



## LINEN COLLAR AND CUFF MANUFACTURE.

ANCIENT PROHIBITION OF SEWING. — SUBDIVISION OF LABOR. — SIGNIFICANCE OF WHITE UNDER-CLOTHES. — STATISTICS OF COLLARS AND CUFFS. — HOME-MADE COLLARS. — SCALE OF MESSRS. CLUETT BROS. AND CO.'S WORKS. — PROCESS OF GETTING OUT A NEW STYLE. — SIZES OF PEOPLE'S NECKS. — CUTTING THE CLOTH. — SERIES OF OPERATIONS IN SEWING. — THE SEWING-MACHINE ROOM. — THE LAUNDRY AND ITS INVENTIONS. — FINISHING AND INSPECTION OF THE GOODS. — FORETHOUGHT AND ENTERPRISE IN PREPARING BUSINESS. — THE PARASITIC METHOD OF DOING BUSINESS. — RELATIONS WITH OPERATIVES. — REQUISITES OF MEN'S AND WOMEN'S GOODS.

It is a curious fact that processes of manufacture have been prohibited, not only from business prejudice, but from religious feelings, as mistaken as those of the pious old gentleman who actually argued against canals, within a century, because, he said, if God had meant to have water run in these channels, he would have made it do so. Until the period of the Mohammedan invasion of India (A. D. 664), it was universally held a sacrilege in that country to wear garments made from pieces of cloth sewed together. Every garment was therefore woven in a single piece, or cut from a larger one; needlework was at an enormous discount; and the sewing machine would have been reckoned a tremendous engine of wholesale damnation.

It is far different now. The tendency to multiply the varieties of all manner of commodities, to apply machinery to the making of separate parts of each, on wholesale principles, and to divide and subdivide those parts almost to infinity, has become the very spirit of the age; and the employment of the sewing machine is one of the very latest, and largest, and most wonderfully useful of all the steps of this social progress.

The first period in the history of dress was that of skins and fig leaves. Next came the use of woven fabrics, but thus far

always of family make. Then those better gifted or situated for the purpose began to weave goods for others to make ; and "purple and fine linen" are among the very earliest commodities named in the history of commerce.

The ready-made clothing business, of comparatively recent date in Christendom, was obviously likely to be introduced far earlier where garments were mostly constructed on the model of a sheet. There have, however, been "slop-shops" in Europe for centuries, although the application of the wholesale methods of modern manufacture has been much later ; and after the separate clothing business had grown up, and even after a still further division had set apart the under-clothing business, and yet again the men's under-clothing business, came the latest subdivision of all — the collar and cuff business. It remains to be seen whether extensive business houses will be founded in the future for nothing except to make button holes. The button business is already set apart.

Cleanliness and white garments always go together ; and the frequent mention of the two in the Bible is, as it most evidently must naturally be, in precise harmony with the constitution of humanity. Where any clothes at all are worn, it will be found that white under-clothes go with cleanliness of the person.

Dress serves more than one purpose. It is for modesty, for comfort, and for ornament. And the tendency of modern improvements in costume is, to serve all three of these purposes, and at the same time to avoid interference with the requirements of business engagements and physical activity. Now, the most characteristic and elegant finish of modern costume is given by permitting the appearance of the white margin of the innermost garments at the neck and wrists, those being the only places (except so far as ladies allow their shoulders, arms, etc., to be visible) where the person is uncovered. The white borders thus displayed are themselves an agreeable finish, in point of color, for artistic reasons ; they also give the further agreeable intimation of physical cleanliness ; and they are susceptible of being treated with a great variety of effective and graceful ornament.

It is evident that the daily emergencies of life should soil more rapidly white surfaces exposed to the outer atmosphere than those which are covered ; and this is a sufficient reason for putting on a clean collar and clean cuffs oftener than a clean shirt. There are no authentic statistics of shirts, so far as our present knowledge extends, but it requires no very complicated calculation to

show that the number of collars and cuffs which must be manufactured in the United States in a year is immense. We have a population of about forty million persons. Suppose the very liberal allowance of one quarter deducted as too young for such elaborate articles of costume, and another quarter as too slovenly or too poor, and twenty millions remain. Now, at six collars and six pairs of cuffs each, — an extremely moderate rate, — being eighteen items in all, the United States at any given moment is using three hundred and sixty million articles of white goods — or thirty million dozen — for dress finish at neck and wrists. These six collars and six pairs of cuffs will not, on an average, last more than a year; and therefore the above total quantity must be manufactured anew every year. Even if these sums total should be greatly too large, it remains beyond question that the actual totals are enormous.

The history of arts and trades shows many instances of the concentration, for one reason or another, of the manufacture of some one article in some one place. Thus the hat business has been established at Danbury, Connecticut, for more than a hundred years; clocks are made, as if by a natural local growth, at Terryville; cheap jewelry, at Attleboro'; and so on.

It is by the operation of this law of aggregation that the business of manufacturing collars and cuffs, along with one or two other closely related occupations, has grown up at Troy, New York, where about eighteen firms, some of them quite wealthy, and all energetic, are established in this one business. It is proposed in this paper to describe the organization and operations of one of these firms — that of George B. Cluett, Brother & Co. — as an illustration at once of the actual extent and importance of the demand for articles seemingly of trifling significance, of the surprising investment of money and inventive talent, and the astonishing complexity of the operations that are carried on, in order to produce goods which shall suit the increasing fastidiousness of customers about style and workmanship, which shall at the same time not cost too much for the average purse of the citizen, and which shall nevertheless afford to the manufacturer a just compensation for his time, labor, and talents.

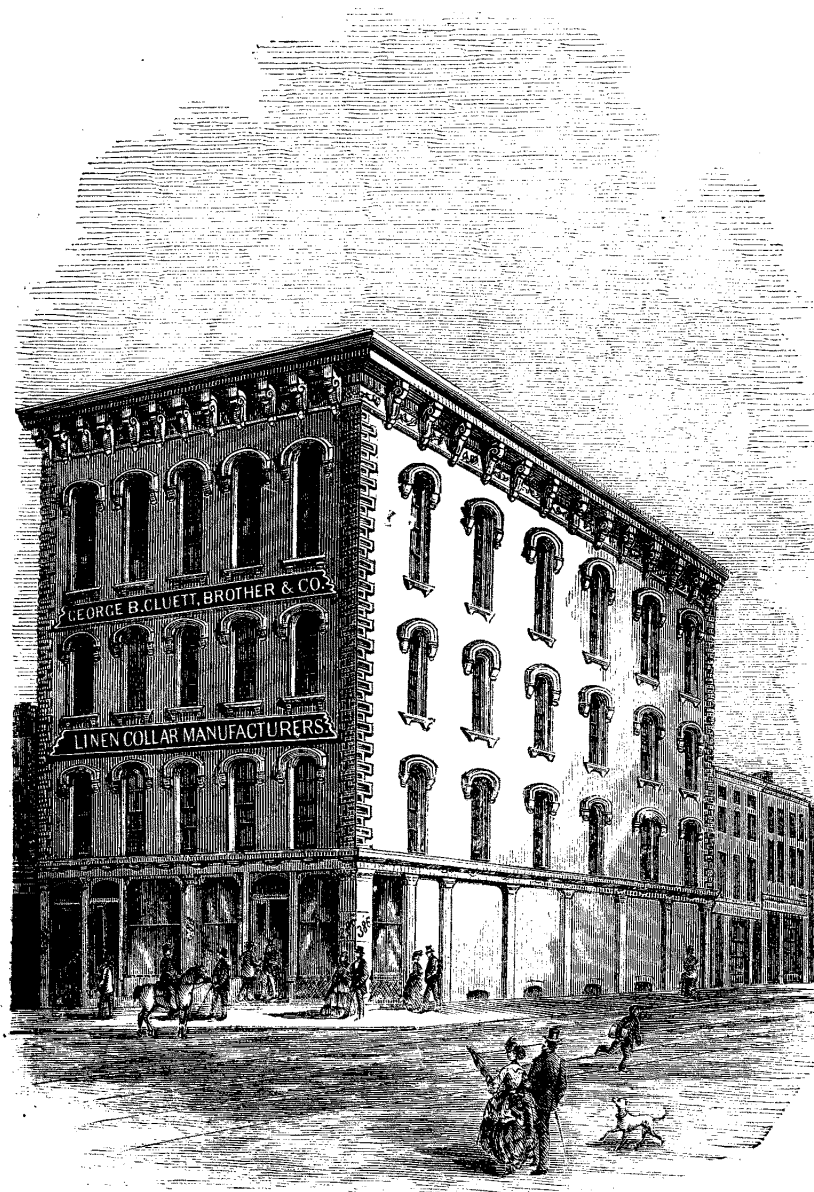
The wife or mother who sits down to finish off the wardrobe of one of her "men folks" with half a dozen collars, has a simple task to perform. She measures the neck, and receives, or should receive, a kiss for her trouble; or takes the measure from a shirt,

or an old collar. If the latter, she has a pattern all ready ; if the former, she cuts out a paper pattern, by memory, or by judgment, or by hap-hazard. Then she cuts the linen for the bands and the collar-pieces, bastes them, sews them, makes the button-holes, rinses them, starches them, rough-dries them, sprinkles them, irons them, and it is done.

At the very furthest opposite extremity of the scale of industrial establishments from this solitary needlewoman, stands a great factory like that of George B. Cluett, Brother & Co., with its dozen of great rooms, each occupied by the hands busied in one special stage of the manufacture ; its hundreds of outside hands, all checked and organized, to carry the work through certain stages ; its lofty, airy sewing room, with a hundred clattering sewing machines, driven by steam ; its departmental laundry, supervised by a practical chemist and inventor ; its extensive depot of goods ready for the market ; and its endless, innumerable mass of daily accumulations, that, if whirled abroad upon the air before some tempest employed for the purpose, would whiten a whole country with a linen snow-storm of tens of thousands of flakes, in cuffs, and wristlets, and collars, and fronts, and habits for ladies and gentlemen, of every imaginable pattern, at the rate of acres per day.

Not the least important era in the history of a collar is that before it exists. Suppose, for instance, you buy in September a new supply of collars, of the newest fall style, from the manufactory of Messrs. George B. Cluett, Brother & Co. If the processes attending the development of this style went through a usual course, that course began in June, in the brain of Mr. Cluett, or of one of his three brothers, or perhaps of one of their employés, and began with an idea. This was the idea of a collar, to be in one way or another improved upon, or varied from, the current styles. Perhaps it is to be broader in the band ; or rounded in front ; or with sharp points in front ; or with points turned down ; or sloped off at the tie at a wide angle, or at a narrow angle ; or stitched with a new arrangement of the lining ; or with a new device for securing clean, sharp corners ; and so on.

Well : this idea grows and develops until it is complete enough to be embodied in a pattern ; and if it is considered likely to please the public, the next question is, How much cloth will it waste ? This is ascertained by trying the pattern on the width of the cloth ; and it is accepted, modified, or rejected, as may be re-



GEO. B. CLUETT, BROTHER & CO'S LINEN COLLAR MANUFACTORY, TROY, N. Y.

quired. This being decided, from twenty to thirty pieces of wood have next to be fashioned — being the working patterns which the cutters use in shaping the pieces from the cloth ready for sewing. The number is fixed as follows: One wooden pattern gives the form of the band, and another of the collar. But necks are not all of the same size. Practically, men's necks are from twelve and a half to eighteen inches round, and women's from ten to sixteen and a half inches, though extra sizes are sometimes furnished to order as far as to twenty-one inches. It is found that a scale of half-inch differences is best between these extremes; so that, for the band of the supposed new style of collar, there must be a separate wooden pattern for the  $12\frac{1}{2}$ -inch, 13-inch,  $13\frac{1}{2}$ -inch, and so on, up to eighteen inches, being, in this instance, — which is an average one, — twelve patterns. Twelve patterns more to match these are also made for the collar part. These patterns are cut out of carefully seasoned thin boards of maple wood.

Next comes the cutting. For this purpose, a whole piece of cloth, or even more, is carefully laid out, even and smooth, on the cutting-board, which is a thick plank of white pine. This wood blunts the knives less than any other; and when the surface is roughened and crumbled under the innumerable knife-strokes, it is planed down to a new, clean stratum again. The cloth is laid forty-eight thick; and a number of heavy bell-shaped masses of iron, like large paper weights, are placed on it to keep it in place. The knives used have short blades, somewhat after the style of a small, short shoe-knife, and the blade is separate, fastening into the handle while in use with a small set screw. There is one single blacksmith in Troy who possesses exclusively the secret of giving to these knives exactly the right temper to go through forty-eight thicknesses of linen with the least possible trouble. He keeps his secret, like the legendary forgers of fairy blades in the old stories of chivalry, and makes a very good thing of it.

Having thus been cut out, the pieces are put together in little parcels, each containing the materials for a dozen collars, and the family thus formed remains together through all the subsequent vicissitudes of its youth in the factories, until, having, as it were, grown up to maturity, it is dispersed abroad into the great world, each member to shift for itself; i. e., it goes into the hands of a customer, to be retailed or worn out.

The successive operations which now follow are these: The collars having been (1) cut, are (2) run, (3) turned, (4) stitched,

(5) bands run over, (6) bands turned, (7) bands stitched, (8) button-holes cut, (9) button-holes worked. Of these operations, some parts are done by outside hands, but most of them in the factory. All the rooms of Messrs. Cluett Bros. & Co.'s building are unusually light, airy, and well ventilated; and their sewing-machine room in particular, which was formerly a public hall, is a remarkably lofty and airy room. The balcony which the fiddlers used to occupy is still there, but the innumerable sharp chatter of a hundred sewing machines fills the room with a noise that leaves no place for other music, and the vibration of the needles beats the speed of a fiddler's elbow quite out of sight.

The machines are arranged in rows across the room, and each is belted to a shaft that runs along the floor and supplies the necessary power. This arrangement wholly obviates the well-known serious objections to sewing-machine work by treadle power. The day's work of each machine is equal to what could be done by at least twenty women, and the hundred together therefore constitute a working force equal to two thousand sewing-women without machines. An extreme estimate would add another thousand to this total.

When all these sewing processes are at last complete, the collars — and so of other articles, for we are following the fortunes of the collar as a representative of the rest — are transferred to the laundry, where a second series of eleven processes is gone through with, besides the mere transfer. These are as follows: (1) Washing in suds, to remove the manufacturer's "dressing" from the goods; (2) bleaching, by means of hyperchloride of soda; (3) application of dilute sulphuric acid, to complete the bleaching process; (4) washing in suds, to remove the acid; (5) boiling; (6) rubbing and rinsing; (7) bluing and rolling; (8) starching with thin starch; (9) starching with thick starch; (10) drying; (11) ironing.

These operations are greatly facilitated by the arrangement and fitting up of the different rooms, and by various devices for economizing labor and power. Thus a peculiar formation of the stove for heating irons keeps forty of them hot all the time, with a small average consumption of coal; the order of the tubs used is such as to make the progress of the goods easy through the successive processes, etc. The starch used is not of wheat, but of corn, which is found to be equally efficient, cheaper, and much less disagreeable to the fingers of the operatives. This is a pretty important

consideration, for it is found to make the difference between sore fingers and healthy ones, — that is, work or idleness, — besides pain, which is sometimes no small item, as the very agonizing local inflammation called felon has occasionally been somewhat frequent among those who work in the starching rooms.

After the ironing, each family of a dozen collars is once more assembled, and carried to the inspecting department. A system of inspection is, however, maintained throughout all the works; and it is necessary to use a good deal of strictness in order to prevent the destruction of much valuable property by careless making up. This final inspection, however, decides upon the quality of the completed goods as adapted for the market, and upon passing, each separate article is stamped with the name of its style, and size, after which the dozen is enshrined in its neat paper box, there to remain until sold to the consumer. The firm formerly packed in larger single parcels; but the convenience of trade has made it an invariable rule to pack everything by single dozens, and the dozen is accordingly the sole ultimate numeral standard of the business, no smaller or larger number of any article being packed in one paper box.

The finished goods sent to market by Messrs. George B. Cluett, Brother & Co., being thus thought out and adapted in advance of the demand, are accumulated, according to the practice of the firm, to a very considerable extent. It is not unusual for them to have on hand thirty thousand dozen or more of articles all ready for use, each having gone through the whole series of twenty processes that have been described, and representing, of course, a very large sum of money paid out for materials and labor.

Moreover, this forethought in determining styles must be successful, or the result must be a serious loss to the firm. No moderate number of collars, for instance, can be made up at once and sent out as specimens, with the expectation of manufacturing to fill orders if the new style suits. There will not be time for that; for there are plenty of rival houses ready to snatch after any good new idea, and who do, in fact, do so as it is; so that the chief advantage which this shrewd and wide-awake firm can reap from their good judgment and invention, depends upon their running the risk of success. They therefore take it for granted that each new style will succeed. In sporting language, they "back themselves heavily every time." The result justifies this bold practice; for hitherto, with unimportant exceptions, the large stocks which



they have ventured to make up on this principle have enabled them to constantly keep in advance of their competitors, notwithstanding the unfair as well as fair efforts of others in the same business. Cases have been known, indeed, of a systematic boast that such a one would keep up with all of Cluetts' new styles, and have them in the market as soon as they, which is very much as if a parasite insect should boast that his blood was as good as that of the man he sucked it from. Such boasts have been in some measure accomplished, too, by secret espionage among the hands, and similar methods, but as yet without any signs that this parasitic method is materially injuring either the invention, the temper, or the pocket of George B. Cluett, Brother & Co.

This firm, on the contrary, is well satisfied with that sort of success which is the only really desirable one in business — honest gains from enterprise, industry, and fair dealing. Steady kindness, and at the same time as much strictness as is necessary, keep them popular with their hands, of whom they employ from five hundred to eight hundred. This treatment, and the pleasant quarters afforded to their operatives, secure the important advantage of steady help. Some of those in the establishment have been with the firm for twelve years or more; and it has repeatedly happened that those who left, for one or another reason, have returned and asked to be employed again, having found neither their new employers nor their new quarters as comfortable. This amicable state of things does not, however, prevent a strenuous adherence to their rights. A few years ago, a so-called "Working-women's Union" was set up among the hands, and at once went to work to raise wages. Apparently there was a measure of justification for the step, since the required advance was granted, as was another within a few months. A third, however, met with a prompt refusal; the manufacturers, though not organizing into any formal body, agreed to put a stop to the performances, the Messrs. Cluett being among the very first in taking this ground. The demand of the "Union" was peremptorily refused, work stopped, the ill-advised strikers were let alone until they returned to work at previous rates, and the Union was exterminated, as no member of it would be employed.

There are some noticeable differences between men's goods and women's goods as they appear in a large house like that of George B. Cluett, Brother & Co. Women's collars, cuffs, etc., very properly admit of much more ornament, both in form and finish, than is

allowable on men's goods, and, accordingly, they cost decidedly more per article. On the other hand, the ladies' goods do not have to be made and put up with nearly so much accuracy in respect to length by inches and halves, etc., as the pin method of fastening, and ladies' ways of finishing with a bow of ribbon or the like, render it easier to fit them.

It is curious to see how much and how effective ornament can be put on work turned out in the wholesale style of this firm. Insertion, cords, plain and colored stripes, dots, edgings, embroideries of many kinds, besides the endless varieties of graceful outline, are used on the collars, cuffs, under-sleeves, habits, etc., of the ladies' goods department, affording, of course, a much wider field for the inventive and artistic faculties of the firm than the comparatively monotonous and plain goods which are "good enough for the men."

This house, which offers so admirable an instance of how readily the American business world adapts itself to new conditions, and turns them to its own uses, is composed of four brothers, whose names may well be given here in full, as belonging to the history of American industry: George B. Cluett, J. W. Alfred Cluett, Robert Cluett, Edmund Cluett.

