A NEW EMBROIDERY.

THE DEEP DRAPED WAIST BAND IS WITH US ONCE MORE.

Designing One's Own Gowns Is Now the Smart Thing—The Shirt Waist of the Coming Spring and Summer—Plain Colored Velvets

The deep draped waistband is with us once more asserting its rights to be regarded as an indispensable adjunct of the toilette. Under its present beautifully shaped condition even those who are short of body may safely participate in the fascinations, though hitherto it has seemed to belong exclusively to the long waisted woman and to her alone. Now it is so fitted and boned as to foundation that the material swather upon it seems to be moulded to the figure. These corselet belts are worn both with house gowns and street costumes. Strange to say suede lends itself to

Girls' Three Piece Petticoat With Circular Flounce. To be Worn With or Without Waist.

this use most beautifully. I have just been shown an admirably original gray cloth gown with a small capuchin drapery at the shoulders that fell below a little yoke of grey suede, stitched with steel, a belt, or corselet, of the same suede being drawn down sharply in the centre, back and front, by a quaint medallion-shaped clasp of cut steel. Suede is such a delightfully malleable stuff, one can only deeply regret it has been for so long almost exclusively confined to the department of gloves. Seriously, though, I believe we have thoroughly got in the wedge of its services in other directions through the medium of this new waistband.

The New Embroidery.

Having once started upon a wild, unbridled career of embroideries, there would seem positively no end to the license permitted us. Quite one of the best and most approved effects is now secured by the use of coarse lace, Russian lace for choice, since that, in the richest and rarest qualities, in addition to being pronounced of pattern, is also padded here and there into high relief. In accordance with the accepted degree of the hour, we prefer this pronounced dentelle on some fine ephemerality, declaring by that action our determination to worship at the shrine of the bizarre But also is this bold Russian lace work most happy on grounds of cloth and cashmere. Indeed, I saw zibeline recently so relieved, a finger width of fur outlining the insertion either side.

Some French brodeur, more enlightened than the rest of the community, has lately created a highly unique embroidery, entirely carried out in that fine colored string employed by confectioners. Usually one color and white or a ficelle tint are used, and the result is most delicate and quite indescribably distinctive Invariably are we possessed by the same thought when confronted with the simple means which compass so large an end. Why in the name of all that is ordinary, did not we think of it ourselves first. I am persuaded that the majority are the result of instinct rather than premeditated intention. Necessity is so often the mother of invention—a truth, by the way, very clearly evidenced the other day in the introduction of those hand-embroidered spots on silk and velvet.

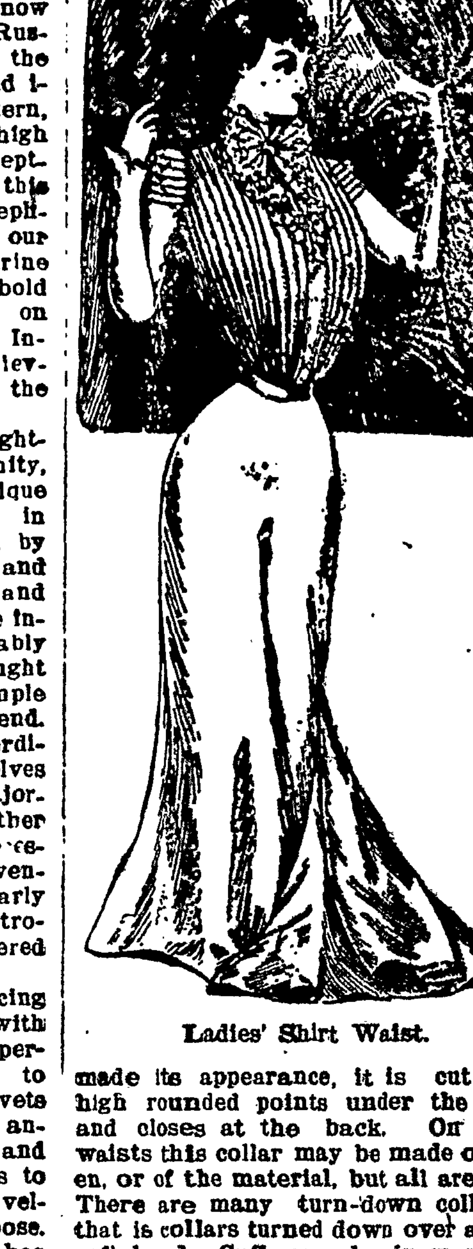
When the vogue came in for facing collars and revers to cloth coats with spoted velvet, the question was perpetually cropping up as to how to match the two. Plain colored velvets there were galore, but spotted with another story. Obviously the one and only solution of the difficulty was to hand-spot just the small piece of velvet required for this specific purpose. And from this small beginning has sprung the present prevailing one of hand-embroidered spots on both silk and velvet.

Designing One's Own Gowns.

I am told by first-class dressmakers that many women now design their own gowns. This is a new departure for the average woman, and indeed, many of us might do worse than turn idle moments to the designing of our dresses; we should find out how much there is to learn ere a perfect costume be produced. We might study ourselves as well as our gowns also, with advantage, many of us—observe the effects, not only of the shade or a color used for contrast, but the proportions in which we should use it. What blendings, too, best become us is another subject of study; for example, green may not suit you, but green mauve may. Again, a mauve hat, perhaps massed with violets, may rob your face of its color; but add plenty green foliage thereto, and, behold, success, the fresh green neutralizing the pallor-inducing influence of the other tone. The fact is, there is a horrible lot to learn if we would look our very nicest and fill up the sum of our possibilities. Again, there is a question of hat and gown, a question not only of color, but of outline and comparison. One can hardly be too critical in the mating of hat and gown, and this being even hypercritical, does not, I insist, as many say, lead to desperate extravagance. Very often one spends much money which does not hit the mark, and that would be better mated with something we already possess, or could easily conjure up slightly altered. The mere fact of a hat being a costly Parisian model does not make it the right hat for a particular gown by any means. Either the gown must dictate the hat, or the hat must dictate the gown. "There must not be two masters in the household." The element of repose in an ensemble so precious is more often destroyed by the hat than by anything else. Here is a case in point. I have a brown cloth gown with quaint effective braidings in cream cord on black cloth and a tucked cream taffeta chemisette. When it came home I put it on to test the suitability of my hat. One was brown with an orange quill. That didn't do. Another I tried was a white grebe tipped with brown, brown wings with a note of black. Now, that exactly repeated the scheme of the gown, and would to many a mind, and many an eye, be the born affinity of that frock. However, I must confess it was thrown aside with the first. It was slavish, an exact repetition. That wouldn't do, and so with another and another till I suddenly remembered my big black feather hat of the summer. Out of its bandbox it came, and behold the right thing, or rather the right idea, for, poor dear, it wore the depressed aspect of a bygone day. I am therefore having a shape of that fine silky beaver black felt that is so delightfully pliant, and takes such charming soft lines, and a certain clever little milliner shall arrange upon it these self-same feathers of a summer's day. They are very nice ones, of course. Now, I am possessed of absolutely the right hat which achieved that aspect of repose—that rest-note of the key. Nothing but an entirely black hat would suffice in this case, perhaps because the contrasts of the dress are sharp and decisive. You notice it was the deepest note—the black cloth trimming—that dictated the hat. The dress is from Paquin, so you will understand I treat it with consideration and respect. A gown with no marked contrast on the other hand, may be rather prettily completed with a repeat of its own scheme.

The New Shirt Waists

The stores are crowded with an enormous variety of shirt waists. It is difficult to predict, but it seems as if a white season is being inaugurated. Thin materials in these white waists are the rule, the figures of several seasons past being almost entirely unrepresented. When this material is used it is of the finest, softest, and lightest make possible. Lawns, organdies, batistes, silk, striped ginghams and many beautiful novelty goods make this year's waists really artistic creations. Yokes are seen rarely and the shoulder seam is directly on the shoulder as in dress waists. A new collar has



Ladies' Shirt Waist.

made its appearance, it is cut with high rounded points under the ears, and closes at the back. On thin waists this collar may be made of linen, or of the material, but all are stiff. There are many turn-down collars—that is collars turned down over a high soft band. Cuffs are also in many instances soft with turned back edges. Sleeves are smaller than ever, and there is very little fulness in the slightly bloused fronts. A dainty fancy is to wear a narrow black velvet tied around the collar of white waists.

This is particularly adapted to tucked materials, although plain goods may be used with good effect. Tucked albatross and nun's veiling make very dainty waists to be worn with skirts of plain or plaid wools, silks or satins.

Some Hints for the Housewife.

A cream of some sort or other is a necessity, and no well-regulated toilet table is without a jar. While many find just the sort they need at their favorite shop, there must be many others who either don't care to pay the good price asked for good creams, or who want to know just what is in said creams to the extent of taking the trouble to make for themselves. So, without further ado, we'll set down for their benefit a few of the popular receipts, and enough to permit much leeway in the choosing.

Cream Almonds.—One-quarter ounce of white wax, two and a half ounces spermaceti, two and a half ounces of sweet almond oil. Melt, remove from the fire and add one and a half-ounces of rose water. Beat—not till cold—and be sure about the proportions. Too much wax will make it hard.

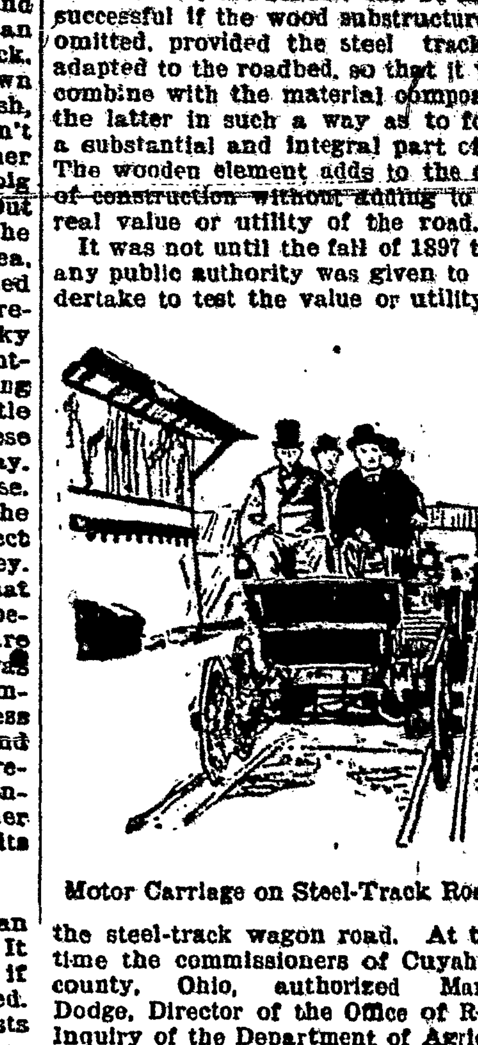
STEEL-TRACK ROADS.

THE LATEST AND MOST PRACTICAL OF GOOD ROADS.

Costs Less Than One-Third of the "Scientific" Road and is Better—Combines the Bicycle Track With the Practical Wagon Road.

Steel-track wagon roads to make traffic easy in sections of this country where modern highway improvement is as yet impractical are beyond the experimental stage. Actual tests in the last few years have demonstrated the weaknesses of most of the plans submitted by engineers for the purpose. These involved wood substructures to support the steed track, and to form the treedway for horses and other animals. The tests, however, showed that the scheme can be made successful if the wood substructure is omitted, provided the steel track is adapted to the roadbed, so that it will combine with the material composing the latter in such a way as to form a substantial and integral part of it. The wooden element adds to the cost of construction without adding to the real value or utility of the road.

It was not until the fall of 1897 that any public authority was given to undertake to test the value or utility of



Motor Carriage on Steel-Track Road.

the steel-track wagon road. At that time the commissioners of Cuyahoga county, Ohio, authorized Martin Dodge, Director of the Office of Road Inquiry of the Department of Agriculture, to lay 500 feet of steel track on the Brecksville road, immediately south of the city limits of Cleveland. The form chosen for this track was designed and recommended by F. Melber, of Pittsburg, but without the wooden substructure provided for him in 1894. This track was completed in June, 1898, and has been disturbed somewhat and obstructed since by grading done adjacent to the track by the contractor, who was charged with carrying out more extensive improvements on the Brecksville road. This track gave satisfactory results.

The most effective tests as to the cost, value and utility of street roads were made by Mr. Dodge on the grounds of the recent Trans-Mississippi Exhibition in Omaha. There a road was constructed on lines suggested by him, which had never been tested. The road thus laid consisted of two parallel lines of steel plates, eight inches wide, laid at a sufficient distance apart to receive the wheels of vehicles of the standard gauge. These plates had a slightly projecting flange upward and on the inner edge, so as to prevent the wheels of ordinary vehicles, which have no flanges, from easily leaving the track. At the same time the flanges, being only half an inch, were not of a height to prevent the vehicle from leaving the track to pass other vehicles whenever the driver so desired. These steel plates were not supported by wooden crossties or longitudinal stringers of any kind, but were provided with flanges projecting downward and outward. The flanges were embedded in the concrete of the roadbed so as to form a substantial part of it, and the steel plates were supported at every point by a superstructure of cement, or other enduring material.

In addition to the road built at Omaha, upon which the traction tests were made, E. G. Harrison, road expert of the Office of Road Inquiry, was directed to lay a short section of 150 feet of steel-track road at the experiment station in St. Anthony's Park, Minnesota. After completing this, he laid another section of 180 feet at the experiment station in Ames, Iowa. Both of these sections were made after the same pattern and style of the Omaha road. Reports so far received from these two stations indicate that the two sections are coming up to the highest expectations.

The cross ties used are not for support, but only to maintain the steel plates at a uniform distance from each other, and also to prevent tilting and to maintain the face of the plates in a horizontal position. The road, when properly finished, contains no perishable material, such as wooden crossties and stringers, heretofore used and thought necessary for all steel-track construction, but forms a smooth, firm and compact mass harder and more durable than a road can be made of any other known material.

Three great advantages, sought for in the steel-track wagon road, are found in this new roadway demonstrating:

(1) That the steel-track wagon road can be built without greater cost in most cases, and probably with less cost in many cases, than any other hard and durable road.

(2) That it will last many times as long as any other known material for road purposes and with much less repair.

(3) That the power required to move a vehicle over the steel-track road is only a small fraction of the power required to move the same vehicle over any other kind of road.

Advantage can be taken of this last important fact, either by increasing the load which a given power would be able to move over a common road or by diminishing the power necessary to move a vehicle over the new road.

A motor carriage is shown in our picture, indicating the ease of movement that requires only a small fraction of the power ordinarily used for moving such vehicles. The bicycle rider finds these tracks of immense value for long rides through the country, a fact that probably will have an important bearing on the extension of rural mail delivery.

The method of laying steel tracks must conform to the material of the roadbed used. In a comparatively dry and sandy or gravelly soil they may be laid with no other material but the natural foundation of the roadbed, and can be maintained in good repair at little cost. The flanges at the lower extremity, which project outward, may be omitted, thereby diminishing the amount of metal required in the rail. But in all wet and clay soils there should be a substructure of broken stone, one foot deep, under each rail, also macadam between the rails, and extending a foot on either side. The cavity under the rail should be filled with cement to give a continuous bearing to support the rail at every point. The joints must be secured by being bolted to a common cross-tie. In building on a grade of three per cent. or more the rails should be corrugated transversely.

Cost of Construction.

The cost of construction for the test roads so far used in short sections was about $1 a foot, which is much in excess of the necessary cost when longer stretches are built, requiring larger quantities of materials. It is probable also that the weight of the steel rails may be diminished without impairing materially the value of the road. Approximately the cost of the steel needed would be $1,500 a mile. Add to that, the cost of laying the track and bringing the road surface up to it in such a manner as to preserve the surface of the roadbed even with the surface of the steel rail, the complete road can be built for $3,000 a mile.

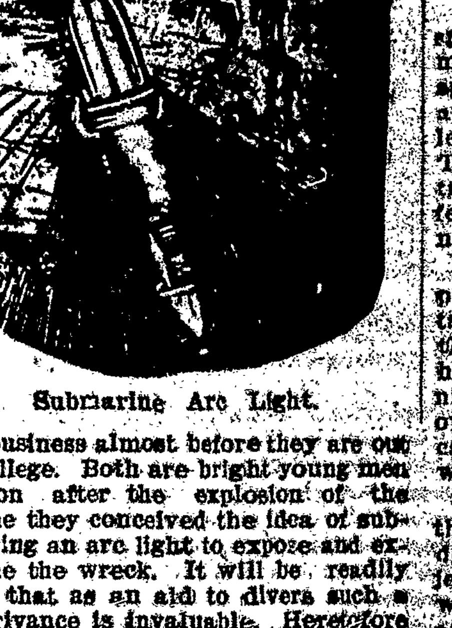
When John L. Macadam advanced his theory of road building in England in 1816 he called the attention of Parliament to the fact that it hitherto had devoted attention mainly to regulating the size of vehicles, the width of tires, the number of horses to be allowed for each vehicle, the amount of toll to be charged and minor details of that kind, but had paid little attention to the improvement of the roadbed. To-day, on the contrary, nearly all persons interested in the good-roads problem are exhausting their efforts upon the improvement of the roadbed only, and seeking to imitate or duplicate the stone roads of the older countries. It is the opinion of Mr. Dodge that the stone age in road building has substantially passed, and that it is possible to introduce new means and methods by which there will be greater gains.

The roadbed as commonly constructed is of great width and solidity, yet the burdens passing over these roads are, as a rule, only from one to two tons in weight. It is unnecessary and unwise to build for light vehicles roads capable of sustaining burdens a hundred times the ordinary weight. The roadbed should be hard and smooth, steel for stone.

First Successful Submarine Arc Light.

Francis G. Hall, Jr., and T. E. Burdick, two Yale boys, have invented the first successful submerged or submarine arc light. They became interested in the idea of a submarine light at the time the battleship Maine was blown up in Havana harbor. Before the war was over they had invented a light that worked successfully at great depths below the surface of the water. Since then they have perfected their invention. The United States Government has tested the lamp and found it highly successful. Great Britain, Germany and Russia have within the last month placed large orders for the lights.

Their invention is the most important ever achieved by undergraduates, and it promises to bring them into a



Submarine Arc Light.

big business almost before they are out of college. Both are bright young men.

Soon after the explosion of the Maine they conceived the idea of submerging an arc light to expose and examine the wreck. It will be readily seen that as an aid to divers such a contrivance is invaluable. Heretofore only incandescent lamps of small candle power have been used. The arc lamps, however, may be of any desired candle power. Those tested at the New York navy yard were of about two thousand candle power.

The first requisite for a lamp of this kind was a watertight enclosing case, containing the carbons and an automatic feeding apparatus, the whole to be sufficiently strong to resist the water pressure at depths varying from ten to two hundred feet. Another difficulty encountered was the internal gas pressure caused by the combustion of the arc. This is relieved by a special check valve.

Heretofore experimenters have operated on the belief that air is essential to successful submarine arc light combustion and have supplied air to the arc by rubber tubes, but Messrs. Burdick and Hall have rendered this unnecessary.

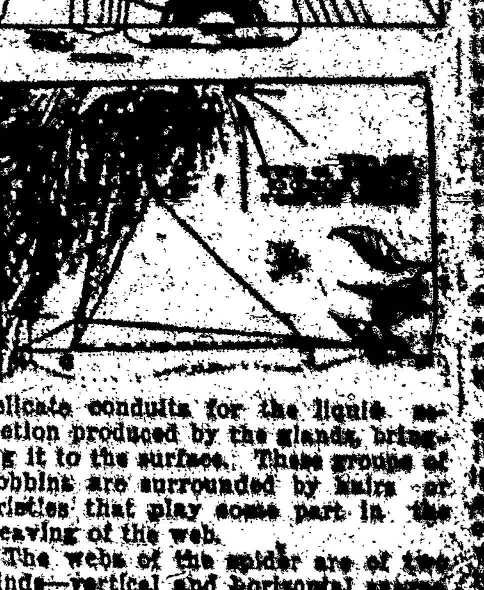
A clock is rarely seen in the farmhouses of Liberia, and many of the town residents have no timepiece of any sort. There are few civilized countries where a timepiece can be dispensed with so conveniently. The sun rises at 6 a. m., and sets at 6 p. m. almost to the minute the year round, and at noon it is vertically overhead.

THE SPIDER.

How He Spins His Web—A Study in [illegible]

AN you tell how the common spider spins his web? The external organs of the little workman — what we call the weaving fingers — are at the lower end of the abdomen. These organs are generally six in number. The three pairs are slightly different in shape and appearance. The central pair are smaller and rather drawn up. Those on each side are jointed at two places, but the central pair are stiff. All are exceedingly mobile, and can be folded up on one another, reaching the source of the silk. Here are the tubes whence the fibres are drawn. But these are generally closed except when the spider is at work, when they are wide open.

On each "field" there are a certain number of bobbins, or tubes, divided into two parts, the lower of which is thicker and longer than the upper. These tubes are hollow, and serve as



delicate conduits for the liquid secretion produced by the glands, bringing it to the surface. These groups of bobbins are surrounded by hairs or bristles that play some part in the weaving of the web.

The webs of the spider are of two kinds—vertical and horizontal [illegible]. There are four subdivisions of the first class—the complete nets, the [illegible] net, the radial net and the partial [illegible].

The network itself is divided into central space, spiral space and frame work. The central space has [illegible] distinct parts—the centre (or [illegible]) the zone of defence and the open [illegible].

The nave is as large as the [illegible] of the legs of the spider that weaves the web. When the insect is on the [illegible] for its prey it is almost always stretched out on this nave, where it lies all night. A careful examination shows that the tips of the [illegible] twisted in the net, and the least movement at any point is immediately felt by the spider, whose twist has tightened the threads, so that his sensitive legs will feel the slightest touch. Perhaps the spider is also aided in this natural telegraphing by the light [illegible] that connects the nave with his own body. At any rate, the chief object of this mode of construction seems to be that the spider remains attached to his web, whether he be after his prey or leaves his net for a moment to get ready for attacking an enemy, or when, after a sortie, he wishes to return to the web.

The nave is woven either [illegible] or open. The weave covers it with [illegible] regular meshes, across which we [illegible] generally see the prolongations of the radial cords, forming a zigzag. [illegible] closed nave is covered with a [illegible] closely netted white silk; the open nave is generally found in horizontal webs.

The zone of defence is made [illegible] spiral lines, four to ten in number, immediately surrounding the nave [illegible] spirals do not cross the radials [illegible] angels, but are woven round [illegible] lengthwise at the points of crossing. The open zone is that part of the central space between the zone of defence and the spirals; it consists of nothing but radials.

The central space probably serves as protective works. No part of it contains any of the viscous bulbs, so that the spider can move freely all around his centre of operations without running any risk of being caught in his own net, though at the same time he can catch no prey in this part of the web.

In weaving his web the first thread that the spider spins is the frame. To do this the insect crawls over the objects on which he wishes to spread his web; he drags the fibre behind him, attaching it to the surface of the things by pressure on the thread [illegible]. When these are opened, provided, as they are, with hundreds of little bobbins, the threads stick to the surface at once and harden. Then the spider presses his weaving fingers together and the numerous fibres are twisted so as to form a single strong thread.

The spider sometimes makes the frame in another way, utilizing the air and its currents. We often see webs spready between very distant points, and where it was certainly impossible for the insect to crawl from one to the other point. In some instances these points are thirty or forty feet apart, the threads of the frame crossing roads or little pools of water. It would have been impossible for the spider to cross the road or the water without finding insurmountable obstacles if the insect had crawled. He has availed himself of air currents for stretching the frame of the web. One observer says that he has often seen spiders borne to their work by currents of air and that after laying the frame the spider walks on it to weave the other threads and radials. The spider seems to attach great importance to the threads of the frame, frequently using them for the construction of new webs [illegible] threads [illegible]