced together.

Cotton is usually passed through three drawing frames, of which one may be a railway hand—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.

One of these frames is called a slubber, one a speaker, one a fly frame, and another a roving frame, a jack. The slubber puts the first twist into sliver, which then becomes roving; this process is sometimes called roving.

Roving is conveyed 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 fineness and tenacity 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—some times called rail setters or rail fillers, from the rail or bar on which the bobbins are placed. A hand who supplies the different frames with yarn, carrying it from one department to another, is known as a yarn porter, from the pouring of the material into the receptacles.

During a large part of the time the framers 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 pleaser 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 hands which transmit power to the spindles and bobbins wear out, they are replaced by hand boys or banders. Doffers are boys or girls who remove spindles, etc., from the backs of the various frames.

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.
Employees and Wages.

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 women.

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 reel or rack of a weaving 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 dressing machine, dresser, or dresser, 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 passing through the dressing machine, or shaver, the warp is drawn through a size compresed 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 wound 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 loose 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.

Benners.
Splitters. Churn splitters.
Warp splitters.
Mop splitters.
Hand splitters.
Hand dressers.

When yarn has been dyed in the form of skeins, it is sometimes placed on a ball warper and made into a short chain, sixed in bulk and not beamed or passed through a shaver. 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 looms' harness; this is done by warp dressers, web dressers, dressers-in, or they 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 makers or fixers, andckeditor

Harness fixers.
Harness makers.
Harness boys.
Handers-in.
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 loom 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 pattern-up-of-samplers.

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 drilis, in some mills, a weaver will care for as many as eight looms or a larger number of automatic looms. The weaver of ordinary 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 weaving is done by a smash piece.

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.

Inspectors.
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, stringers, singers, warp makers or mixers, chemic manglees, calender hands, pliers, pressmen, layers-out, stenciller, and kier and vat folders; in the third are puddling-machine men, winders, whiting-can men, patch dyers, screeners, steers, stitchers, bangers, ramnant girls, check pullers, and box tenders. For occupations in superintendence, see "cotton mills," page 1109.

The occupations connected with the repairing of buildings and machinery and with the heating and lighting of the mills are...
the same as in cotton mills. Laborers and helpers are under names slightly different.

Layer-out.
Beamers.
Bobbin hands.

Chemists.
Milkers.
Color mixers.
Strainers.

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 soared or washed and bleached and dyed in mills for dyeing and finishing textiles. Dye-house hands are a general term covering a number of operations 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 soap intended for the French system of drawing.

A bleacher is an operative who tends the vat, or kettie, in which the yarns or other goods are saturated with bleaching preparation. He is also known as a kettie hand or kettier, either hand or hands, 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 superfusible 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 machinery, extractor, or whizzer.

A yarn poler is one who hangs yarn on poles after dyeing. A ligurnorman 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 hands 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 bundles 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 loom 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 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 gasers. Generally the method of singeing by the gas-singeing machine is preferred, particularly in the case of light thin cloth.

After singeling, 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 grey to a pure white. The rope of cloth is drawn into kiers (or keirs)—large cylinders of iron—tightly packed by being tramped under foot by kier hands, and then boiled. If boiled in soap (as 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 steersers, who also assist the vat folders or kier hands. Gray boys pull the white or undyed cloth from machines, and lift binnacles of cloth.

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

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 presser. After being opened to full width by tenders 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 caiman or whitting-can man is one who steers the cans for the drying end 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 scour woolen cloth, a fuller tends a machine which is designed to shrink the cloth, and a crapper is one who operates a crapping 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 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 gigging or teaseling 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 shearsers or machine cutters.
EMPLOYEES AND WAGES.

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 stuff and drawerdits, those operating full-fashion frames and Cotten's patent frames, pressmen, loomers, crocheters, andducers; in the second grade are general knitters, makers, ladderers, seamers, button-hole-makers, and button sewers; in the third, thread trimmers, breeders, needle boys, and ribboners.

The division of superintendence is as in other mills. Similarly there are bobbin boys, deferer, etc., much the same as are found in the cotton mill manufactur. (See page 1160.)

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 as set forth under "cotton mills," page 1160.

The yarn is first wound off the egs, on which it is received from the yarn mill, onto the lago bobbins or cans of the knitting mill by operators called winders. 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 hose an automatic knitter, although the machines used by both are run by power.

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.

For occupations in mending or brushing the cloth for fleece-lined goods, see "dyeing and finishing textiles," page 1172.

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 fastened together by a baton.

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

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.

In some factories the operators 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 sewer being generally the one who sews a garment together after it comes from the cutter.
A runner-on is an operative who completes sleeves by knitting a seamless cuff on a rib-knitting frame and then, placing the needles of 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.

In making the hosiery, the top of the body is closed on a looping machine by a toppler. 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.

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

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

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 dried 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.

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 they 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 cut stitching is often done around the collar, either on a machine or by hand, by cutters.

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 buttonholes, and by a button sewer whose machine sews on buttons. Another girl, a buttoner, sews the buttons.

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 overseamer, or cover-seaming machine, which stitches from side to side across the seam, the operative being known as an overseamer or cover sewer. When this work is done on sleeves, cuffs, and drawer bottoms of ribbed goods, the employee is often called a cover. Sometimes this work is done by a point sewer, on a special point machine. A tacker is one who sews a seam or edge over and over by hand.

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 budding.

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.

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.

Drawers go through much the same process as shirts. Around their top they have a band or facings, 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 cases of shirts.

In the back part of the band, eyelets are often inserted by eyeleters; these may be finished with 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 lace, the former by operatives called bowlers, the latter by facers. Cloth straps may take the place of the eyelets and facings; those who sew them on are called strapers.

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

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

Both washing and ironing, or mangleing, are done as in a power laundry, by washers, ironeers, and mangleers.

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.

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

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

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

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 slackers; in the third are skelmans, card looms, reevers, spoolers (of sewing silk for the market), quillers, winders, coneon sorters, bobbin boys, and carriers.

The occupations found in superintendence and oversight are similar to those described under "cotton mills" (see page 1139), though some overseers are called looklookers. 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 ganmen 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.
EMPLOYEES AND WAGES. 1175

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.

In the preparation of organdie, 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 hand-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 doubletiers; fourth, second time over, spinning; fifth, reeling, by reeulers. When the silk is wound on a core, which is used for either the filling or the bobbin, the processes are the same, except that there is not so much spinning, since 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 thrower; 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, see "cotton mills," page 1160.

When the weaving of silk is done on the Jacquard loom, the filling is wound on spools instead of bobbins. Slicing silk, embroidery twist, and machine twist are formed in a twisting machine, which unwinds several yarns from a roll of 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 spooling; this is done by matchers. Most sewing and embroidery silks are put on spools for the machine by operatives called spool printers; the spools are printed by spool printers with a large stamping the kind and quality of silk and the name of the manufacturer. Some kinds of silks, however, are wound into bobbins on machines tended by bollers, and some are reeled by hand into cuts, skeins, or yard lengths. Sometimes skeins are made by people outside of the mills.

Spun silk is made from pressed, stained, or imperfect cocoons or from waste silk. The cocoons are sorted, and then in order to loosen glistening fibers, they are boiled in a hot soapy solution in a revolving machine called a preparer. Next they are placed in a warmer—a beating machine—by which they are beaten into a woolly condition. They are then put through a dressing frame or combing machine, and afterwards treated like cotton, by slashing, rolling, and spinning. After the thread is spun and twisted, it is coated 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 1160); but the warp thread is picked in order to remove the remaining knots and other imperfections by an employee called a warp picker.

Occupations involved in placing the beam in the loom, in replenishing it, and in repairing smashes are similar to those in cotton mills (page 1160). 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 laid 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.

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

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.

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 is also called trimming, requires much dexterity.

Inspectors examine the finished product for imperfections. If there are any spots in the goods, they are removed with acids or other harmless cleaners. Mufflingers or handkerchiefs are hoisted on the sewing machinery.

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

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 superintendent and oversight, as overseers and auction hands, and also wool sorters, card grinders, comb sorters, spin sorters, mule spinners, mule fivers, loom spinners, pattern-makers, fancy and sample weavers, embroidery-makers, smash pickers, 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 1130.

There are many mechanisms 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 flye-makker making flyes for frames, may be classed in some establishments as a muckiner 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. Flynn, 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 covers are men who cover the worsted spooling rolls. There are helpers and laborers of all kinds, and many errand boys and carriers, variously known, as in cotton mills.

Kerand 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 stocky they are sorted by rag sorters before being bleached.

The wool is scoured, or washed, in scouring machines, for the removal of dirt and of the gross natural to the wool by scouring
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 weaves, see "cotton mills," page 1180. Before the weaving is begun, designs are made by designers, and these are first worked up into samples. (See "cotton mills," page 1180.) 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 1180.

In addition to the harness cleaners (see "cotton mills," page 1180), in some mills there are shedmen, 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, carvers, turners, assemblers, machinists, blacksmiths in general, temperers, molders, and employees in occupations calling for the
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, timbers, painters, grinders, and the like. The third grade is made up of sandpapers, ladle dumpers, hemp openers, sickers, silver 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 superintendences include, as in other industries, foremen and their assistants, headmen, and bosses of various kinds.

Bricklayers, electricians, saw fillers, horse-shoes, 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 branchers, core carriers, handymen, hangermen, general utility men, car loaders, and others.

For a description of the occupations of boring-machine hands, body and gear makers, blacksmiths, hammermen, wheel-makers, woodworkers, etc., see "ravens and carriages." page 1186.

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

For a description of the occupations of boiler-makers, machinists, boltheaders, bolt threaders, rollers, core-makers, blacksmiths, hammermen, laborers, molders, iron molders, pattern-makers, moulder, floor molders, bench molders, straighteners, nut tampers, and polishers, see "foundries and metal working." page 1182.

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

Ladle dumper patch and line with refractory metal the ladle laddies used in the foundry. A blow-liner hand operates a machine that makes a crock 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 serrar 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 laces on a grindstone or emery wheel.

A Babbitt machine man, or tender, operates the machine in which the axes 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.

Timers.

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

Flow openers.

Brush hands.

Pay stockers.

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.

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. Silver 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 "action mills," page 1190.

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

Assembler is, 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.

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

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

In some establishments the work is improved by experiments in existing appliances and methods, and to devise new ones.

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, inlays, some kinds of finishers, outside men, niter sawyers, grinders, 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 stonemasons. General and particular helpers and laborers, oilers, sweepers, etc., are also employed.

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 stenciller 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-machinetenders, machine hands, and cabinetmakers, see "woodwork and planing mills," page 1178.

A whip sawyer operates a thin, narrow saw blade used in following curved lines. A miter sawyer operates a saw in a miter box, which are cut to the ends of pieces to be united in a miter joint. A dovetailer operates a dovetailing machine, which makes a peculiar interlocking 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 be received polish.

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.

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

Inlayers are skilled workers 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 salon 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, strippers, fillers, and polishers, see "finishing," page 1178. For a description of the occupations of finishers and strippers, see "finishing," page 1178.

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

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.

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

A sewer sews coverings, linings, and other upholstery 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.

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

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 the framework is free from sticking, that handles and casters and all similar attachments are in place, that the work is properly executed, and that a fine finishing touches to the work before the furniture goes to the market.

A pad maker makes pieces of India rubber or other material that prevents injury by rubbing or striking against other objects.

Varnishers, packers put up small fittings. Packers stuff.excess cloth around the furniture and cover it with burlap, or pack the goods in crates, boxes, or packages.

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 the same kinds of sawyers or saw tenders, planers, sash-makers, sash-stickers, blind-makers, door clammers, core-makers, lattice 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, log tenders, loaders, mill hands, yardmen, and the like.

Operations 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 files, which 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.

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.
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 leaders 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 macamating 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 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 process of manufacture 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 rails 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 smoothed by a scraper in order to afford a convenient surface for the application of glue by the gluing spreader. The veneer is firmly pressed on by veneerers with veneering hammers, so that every part adheres.
Clampers adjust screw clamps to hold the surface together evenly and firmly until the glue has dried.

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 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.

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.

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 chossed in the second grade of skill.

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 clamp puts these doors together tightly with clamps, gluing and welding them.

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 gladiator puts glass into sash doors and window sashes. 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.

A woodworker is a general term for any employee who has to do with woodworking machinery.

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.

A sawyer puts on the stain and a varnisher applies varnish, which is usually the finishing coat.

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

A molding-machinist in a molding-room, 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-boxers, most of the machine hands (who now turn out by attendance on machinery parts that used to be made by hand), and also mull-makers, 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 handlers, wheel cleaners, wagon washers, porters, roundabout men, 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, templates, 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 "Lumbering 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 those 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 the help of the gofers, technically known as finishers, who are in forging and attend to the finishing. If the helper only swings the hammer he is merely a laborer.

There are various kinds of axes, but the one most commonly used are made of steel. In making axes 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 axle trees, 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 shaft within which is fitted the axle arm about which the wheel revolves.

A wheelwright is a skilled man who makes wheels and running gear, 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 for wheels.
EMPLOYEES AND WAGES.

For a description of the occupations of machinists, see "foundries and metal working," page 1185.

Machinists.

Carriage-part makers.

Gear workers.

Gear hands.

Wagon-body makers.

Assembler.

Hanger-up.

Spoke-makers.

Spoke drivers.

Spoke-makers.

Spoke drivers.

Wheel rimmers.

Bending-machine band.

Tire blowers.

Single-tire blowers.

Welders.

Tire welders.

Tire setters.

Tire bolters.

Wheel truers.

Pole-makers.

Shaft-makers.

Iron grinders.

Machine hands, metal.

Machine hands, wood.

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 hand workers, fitters, tool-makers, latheworkers, forgemen, hammermen, sheetmen, furnacemen, heaters, brass finishers, decorators, and painters.

In the first grade of skill are foremen and supervisors—known by many names— and roll boys, rollers, rollers, 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 showlos, 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-boys, 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 lowest grade are supervisory employees of various names, all-around machinists, some lathe hands, certain boiler-makers, molders, and boose workers, cabinet-makers, carvers, turners, inlayers, marquetry workers,
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 wuckers, some brass workers, and electroplates, glass embroiders, 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. Auxiliary mechanics include bell-makers, masons, horseshoers, millwrights, stonemasons, etc.

Helpers and laborers include iron carriers, brass cleaners, car carriers, castings cleaners, pit cleaners, boiler washers, dry-kiln men, lamp trimmers, scrap pliers, sand dryers, sweepers, and wipers. Boy employees are called utility boys, call boys, check boys, errand boys, hammer boys, messengers, etc.

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 stripers are carpenters who delineate cars that are unserviceable.

Sawyers.

Carpenters.

Joiners.

Inside finishers.

Decorators.

Repairers.

Car repairers.

Stripers.

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

Inlayers.

Marquetry workers.

Machine-makers.

Pattern-makers.

Molders.

Core-makers.

Bell-makers.

Brass finishers.

Painters.

For a description of the occupations of furnacemen, heaters, shearmen, and hammersmiths, see "iron and steel," page 1182.

Furnacemen.

Heaters.

Shearmen.

Hammersmiths.

Blacksmiths.

Locksmiths.

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

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

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 flute cutters cut pipes or flutes to length. Screw cutters tend screw-threading machines.

Brass workers include finishers and plate of brass. Electroplaters or silver plate 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.


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

Marble cutters hammer out marble for decorative purposes.

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.

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

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


dineers and Metal working.

Foremen and assistants, some molders and core-makers, tampers, boiler-makers, such machinists as tool-makers, test hands, erectors, pattern-makers, blacksmiths, and forges may be placed among workmen of the first grade; in the second grade are molders, tappers, drillers, grinders, drills, machine cutters, the various metal-working-machine hands, blacksmiths' strikers, hold-on-men, bolsters, rivet heaters, and core-makers on small iron 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.

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 fitters and helpers were simply laborers.

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 sand 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 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 mold 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 rammer.

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 flaskmaker 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 ramming-machine tender, tumbler, or rampler removes most of the sand from small castings by means of a ramming box. Superficial metal on larger castings is sometimes removed by chippers, trimmers, or snappers 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.

Craunmen or craun runners handle heavy articles, such as lids of molten metal with the spade; their skill varies from that of the skilled runner of the electric crane to that of the workman who operates a crane by hand windlass. The tackle and ropes are adjusted and kept in order by riggers; see "shipyard," page 1183.

Boiler-makers and tank-makers 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 scarifiers, who bear 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 drive them, the heading being done by the riveter, either by hand or by machine. Assembler, erecter, 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 taper 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 fastens 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 from the forge and place them in position.

A done 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 fits it. In other kinds of factories tinsmiths or sheet-metal workers do various work in sheet metal, either by hand or with or more or less complicated machines. A woodworker builds the frame of the locomotive tender of oak, binding it with wooden braces and brasses, 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. Annioskers or furnace tenders regulate the heat of the oven in which iron is annealed, usually to make it malleable. Dampers empty the pots in which the castings are annealed.

Machinists, in their 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 benches 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 employes 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 these 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, hammers, gear cutters, planers or planer hands, bolt and other cutters, threaders, bolt threaders, nut tappers, shapers, etc (those who finish the heads of bolts and nuts), milling-machine tenders, polishes, nail-makers, reamers, press
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 order.

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 visé hands, from the fact that their work is usually held in a visé.

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 sings a work upon a die, either with a hammer and chisel or by forcing in a piece of hot metal.

A brass finisher is a skilled as a first-class machinist. Like the machinist, 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 workmen who work 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 forgers, hammermen, hammer drivers, and forge heaters, whose occupations are described under "iron and steel," page 1184. Spindles, bolt-heads, 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 stripping 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. Japanese apply varnish called "japan"; varnishers are generally brush hands, although they may be dippers. Enamelmasters 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 wiring dynamos, where these are made, and wiring electrical machines. Pipe fitters and steam fitters fit steam connections, and valve men pack and set valves. Browners brown gun barrels. Gas-makers or gas producers manufacture gas. Reeders 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, strainers, finishers, polishers, chemists, and forgemen. The various metal-working-machine hands, tablemen, hammermen, ladlemen, levermen, liners and patchers, chargers, hoisters, and hoist men may be given position among those of the second class.

In the third class are barrowmen or luggagemen, cleaners, coal heavers, wheelers, sludge, 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 railroad cars, 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-up employees couple cars to one another and to the locomotive. The metalman has charge of the cars of molten metal. The hoister 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 carbomasters, filterers, handymen, wheelers, levelers, doggers, care takers, metal mixers, floormen, strainers, and strikers.

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 examined 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 1186.)

Hoist engineers operate the engines used for hoisting the material to the top of the stack and for raising and lowering the hobs to permit the ingress of stock and test the height of stock in the furnace stack; pig-machinists engineer the engines that move the string of molten pig-some include as more of the pressure pumps at the hobs; 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
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 man, 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 scoters 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 stage-men unload ore from vessels. Coke screeners screen coke to remove the dust. A breaker or sledger breaks up large pieces of scrap. A barrowman, buggymen, or buggy puller wheels the material, loaded into barrows by the helpers, slumin, stockmen, or stock-house men, to the scales for weighing by the weighers.

Cagers place the barrows on the hoist. A skimmer or hoistman elevates the charge. Charge men, top fillers, or dumpers receive the barrows at the top of the hoist and dump the contents into the furnace.

Sweepers, scrapers, scrappers, or clean-up men 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 flux 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 tuyeres, coolers, taps, stock plates, coils, spouts, etc., except that at large furnaces; the last is done by a water tender.

At furnaces equipped with pig-casting machines, menmen 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 hogger.

Bessemer converters pour iron over the track to the pig-machine molds or the mixer. For a description of the occupations of riggers, see "Shipyards," page 118.

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

At plants where a casting machine is used the molten metal is run on a runner into open molds of sand on the casting floor.

Central-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 sid of the cast house.

Cinder snappers, slagemen, cindermen, or runners 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 streakers pile and keep a record of the stock for which there is no immediate demand.

WHEELSMEN OR WHEELRIGHTS 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; dynamiters who explode dynamite in the stack, to dislodge stulls or hardened masses of ore; a pull-up who raises and lowers certain furnace doors; and pig-lead 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 another 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.

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 engineers 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-gage 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 tender smudges, caps, and keys up the mold.

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

Refractory material for linings, which has been wheeled from the bines 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 vessels, the furnace hearth, and the metal ladle.

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

Yard-cranes engineer run the steam cranes used in handling the molds and in loading and unloading ingots.

In the open-hearth process a first helper, in some mills, has immediate charge of two furnaces; under the supervision of the open-hearth 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 tops the heat into the ladle from the back of the furnace. A sampler takes samples of the heat and carries them to the laboratory for analysis.
A charging-machine man charges the furnaces. A soaking-pit crane man charges the ingots into and drawn from the soaking pit. Where artificial gas is used in the open-hearth process it is made by 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 clanders from the pits.

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

The puller-out, swathed in sacking which has been wet to prevent ignition, lifts out the crucible with a pair of tongs. The pouter then raises the crucible 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.

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

Wrought or malleable iron is made from cast iron in the puddling furnace by the puddler. He lifts 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 rotary press operated by a squeezer-man. If the mass is heated in a forge fire, the workman is called a knobbler.

The forge department is under hammermen or hammer drivers, who control the power hammers under the direction of the forge-man, 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 forge-men are forge hatters, who see that all work for the hammer is brought to the proper welding heat.

In a rolling mill the steel ingot or 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 roller turner; the rolls necks that fit into the housings are trued by the roll neeker, a lathe hand; and notches are cut in the grooves of the roll by the roll nagger.

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.

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

A roller engine 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 stumpner beats the heat number on the ingot.

The iron bloom goes from the shingler or squeezer to the rougher or rough 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 pass 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.

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 formed piles which are laid into bins for reheating. The hatter must possess skill in order to be able to tell when the proper degree of temperature has been reached.

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.

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

Catchers, finishers, roughers, and stranders are all included under the general term 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 cooler or hot bed men, or coolers, and passed through straightening rolls by a straightener, assisted by a gagger. Next a ganger 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; edger trims 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.

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 off. The galvanizer immerses the iron in a bath of molten zinc.

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.

Bolt makers and henders, 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.

For the occupations of other employees, such as molders, ratting-machine men or tumbler, annealers, machinists, operators of the various metal-working machines, drillers, punch hand, slitters, aioters, riveters, bolt-makers, blacksmiths, fitters, holders-on, tool-makers, strikers, lathe hands, pattern-makers, and others, see "founaries and metalworking," page 1182.

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 this 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, boilermakers, blacksmiths, machinists, and the various metal-working-machine hands are identical with occupations of the same names described under “foundries and metal working.” (See page 1185.)

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 frame, lays out or marks the shape of the plates which are to form the covering for the vessel, making wooden templates when necessary; usually he also inspects the assembled work to see that it has gone together as he laid it out. From the templates, cutters, 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. Ironworkers are workmen employed on any process in the construction of an iron ship. The work of putting in the metal plates is similar to that performed on a boiler in a boiler shop. For a description of the occupations of riveters, hewers, holders-on, etc., see “foundries and metal working.” (See page 1182.)

The parts of a wooden vessel are sawed or hewn to shape by sawyers or bowmen, 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 ironworkers or fitters in an iron and steel ship yard, put up the frame of the ship and cover it with a plank. The well-trained ship carpenter is a skilled workman. The fasteners or driver of tree nails drives pins of oak or locust to serve as fasteners for planks below the water line.

Stage builders, as the work proceeds, shape the rough stages of the hull; the base stage builder is usually an expert ship carpenter who shares the members in proper line and is responsible for keeping the ship in shape. The inside of a ship is shaped 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 interior surface of a wooden vessel. A ceiling worker is a skilled joiner who excels in the ceilings of the cabins and saloons.

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

MISCELLANEOUS INDUSTRIES.

BAKERS.

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 makers, and spongers; in the second are bread workers, pudders, roller hands, and the like; and in the third are pie fillers, 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, foremen leaveners, etc.

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

Some of the workmen in a bakery are wagmen, 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 what other products are turned out by the shop; in larger shops there are bread bakers, cake bakers, pie bakers, pastry bakers, cracker bakers, doughnut-making, 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 or yeast for bread; dough-makers knead the bread by hand, or machine mixers mix it with a machine. These men are considered 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 leaves, and puts these leaves into pans; he also forms rolls, cakes, and crullers.

Roller hands roll out the dough for crackers 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 pans 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 pure and slice apples and other fruit for pie filling.
After the pie dough has been cut into small pieces, rolled out, and laid in the bottom 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.

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

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.

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.

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

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

DRENNERS.

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, kilnmen, cellarmen, rackers, bottlers, cooperers, and corking-machine operators. In the third grade are bag fillers, washhouse men, cleaners, cork wipers 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 cooperers, 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 locations.

General hands, helpers, and laborers include drivers' helpers, beer-peddler's helpers, pitch-yard men, oilers, porters, washmen, machinists, blacksmiths, washmen, yard hands, wood haulers, bottling-room boys, and sometimes boys are employed as general hands, bottling-room boys, and bottle men.

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

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

A brewer is a skilled employee who oversees or performs all the operations in the brewing of malt liquor. A kettleman tends the kettle or malt tub, in which at a high temperature the crushed malt is boiled into wort. A cellarmen, 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 rackers racks or draws off the wort into hogheads, that it may ferment more.

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.

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.

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

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 wiper wipes the corks of the filled bottles.

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-roller.

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

A stamper puts the revenue stamps on filled kegs. A car loader is an ordinary hand who loads the filled kegs or barrels into railway cars for shipment.

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

For a description of occupations of ice-machine men, ice-machine hands, or ice-men, see "Distilleries," page 1181.

CANDY.

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

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 decoration 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.

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-
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-bolleted-candy maker boils hard candy. Stick candy is made by a stick puller or stickmaker, who puts 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 losange cutter tends a machine by which losanges are cut into shape, and sometimes also stews 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.

Cocoa-nut openers are helpers who break open coconuts; the meats are then prepared for the cocoa-nut boiler or candy-maker by cocoa-nut workers, who grate them, or cocoa-nut rollers, who mangle them by rolling. These are unskilled operatives. A cocoa-nut boiler tends the boiling of cocoa-nut and sugar to be made into cocoa-nut candy or cakes or used for ornamental purposes. Sometimes, however, he does all this work of a cocoa-nut maker. A cocoa-nut-maker, or cocoa-nut candy maker, makes cocoa-nut 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 consistancy 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 casting 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 55 to 100 pounds in a day. Sometimes the man who casts the cream also does the dipping; he is then known as a chocolate-cast 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-syrup 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 supersitious syrup, 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 syrup and crystallized. A fig-jelly helper is a general assistant in the gum-drop department.

A marshmallow maker casts the material for marshmallows into molds similar to those used in making cream and bonbon centers.

A grain worker rolls, grinds, and drops old-fashioned peppermints or dry candy.

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

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

An ornament is 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 carrier cuts the papers in which candies, lozenges, etc., are wrapped.

An insane helper, who wraps the candy wrappers in wrappers; they are often known, according to the kind of goods they wrap, as cream wrappers, soda-tablet wrappers, etc.

A candy wrapper puts 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 foreman, 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.
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.

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 bellmen, blacksmiths, boiler-makers, brickmakers, brakemen (on railroad), carpenters, cooperers, printers, cooks, electricians, engineers, folders, binders, pressmen, and presswomen (in printing office), steam filters, gas-makers, teamsters, molders (in foundry), painters, Plumbers, tinsmiths, machinists, etc.

CIGARS.

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, cutters, bookers, dryers, stockmen, fillers, pressmen, and branding-machine operators; and the third grade includes hand handlers, labelers, and pasters.

In superintendence, a large cigar factory has its general or factory foreman, and its foreman or female assistant and assistant foreman 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 carrierg service in and between the departments, are found in cigar as in other factories.

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

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 fragile 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.

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.

A wrapper selector or cutter, or shaper, sorts the wrappers into classes to be given to the makers of the various grades of cigars. 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 buns 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. Cigars are made either by the all-band 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.

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.

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.

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

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.

Labelers and pasters paste on the labels, stamp or stencil on the box the name and color, and attach and cancel the revenue stamps. A pouch-maker makes the pouches in which the tobacco is sometimes packed.

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, sorters, pressers, padders, machine operators generally, etc.; and in the third are padders, tappers, 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.

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.

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

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.

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.

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.
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 coatmaker makes coats; a vest-maker, vests; a pants-maker, pants, etc. A butcher or vest maker puts the backs into vests.

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

A finisher is one who examines the garment for defects, after it has apparently been completed, and remedies any he finds. He is dependent 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. A seamstress sews on descriptive tickets; packers put the garments into cases, and shipping clerks ship them to dealers.

DISTRIBUTERS.

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 mashers, mixers, skimmers, slop runners, stillmen, and the like. The third grade includes plate cleaners, pump tenders, scrubbers, slope dryers, slope 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, blacksmiths, electricians, machinists, painters, and pipe fitters. Each department has its helpers and general hands, including wheelers 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, teads the vat into which the material is put to ferment. While the water is being poured in, a beer plunger stirs or plums the mass continuously, heating it in every direction, to prevent the formation of bumps and to wet thoroughly every portion of the floor. A yeast-maker makes the yeast which is added to the mash to promote fermentation. Some distillers 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 liquors or swill and stores it in hogheads 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.
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.

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

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

FLOUR MILLS.

Among the most skilled employees in a flour-mill are the Miller (who is the foreman of the entire plant); the foremen of the various departments and processes; and batters, ball grinders, corn millers, oatmealmen, rollermen, 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, cooperers, electricians, engineers, firemen, steam fitters, machinists, masons, millwrights, paintmen, planemen, and tinners. Inside and outside the mills are oilers, sweepers, mill hands, floormen, laborers, teamsters, and the like. Boys are employed in the running of errands from department to department, or wherever needed.

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 in many mills he is 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, and that it is not exposed to 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.

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 track; from here it goes into the elevators. An elevator man has charge of the grain stored in the elevators.

Smutters or cleaners operate separator machines, fitted with iron plates or sieves, which remove foreign substances from wheat, and also sieving 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 smoky.

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 rollermen, barley rollers and stones, being men who work only in barley. Rollers' helpers are called roll tenders.

A purifier or purifier hand operates a middlings purifier for the separation of the flour, the middlings, and the bran or fillings; 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.

A bolt mill has charge of the long silk-covered reels through which the flour is bored or sifted. A wheat-rolling-machine hand and dry-kiln hands are employees who attend to the rolling machines and kilns in which grain is cooked in the manufacture of breakfast foods; they are sometimes called pannmen.

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 miler puts the barrels in the head house and nails them. A sack sewer sews up sacks, and a stenciller stencils the brand upon barrels and sacks. A sackman repairs worn sacks.

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

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

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

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

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 sawyers, footmen, lehrmen, bit gatherers, polishers, deconectors, filters-in, and those of similar skill; and in the third grade are batch mixers, groundlayers, roughers, washers, wrappers, rubbers, and employees having corresponding duties.

In superintendence there are foremen and assistant foremen of many departments and processes, gauffers, bosses of shops (or groups of workmen), master teasers, master shearmen, 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, cooperers, 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, sandmen, 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 course 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 teasor 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 press-room houses, this workman is sometimes called a shearer.

A skinner or skin cutter removes the thick semi of uncombined salt from the furnace, 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 furnace long enough to heat the superimposed layers into a homogeneous mass that can be blown evenly by the blowers. A bit gatherer, usually a boy, gathers in small pieces of glass.

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

A layer, or layered boy, carries 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. Our 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, or an annealer, anneals it in a kiln, or lays it flat and anneals it in a lehr (also spelled leer, leer, and leer).

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 blowers depend upon the size of perfect glass the cutter is able to cut from the sheet.

Plato 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-dill 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 tank by means of a crane suspended over the table. A teaster or hour and tablemen fill 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 layer, or 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 guess to the required width. A rollman operates the roller under the supervision of the rough-glass foreman. A sword boy lenses the sheet from the table with a long flat tool called a sword.

A boyman attends the boygesy, 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 grider or grider grinds the rough plate, which is converted for the purpose by plaster of Paris to a cast-iron table having a rotary movement. A grider is also one who removes pesty marks from glassware by grinding on a stone wheel. The emery used in this process is prepared by eating 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 roasting the iron calcined in iron sulphate. The plates are carefully examined for quality and finish, and any defect is cut out.

Plint 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 ballmaker, 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 blowers have blown the mass to the approximate diameter required, he inserts it in a hinged iron mold, which is then closed, shaping the included 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.
Glassworker is a general name for a worker in glass of any kind.

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.

A printer or stick-on is an unskilled hand who sticks paper impressions or decals 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.

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

A filler-in is one who fills in by hand the outlined pattern on decorated glassware.

Painters and decorators decorate opaque glassware by painting designs by hand upon its surface; painters are highly skilled workmen.

Sorters, or matchers, select the ware according to quality.

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.

A bench boy works at a bench, at many kinds of low-grade work.

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-makers; when ready for shipment these are stenciled and shipped by shippers.

Wrappers wrap fiant glassware in paper and pack it in straw, after which it is ready for shipment.

A cullet, or broken-glass, cleaner washes broken glass which is to be remelted.

A block fitter is a mechanic who fixation repairs the blocks used by the gatherers and blockers.

A line burner burns lime for lime glass.

The clay-stone maker and the brickmolder 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 brickklin.

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.
bollermen, coopers, etc.; in the third are finishers, sorters, counters, washers, drainermen, screeners, jobbers, pullers, wood-pulp grinders, cutting-off men, sheet liners, plater girls, and the like.

Occupations of superintendents include superintendents, foremen, assistant foremen, toure bosses (those who in alternate weeks change from day to night work), and their assistants, and headmen of various departments, rooms, machines, and processes.

As in other mills, there are carpenters, electricians, engineers, fitters, 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 and steamers to convey materials and products. Helpers and boys do heavy work and armature.

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 thrashers or feeders feed them into large wooden boxes or machines, which free them from some of the dust and heavier particles of dirt.

A rag or stock sorter, or shredder, is a woman who works at a table on which are fixed upright sythe blades; she sorts the rags according to quality and color, and, by drawing them over the sythe blades, opens up scenes, removes all bottoms, hooks, eyes, and other hard substances, and cuts the cloth into pieces. Table girls or overlookers inspect this sorting.

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 feeds them into a dusting machine, which removes the remaining dust and dirt.

A rotary filler throws and presses the rags into a rotary boiler or rotary, where for so many hours they are cooked in a bleaching solution. Then the cooking is finished, a rotary damper takes the cover off and pulls out the rags with poles or forks.

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 pouring the ingredients into a tank where a wooden stirrer or agitator, moved by power, does the mixing.

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 brokers, and it is carried to the beating engines, into which it is thrown by the 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 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.

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.

A size-maker mixes the ingredients for the size, and makes it, usually by boiling scraps of hide, hoops, and horse in water.

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 loftmen, who work very rapidly and with great dexterity. 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 of ashes for fumigating finished coated paper on racks to dry. A puller removes the bundles of sheets or spars from the poles, and opens them up so that the air can get between the sheets. A jogger puts 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 calendared 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 calendar boys or girls—a feeder, who feeds the sheets one by one into the machine and must work very quickly, and another operator who has only to receive the sheets; the two change places from time to time, usually every hour. A plater finishes paper by plating, instead of by calendaring. 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 platemen between heavy rollers and rolled back and forth. Plating is so expensive that it is done only on the finest quality of paper.

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.

A finisher wraps the paper and seals the package; a roll finisher wraps news and other papers which are shipped in rolls.

A labeler pastes on a descriptive label or stamp it with a stamp; and the goods are then packed and shipped.

Some papers are packed in wooden frames, or crétes, the maker of these frames being called a frame-maker; his work requires little skill.

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.
MANUFACTURES.

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 calendar, though usually larger. Tending these calendars 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. A ruler or ruling-machine tender operates a machine by which writing paper is ruled. A sheet liner runs a machine by which lining paper is pasted onto boxboard.

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 blocks with one blow. A barkers 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.

In making chemical pulp, a chipper man 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 hoppers—either rotary, like those in which rags are boiled, or stationary upright, called digester—tended by boilermen, or cookers, and cooks' 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.

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. 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 alkaline liquor by squirting fresh water into the pits after the pulp has been blown out of the digesters. Screeners 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 bleacher man draws the pulp from the washing engines into rats, where it is mixed with a solution of bleaching powder. 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.

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 yarum-machine tender operates the pump of a machine which concentrates the alkaline liquor used in the manufacture of soda pulp. A pulp drawer is a common laborer who draws wood pulp from the storagehouse to the beaters, or from the cart to the same.

Where a factory uses natural gas, piping it from its own wells, pipe-line men keep open the gas-pipe line. 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.

Skilled men of the first class in the various branches of work in potteries include foremen, head workers, casters, pressers, jigger-men, dish-makers, engravers, hand painters, and the like. Of somewhat less skill are dippers, placers, mould-makers, turners, saggar-makers, decorators, fillers-in, liners, slip-makers, kiln dressers, pressmen, pluggers, 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 blinder. 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. 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 jigger-men, or wherever needed.

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 pressers 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.

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.

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.

A turner turns off the rough edges of cups in a lathe. A sponge or cup sponge sponges them, as well as the other dishes, so that they may be worked more easily.

A caster, by pouring fine slip into plaster of Paris molds, casts fine ware such as belleek, which is neither pressed nor turned.
A sagger-maker makes the clay box in which the green ware is placed in the kiln to be baked or fired, or worn once baked is referred for glazing. A glazed-kiln sagger used in rer-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 saggers when pins are not used.

Placers. A placer puts the ware in the saggers.

Wad-punch men. A wad-punch man makes a wad null or wad punch, which is made ropes of clay to be placed between the saggers to keep out the smoke and protect the ware from irregularities of heat.

Klinmen place the loaded saggers in either the biscuit or the glazed kiln. Klinmen, kiln drawers, kiln workers and oddmen can be included in the same class—all being employed in removing the ware after firing.

The kilns are fired by firemen, the proper temperature being determined by Segur's cones or other method.

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 saggers have left clinging to it. A selector sorts the ware to quality, and a stopper stops any cracks or holes with slip.

A glaze grinder grinds the enamel or glaze made of first—a translucent glass, composed of silica, lime, soda, borax, and lead—into a mixture resembling slip, and in this the bisque ware is dipped by hand, with 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 of the marks left by the pins or stilts. A polisher, using a buffing wheel, polishes off any rough places in the glaze.

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.

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 glazed ware draws a line of gilt or gray around the piece, near its edge, with a brush. This is usually done by a girl. A glider touches the ware near the edges, here and there, with a cloud of gold dust.

A cutter is a girl who cuts out designs on tissue paper from large sheets; a decalcomania transfer 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 impressed upon it when the paper is removed.

When trade-marks and other legends are not stamped in the biscuit, a stamper places them on the glaze.

Stampers. Packers pack goods in hogheads, barrels, or crates for shipment, and are usually skilled in their line.

Packers.

A job is made by the foreman or the stamper. The foreman or stamper arranges the pieces 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.

Proof readers. A proof reader reads the copy aloud, or follows it while the proof is read.

Corrector or correct man, who is a compositor, corrects the proof, if it be of hand-set matter or matter set on some typeset (?)
MANUFACTURES.

A feeder or press feeder is an operative who feeds paper into a press by hand. A job-press feeder, feeding 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 ink 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.

A stapler 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 binder puts on the cover and finishes the book. A binder has charge of a machine that rolls blank paper; sales-office feeders are boys or girls of little skill. A paper or operator of a numbering machine, usually a boy or girl, runs a machine that pages blank books.

Occupations of the greatest skill in shop factories are those of foremen, overseers, and other headmen and their assistants in the different departments and processes, and also cutters, stock-sorts, Goodyear wefters, rough rounders, edge trimmers, and operatives doing the same grade of work. In the second grade are skivers, closers, sawn rubbers, gore and guised seamers, top stitchers or orderers, fancy stitchers, rounders, edges, heel compressors, shankers, fair stitchers, pick stitchers, bottom finishers, ironers, pegging-machine operators, and the like. The third grade embraces punchers, eyeletters, hookers, perforators, tip flawers, table workers, stock wefters, channel combaters, 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 employed in repairing buildings and machinery. General helpers in the factory are designated as lumpers, off-bearers, utility hands, last pickers, etc.
Boys are employed to help and carry, with such designations as dinker boys, last boys, helper boys, take-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, where the fitting of the upper is done, and the finishing room, where the uppers are finished and 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, facing, and other small leather parts, and for linings and gussets—these are usually cut from cloth—all done by hand. These are hand operations, but sometimes the leather and the die are cut under the beam of a die-cutting 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 skinning machine the edges of the pieces for the uppers. Comantors or paper cutters put on the skived surfaces which fold over and stick together by pressure either in a machine or by hand, thus producing a finished edge instead of a raw edge.

Upper stitchers include all work on sewing machines in the fitting room, whether on leather or linings.

An eyelet-row stitcher puts eyelets on the upper, just outside the place where the raw 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 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 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 faced shoes, with a machine called a gang punch. An eyelet or fastener setter sets in the eyelets with an eyeletting 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 be, and a tipper or tip stitcher stitches it on; sometimes a tip stuffer pastes or gums the tip onto the vamp before they are stitched. A performer perforates the edges, and a tip fixer goes 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 vamper sews together the quarters and vamps. This operation is called vamping. A barer or stitcher puts the shoes 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 head-stay stitcher and an eyelet-stay stitcher put on heel stays and eyelets, 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 workers who do such work as gumming or pasting, tip marking, and sewing on buttons, by hand, at tables in the stitching room.

The cutters' 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 die-cutting machines like those used in the cutting room. The outside cutters take a side of sole leather and cut the best parts of it into outsoles; what cannot 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 die-cutting machines.

A stock sorter selects the stock which is to go into the various orders, an occupation requiring skill acquired only by long experience.

**Employees and Wages.**

**Cutters.**

- Upper leather cutters.
- Top cutters.
- Quarter cutters.
- Vamp cutters.
- Tip cutters.
- Linen cutters.
- Specialty cutters.
- Fancy cutters.
- Black-hand cutters.
- Dinkers.
- Clickers.

**Skivers.**

- Cementers.
- Pasteurs.
- Folders.

**Nailers.**

- Riveters.
- Seam nippers.
- Gore stitchers.
- Gusset stitchers.

**Eyelet-row stitchers.**

- Closers.
- Seam rubbers.
- Seam pounders.
- Gore stitchers.
- Gusset stitchers.

**Lining stitchers.**

- Lining-makers.
- Linters.
- Closers-on.
- In-seamers.
- Vamp lineners.
- Stitching stitchers.

**Readers.**

- Top stitchers.
- Corders.
A rander makes the rand—a horseshoe-shaped piece of leather used to make the heel fit the curve of the shoe bottom.

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.

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.

A sole skiver, working with a skiving or souring machine, skives the back edges of the half soles, which are to lie between the cutouts and the inner soles, so that they shall fit the angle where these come together. A leather skiver skives the shanks of the outer sole.

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 presses the soles between heavy steel rollers, which compress and level them.

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.


A supporter places the soles on a machine 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.

The 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.

A counter cutter cuts out on a machine the counters which keep the back of the vamp in place, a counter skiver skives their edges, and a counter molder with a powerful machine shapes them between steel forms.

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.

The uppers and the several parts which form the bottoms are brought together in the making or bottoming room.

A bottom is an operatic occupation with any of the operations in the bottoming of a shoe.

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.

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 shankler takes 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.

If a shoe is to be made by the Goodyear or welt system, a Goodyear weltler 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 around the welt, 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 weltlers do the same work on an Eppler machine.

A welt butter puts or joins welts on Goodyear and hand-sewed shoes. The ends of the welt 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 heel, 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.

A sole layer or stocker lays the outsole in cement on the bottom of the shoe and firmly presses it in a machine.

A Goodyear stitcher sews the outsole to the welt.

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 shoe-making, since the hand method of rough rounding was tedious and inaccurate. A good rough rounder is a very skillful man.

After the stitching a channel is turned, promoters cement it in the bottom. A leveler or beater-out trims down the last of the channel by rubbing over it a piece of steel and, by pressing out or levelling the bottom in a machine, gives the sole the shape it is to take in the finished shoe.

The McKay-sewed shoe passes from the shankler 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 faikir 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.

A heel-sew nailer nails the heel seat or back part of the sole around its edge after the forepart has been sewed. A machine leader or nail stitcher, usually a boy, keeps full the magazine for nails in the heating machine, and supplies any nail which the machine fails to produce.

A heel slagger drives into the heel a row of steel or brass nails.

Heel slingers.

Heel trimmers.

Heel scorers.

Heel breasters.

Bottom sanders.

Buffers.

Savers.

Califiers.

Naumkeag-machine operators.

Blackers.

An edge blacker, a boy, applies blacking or ink to the edges with a brush. An edgeetter sets up the edges with a block of steel cut to fit the edge and heated by gas or by friction. The edgeetter is to be counted among the more skilled operatives.

Heel blackers.

A bottom or Shank blacker or painter blackers or paints the soles, the bottoms of the heels, and the shanks. A burnisher, Shank burnisher, or Shank fakir burns the better class of blacked bottoms by rubbing them with a heated hard iron.

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.

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.

A wheeler runs a small caged wheel around the upper edge of the heels of most shoes and the soles of many, thus leaving the imprint of its cog.

In the upper-finishing and packing room a tree puts the shoe on a horizontal form and supplies 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 raises a hot iron over them, in order to make them stand up and give them form. All these operatives are collectively called finishers.

A workman puts in the soles and heel linings, which are pieces of thin leather or cloth gummed to the inside of the shoe bottom.

A stringer or lacer lace the shoes, or a buttoner buttons them.

Inspectors look over the finished shoes, and 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.

A bench hand is a hand seamer at a bench, or one who does any hand sewing or repairing that is necessary. In this category are cobblers, too repairers, hand heel-shavers, etc.

TANNERS.

Employees of the first grade of skill in tanneries include foremen, assistant foremen, the bosses who supervise various machines and processes, beamers, unhairers, fleshers, fleshers, line unhairers, pokers, strippers, grainers, boarders, shavers, skivers, splitters, buffers, certain kinds of mill laborers, men, women, and the like. Among employees of the second grade are ordinary tanners, reassemblers, stuffing-mill hands, glazers, colorers, sanders, backers, dyers, oilers, leather pressmen, and others of like order. Third-grade workmen include washers, washers, liners, stringers, hangers-up, handiers, 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 skins, such as soaking.

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 piles them back and forth.
A ripper slits each hide down its back, ripping it into two sides. A trimmer trims off corners, loose pieces, têtes, etc.

A fleshers, cutters, or machine cutter, puts the sides through a fleshing machine to remove adhering flesh. A filler is an employee in the machinist’s room who files the blades of the rollers used for fleshing skins.

A limner is a laborer who puts the fleshed hides in a solution of slaked lime, by which the hair shreds 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 beachman, beachman, or beam slater—scrapped the hair or flesh from the hide with a heavy, two-handed 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 beachman and beam house.

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.

After being washed, the hides are reflexed. Reflexing is a repetition of the fleshing process and takes the place of the green shaving or hand shaving, which, in the old process, accomplished the same thing by hand.

A later, purer, or purseman removes all traces of lime and the looser tissues from hides intended for the manufacture of all moroccos, 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 dresser works at a drum in which sole leather is bated to remove traces of lime. He may also be one who puts hides into a drum after fleshing.

Some sheepskins come to the factory unpulled, in which case a wool puller pulls off the wool.

A tanner either supervises or performs several operations in a tannery, and is known by various names descriptive thereof.

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.

Leather-house men, under the supervision of a tanner called a punchman, make the tan liquor by leaching tan bark in water. Tannery having charge of the distribution of this liquor and of the replenishment of the pits are known as liquormen, liquor runners, or liquor runners.

A tacker or stringer takes one edge of the hide to a stick and hangs or throws it into a pit of tanning liquor. 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.

Carrier is a term covering those who do all or any of the operations in a carrying shop, where the tanned hides are prepared for use.

The leather is immersed in water by a dumper or damper, and immediately withdrawn. A scavenger or filler-up, using a hand knife, then frees it from bunches or marked variations in thickness, with firm pressure, thus smoothing out all wrinkles and stretching it.

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 the skin, 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.

As the split has not been fully penetrated by the tanning liquors, it is sent back to the tannery 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.

A hardener or hanger-up hangs the retanned leather in a heated room, where it is thoroughly dried or hardened.

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.

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—scrapping and stretching it, and removing any 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.

Up to this point employees have given the same treatment to grained or skins, and splits; now the occupations differ, and those working grained 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-
A shaver shaves instead of splits leathers, removing the rough, uneven surface of the flesh side, either with a 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.

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.

A smoother coats the surface of the leather, preparing it for the final finishing, which prevents the glazing from pinching or drawing the surface of the skin. Glazing puts the final finish on glazed leather.

An anamper 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.

An ironer irons off chilled-leather with a smoothing iron; a Dongola iron is a Dongola leather.

An inspector inspects the hides, skins, and leather at various stages of the processes.

A belt-maker is an operative in a leather-cutting shop or department, who makes belts for use on machinery.

In some shops attached to tanneries, harnesses are made by harness-makers.

Among Morocco workers a somewhat different nomenclature obtains. If the leather is too soft to stand much stretching, a crackler 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-cracking it—drawing it, extended in both handles, over a blade set upright in a press or pressing one side down with the knee. Leathers which will not bear much strain are smoothened by a perch with a similar blunt steel blade held in the hand and having no stick residual under the arm. In a Morocco shop the process of setting out is performed by a putter-out.

A dryer dries many of the skins which are made into morocco. One who can make dyes and ovann 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.

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.

A journeyman currier of morocco is called a morocco dresser.

**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 hand hands and bosses, and inspectors; in the second grade are box pricers, rehandlers, assorters, selectors, rollers, wrappers, lump-makers, shapers, potters, twistiers, stuff 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 superintendent 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.

A rehandler rehandles new-crop tobacco, grades it, places it in a dryhouse, and after the curing packs it in hogsheds. A tobacco hanger or shaker-out hangs bundles of leaf tobacco on sticks to dry.

A leaf picker sorts leaf tobacco into the various grades required for the different brands of goods to be manufactured, removing foreign substances.

A steam-box hand works around a steam box, where the leaf is steamed in order to soften it for handling by the stemmers.

A job hand removes tobacco from hogsheds, 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 bulk or boxes for ordering, and from the bulk, after ordering, to the lump-makers.

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 classifier selects or sorts the wrappers; both may be called selectors. Casers put licorice and flavoring on tobacco to be made into plugs, and machine wringers operate a machine which presses out any superfluous part of the flavoring matter in which the tobacco has been dipped.

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.

A capper or nip wrapper puts the leaf wrapper on the lump or plug of tobacco.

A lump-maker takes the fillers from the job or ordering room and makes the same into lumps preparatory to prizing or pressing. A prizer or pruner 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 prizers 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.

A tagger, usually a woman, attaches the paper or metal tags to plugs of tobacco. A binder labels, stencils, or boxes with name, weight, etc., and otherwise prepares the goods for the market.

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.

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.

A bag-maker makes the bags in which smoking tobacco is packed. A cigarette-book maker puts cigarette wrappers into books.

An inspector inspects the tobacco at the various stages of its manufacture, to ascertain its quality.