

HOW A BATTLESHIP IS FIRST BUILT ON PAPER.

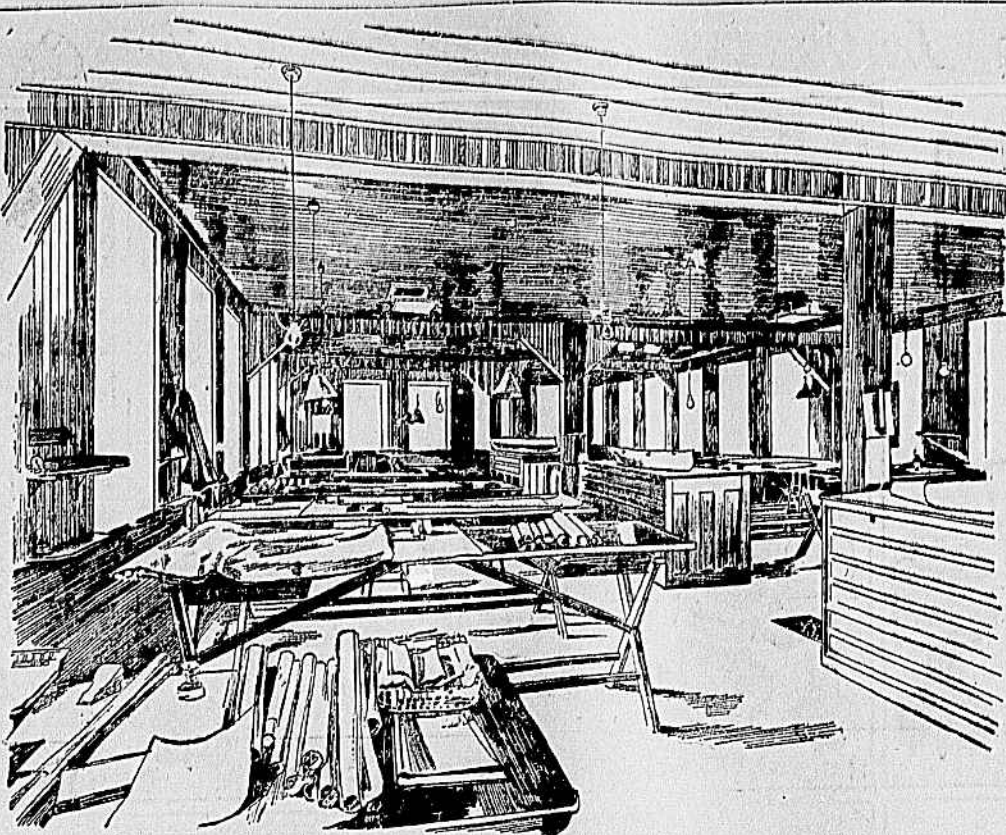
BOSTON, MASS., August 22.—When Uncle Sam decides to build a warship there must be something over 1,200 plans drawn and approved by the government before the vessel can be constructed. These plans alone, in the case of a first-class battleship, such as the Vermont, the contract for which has been recently awarded to the Fore River Ship and Engine Company, near this city, cost the builders about \$75,000. For the steel plates of the hull, to take a single large item, 600 distinct, and separate plans are necessary for the hull as a whole ranging from a small sheet of paper twelve inches square, to a big sheet eleven feet long by two feet and a quarter wide and each plan must be duplicated in at least a dozen blue prints to facilitate the work of the shops, and save the original drawings from being worn out by constant handling.

At a rough estimate this means that over 18,000 square feet of paper will be covered with drawings before the vessel begins hull construction. To say nothing of over 10,000 square feet of paper that will be used in preparing the schedules of materials by which the yard will order the various supplies necessary for construction. To make the hull of a war vessel more paper is used than would serve to wrap it up afterward. Meantime the engine department and the electrical department must prepare their own plans on a similar scale of detailed minuteness, the result being, all told, that about twelve hundred separate drawings will be necessary before the battleship has been accurately made on paper.

These hundreds of plans do not consist, as one might at first imagine, in plan after plan of the vessel until Uncle Sam smiles approval and says "Go ahead. That suits me exactly." As a matter of fact, Uncle Sam has a very complete notion of what is going to suit him exactly before the contracting shipbuilders touch pencil to paper, and the shipbuilder's work is based upon yet another series of mysterious looking blue prints that come from the government. The first plans for every class of war vessels, with the single

exception of the lively little torpedo boats, and their equally lively little destroyers, are drawn by the government before either Fore River, Newport News, the Charlestown, or any other shipbuilding establishment is invited to bid for the task of finishing them. But these first plans, although they represent the labor of three government departments, the Bureau of Construction and Repair, the Bureau of Equipment and the Bureau of Ordnance, are simply a statement of the kind of vessel wanted and are supplemented by a bound volume of specifications that covers between 200 and 300 pages. It is this interesting volume that the management of the shipbuilding establishment has to reduce to terms of profit and cost before it decides upon the minimum price for which it can build the vessel, pay about four years' wages to a thousand workmen and put a little something in the bank on its own account. In the case of the Vermont the final cost per pound is estimated at 15 cents, or three times the cost per pound of a thoroughly modern steel schooner.

No object, either on land or sea, could be more carefully specified in its every detail than a modern war vessel. When the government orders a canvas gun-cover, for example, the specifications state definitely how many stitches to an inch are to be taken in sewing the canvas, and these stitches are not to be averaged up, but there must be just as many of them in every inch, no matter at what point the government inspector who supervises the making of the cover may choose to count them. If the number is not parallel with the specification the right number of stitches must be put in at the expense of the company. This small example is an exact illustration of what "specifications" mean as they apply to a war vessel, although as a rule, the specifications that reach the modern shipyard concern themselves only with the hull and machinery of the vessel. But they include every bolt that goes into the hull, every beam that supports her decks and platforms, and every inch of the miles of pipes and wire that connect her engines, dynamos, and conning powers with the various mechanisms that they are de-



WHERE THE VERMONT IS BEING BUILT ON PAPER.
Corner of the New River Drafting Room, in which the New Battleship's 1,200 Plans are Under Way.

signed to operate. In the Vermont there are more than 20,000 of these bolts, and electric wires alone sufficient to distribute an amount of power that would supply light to the streets and houses and run the trolley cars for a city of 25,000 inhabitants.

Putting these specifications into actual plans—in other words, building the warship on paper, with rule, T-square and compass—takes about twelve months of steady work, and requires the services of a small army of expert engineers, naval architects, draughtsmen and photographers. All through this period a special electrical apparatus is busy preparing blue prints of the completed drawings. From the government point of view, everything that is drawn on paper is a plan, and everything that goes into the vessel must first be drawn on paper. Building a war vessel is different from building a house, in that you can't nail the parts together or make them fit as you go along. Every plate of unbending steel, of which no two are exactly similar, has its individual place in the ship; every rivet hole has its individual place in the steel plate, and every plate must, therefore, have been carefully planned on paper before it becomes part of the ship's construction. The armor plan of a warship is, therefore, one of the longest tasks of a shipyard's draughtsmen. Other large and more complicated plans are those that provide for the working of gun mounts, ammunition hoists and other important sections of her inner mechanism. And in this respect no two vessels are alike, even "twin warships" being like other twins, in that they look alike, but usually act differently. Still another series of delicately complicated plans are those that provide for the arrangement of tubes, wires and other means of connecting every part of the ship with every other part, for not only must space be economized to the finest practical point, but every part of the system must be readily accessible in case of necessary repairs at short notice.

The plan for a bolt—the perfect mechanical drawing—that is, whereby the Fore River Ship and Engine Company in Massachusetts proves to the United

States Government at Washington that it has read, pondered and put in practice the volume of specifications under which it signed a contract to build battleship No. 23, as the Vermont is officially known, is a good example of the expenditure under which a modern war vessel is put together. Very likely, if a visitor should pick up that bolt after it had been actually manufactured and was waiting to be used in the vessel, it would seem much like any other bolt; but the government inspector would be able to point out the differences, verify them by measuring the angles, and show the astonished visitor that not only had the bolt been cast to order for that particular vessel, but very likely that a machine had been made to order to cast the bolt. For an ordinary vessel of commerce the bolts would have been bought ready made in the open market. In a war vessel every part of its mechanism, over the smallest, is designed to have a specific value in increasing her strength and fighting power, and the government, therefore, scrutinizes with impartial severity the plans for the great marine engineer that must drive the vessel day and night; for the ammunition hoists that are to keep her guns supplied and busy during a possible engagement; for the mechanism that is to aim the guns and protect the vessel from the recoil of their long-barreled barrels; the bolts that are to hold her steel plates together, or the little wheel and track that runs a sliding door between the captain's cabin and his morning bath-tub. The smallest plan in these necessities, to put the Vermont finally into commission, is the carefully studied and exactly described drawing of a future hammock hook.

All these plans go forward in great groups, the ship being divided into hull and engine and electrical arrangements, and the work of the yard following these lines of division. The two departments start their drawing simultaneously, the engineering department, whose share naturally includes hundreds of minor bits of machinery, driving rods, pistons, cranks, valves and gages, as well as the big engines and dynamos in toto, making rather less than the number of plans made by the department of hulls.

HOW UNCLE SAM TEACHES HIS BOYS TO BECOME SAILORS.

His Great Training Schools Where He Educates Every American Lad Who Wishes It, Gives Him Clothes and Food, Sends Him on Cruises and Pays Him While He Is Doing It.

NO. II. THE PROBATIONARY TERM

By H. IRVING KING.

A BRIGHT, ambitious boy, who really means business and wants to be a sailor and a good one, need not stay in the newcomers' squad at the training station more than two, or at most, three weeks. By that time the novelty of his surroundings has worn off, and he knows a lot of things he did not know before, notably how to keep himself and all his belongings scrupulously clean.

He has been instructed in the manual of arms, has had plenty of exercise in the gymnasium, and, if it is summer, has been exercised and instructed in swimming.

A dentist has examined his teeth and repaired them if they needed it. Finally, the day comes when the chief boatswain's mate, who has charge of the squad, and whom the newcomers have learned to look upon as vested with authority a little lower than angels, recommends a lot of them for promotion to the battalion.

Bearing his hammock and his clothes bag and his other belongings, the new boy is marched over to the big building in which he is to make his home henceforth while he is at the training school.

He is like any other boy at a big boarding school, now—a young cub with his troubles all before him—yes, and his pleasures, too.

He will have his friends and enemies and possibly his little "scrap," but he learns to rely upon himself and to become strong and manly.

He swings his hammock that first night in the big building in a great room with hundreds of other boys, and as the waves on the beach lull him to sleep he feels that he is already a sailor. But he isn't—not by a long shot.

When he is taken over to the big building in the morning the boy, no longer a "newcomer," is told that he now belongs to such and such a section of such and such a division, and realizes that he is a part of the regular battalion.

He gets his full outfit of clothing and is told where to stow it in a big room full of hundreds of other clothes bags. He is also taken to a locker where he is to keep his hammock, and he gets a new lot of orders and instructions, which soon come to be to him only a part of the daily routine of his life.

The place is full of boys going and coming, petty officers hurrying about, and a commissioned officer or two here and there. The morning cleaning and scrubbing has just over and the place and its occupants smell of soap and water.

It is time for the early morning inspection, being 7:15 A. M., and as the call sounds the boys fall in. They take their places in long lines. Their faces shine from recent scrubbing, and they are clad in clean, crisp uniforms. The new apprentice, possibly with some difficulty, finds his place in the line and a petty officer may order him in a decided tone to stand straighter, to move to one side or the other, or a little forward or back.

The roll is called to see that all the boys are there, and then the ranks are opened and the senior instructor commands, "Off undershirts!" "Rest!"

At the first command the boys strip off their undershirts all together, turning them wrongside out as they do so. At the second command they stand with them in their hands holding them out so they can be seen all over.

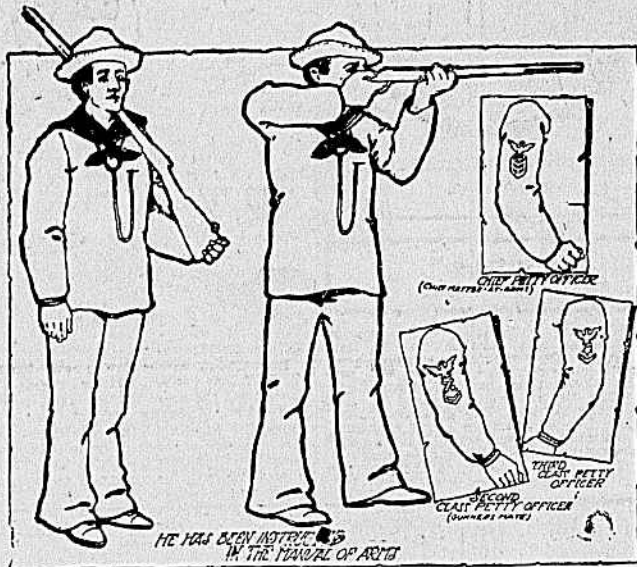
Two instructors now walk down the ranks looking carefully at the boys and their clothing to see, if any chance there is, a suspicion of dirt anywhere. As each boy is passed by the inspector he puts on his undershirt again, and this makes a ripple of undershirts being hoisted on to bare young backs running down the two long lines.

The uniform order for the day is then read out—whether they shall wear their blue suits or their white ones—and then, at the order to "break ranks," the boys scamper off to the bag-room, where they get out their bags and don the designated uniform.

They are supposed to be all dressed up, with shoes shining like their faces, their hair combed and brushed and generally in "ship shape and Bristol order" by the time the bugles blow for breakfast formation at 7:30.

The new boy has a hard time of it, for he is nervous, with so many other boys pushing and crowding about him, all talking at once, and he has not yet quite got the hang of his sailor togs and of knocking off getting into them quickly.

His knife lanyard refuses to hang with just the same graceful and abandoned air as that of the older boys, and when



It comes to tying his black silk neckerchief he despair of producing anything in the way of a sailor knot that will be a disgrace to the battalion. But some good-natured fellow helps him out, and he is back in the great hall with the rest of them, and in his place in the formation before the bugles have ceased announcing that breakfast is ready.

That breakfast formation involves another inspection, at which an officer looks over the boys to see if they are all in proper uniform. One who is not is punished with two demerits.

The officer of the day, a commissioned officer, makes this inspection and presides at the formation. To the apprentice he is a great and powerful potentate, and he has sharp eyes and the military air which impresses.

At the formation the names of those apprentices who have been guilty of infractions of the rules and regulations of the school and read out together with the charges against them. The orders for the day are also read, but of these the new boy understands about half.

If the weather is good this formation is held out of doors. At its close a gun is fired and the station flag hoisted to the top of the lofty staff in front of the commandant's office, with proper ceremonies. This is "colors," and a formal notice that the navy is "at home" for the day.

At this gratifying intelligence the entire battalion marches off to breakfast. They have all had a cup of cocoa, when they first got out of their hammocks, but by this time every boy feels that he could do justice to several breakfasts, all at once. The new apprentice thinks with a smile "If his mother could see him now!" she that used to have to call him on an average, three times in the morning before he would get up and tumble carelessly into his clothes, and then have to call him away from the breakfast table on not infrequent occasions because he had



DRAWN BY JOHN SM ART, OF RICHMOND.

omitted to wash his face and hands properly.

He already begins to say to himself: "Oh, could that boy be I?"

When he takes his place at the breakfast table to-day he sits among the older apprentices and looks over patronizingly to where the "newcomers" sit. The breakfast formation has been held in the great hall with the gallery around it. In the gallery there are signal flags, and inlaid in the stone floor, is a compass-

card, with all the points marked in brass. It is an impressive place, and this being the first time the new boy has taken part in any formation in it, he feels a new sense of belonging to a vast system in which flags and stately officers, orders and uniforms, play a part.

After breakfast the apprentice, unless he is sick and has to attend "sick call," or has a report against him about which he has to give an explanation, has half an hour to himself to do what he pleases,

provided he pleases to do nothing which conflicts with the regulations and rules of the establishment.

At 9 o'clock all assemble in the big hall again at "quarters," and from there the different divisions are marched to the places where their real work for the day begins—the work of examining the various things which a sailor has to know in order to be one of Uncle Sam's best.

With the exception of half an hour for recreation after it, the rest of the day, up to quarter of five in the afternoon, is taken up entirely with the instructions and exercises, which transform the boy into the man-of-war's-man.

From quarter of five until supper time the band plays, and the boys can dance and play about the buildings and the grounds, or read and write and play games in the library.

After supper there is nothing to do but to enjoy one's self until hammocks are "piped down" at 8:30, when every boy goes and gets his hammock and carries it to the place where he is to sling it from great hooks in the beams overhead. Then, at the order, he hooks up his hammock and prepares for bed. When the lively notes of "retreat" are heard the boy is supposed to be in his hammock, and when they are followed by the good-night of "taps" at 9 o'clock a silence falls over the great building, and that day's work and pleasures are done.

Troubles of a Boy.

Editor T. D. C. C.: I have sent you three colored pictures, but as none of them took the prize, I am going to try for it again, by telling you something that happened to me while I was in the country.

CHAS. BROCK HUGHES.
Aged nine years.
No. 206 E. Franklin Street.

When I was at Val Verde two years ago, I had a horse named Mattie and she had a nice little colt. Once I rode Mattie to town to get the mail, and coming back she threw me off almost in the creek. One day I rode her to a store to get some eggs and when I got back she shied just as I got off, and almost broke all of the eggs. I fell out of a chestnut tree one day and hurt my arm, but I enjoyed the chestnuts just the same.

I received the badge of the T. D. C. C. and thank you for sending it to me. It is very pretty.

CHAS. BROCK HUGHES.
Aged nine years.
No. 206 E. Franklin Street.

In Meadows Green I Wandered.
In meadows green I wandered
On sultry summer day,
The wind was blowing gently,
And the clouds were silvery gray.

The little birds were twittering,
In the tree-tops overhead;
And the frogs were chiming softly
In their deep and watery bed.

Many pretty flowers were blooming,
In the grasses 'neath my feet,
And they seemed to whisper to me
In accents low and sweet.

But at length my feet grew weary,
And I lay me down to sleep,
And God's blessed and holy angels
Watched o'er my slumbers keep.

And behold when I awakened
The stars were shining bright,
And I bade farewell to the meadows
In the stillness of the night.

LINWOOD HUGHES WARWICK.

II.
"If any little word of mine
May make a life the brighter,
If any little song of mine
May make a heart the lighter,
Then help me speak the little word,
And take my bit of singing,
And drop it in some lonely vale,
To set the echoes ringing."

"If any little love of mine
May make a life the sweeter,
If any little care of mine
May make a friend's heart lighter,
Then help me speak the little word,
And take my bit of singing,
And drop it in some lonely vale,
To set the echoes ringing."

To help my toiling brother,
—Selected by Louis Cohen.

Tabby Gray.
I'm a pretty little kitten,
My name is Tabby Gray.
I live in Froy's Farm house,
Some twenty miles away.

My little eyes are hazel,
My skin as soft as silk,
I'm a good little morning,
With a saucerful of milk.

I'm petted by the mistress,
And children of the house,
And sometimes when I'm nimble,
I catch a little mouse.

KATHLENE E. SEAT.

OUR MOTHER GOOSE PAINT BOOK CONTEST.



This is the house that Jack built.
This is the malt that lay in the house that Jack built.
This is the rat that ate the malt.
This is the cat that killed the rat.
This is the dog that worried the cat.
This is the maiden all forlorn that milked the cow with crumpled horn.
This is the man, all tattered and torn, that kissed the maiden all forlorn.
This is the priest, all shaven and shorn, that married the man, all tattered and torn.
This is the cock that crowed in the morn, that waked the priest all shaven and shorn.
This is the farmer sowing his corn, that kept the cock that crowed in the morn.

In this series of "Mother Goose" picture painting contests, three prizes will be awarded each week, and each will consist of a copy of the "Mother Goose Paint Book," 48 pictures and 48 pages of verse, making a book of about 100 pages, with paint brush and five cakes of paint attached to the cover. The three pictures that are most neatly and most appropriately colored will be selected each week for prizes.

RULES—Cut out the picture, leaving the coupon attached, and color the picture as neatly and artistically as you can.

Write your name, age and address in the blanks on the coupon left for the purpose. All pictures intended for competition must be in The Times-Dispatch office not later than Saturday at 6 P. M.

The pictures look better if mounted on stiff paper or cardboard, but mounting is not required. The award will be made a week from next Sunday.

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