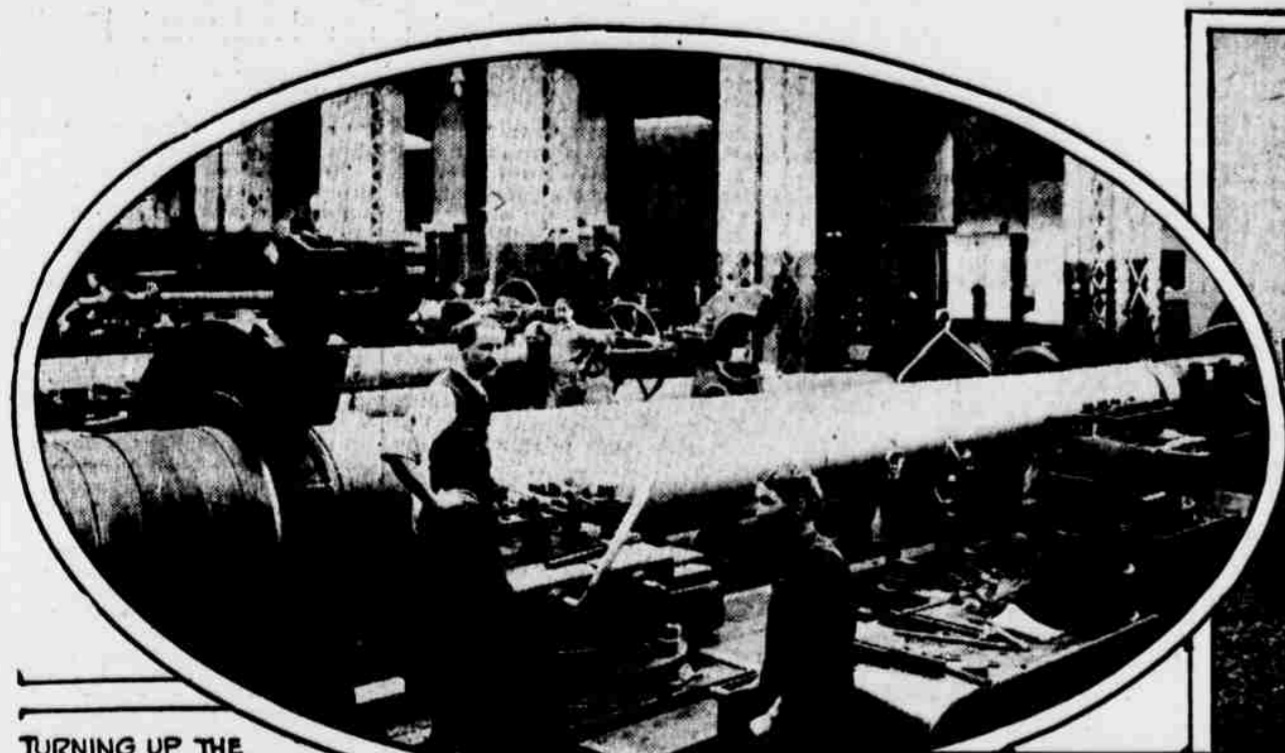


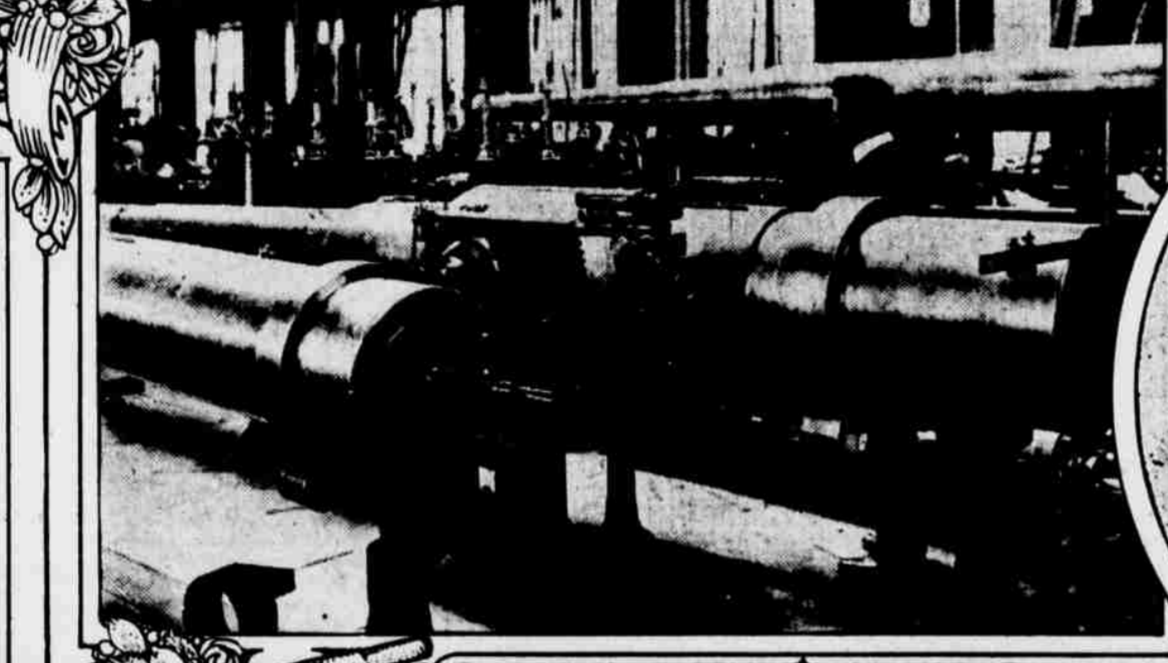
# NAVY'S GREAT NEED IS GUN AND AMMUNITION RESERVE



TURNING UP THE OUTER SURFACE OF A GREAT GUN FOR A DREADNOUGHT.



FORGING ROUGH BLANKS FOR THE MAKING OF BIG ARMOR PIERCING SHELLS



ADJUSTING THE TELESCOPIC SIGHTS OF A BIG GUN



ARMOR-PIERCING SHELLS FOR NAVAL 14 INCH RIFLES

EVERY NAVAL GUN MUST BE TESTED BEFORE TAKING ITS PLACE ON SHIPBOARD.

By ROBERT G. SKERRETT.

An open break with Spain in 1898 was postponed by us for something like six months so that we could obtain enough powder to meet our immediate requirements in the more pressing directions. The morning after war was declared the newspapers proclaimed New York's immunity from attack, basing this pronouncement upon the authority of a prominent staff officer in Washington. As a matter of fact, it was six weeks after that before all the guns defending this port had a single round of ammunition!

What is our situation to-day? Our potential enemy to-day is a vastly different military power. She has shown no disposition to wait for her foe to prepare; she has struck hard and at once when ready. This completely alters the circumstances that confront us. Unreadiness means vastly more to-day than it did in 1898, and the possible consequences are correspondingly greater. What have we that should make us confident? Let us begin with the navy, which, of necessity must form our outermost line of defence.

Not long ago Capt. Joseph Strauss, then chief of the Bureau of Ordnance of the Navy Department, answered in this fashion a query put to him by a member of Congress: "It is very difficult to argue from the past in the matter of warfare. Weapons have changed so tremendously that I think we should not take any lessons from the past as to what is happening now or what could happen."

"For instance, I speak now of a range of 24,000 yards. That is over thirteen land miles; it is nearly fourteen land miles. A gun of that sort in the civil war would have been considered an absurdity, an impossibility. As short a time ago as the Spanish war that was away-out of the range of any gun then mounted."

Not only have the weapons changed in their reach and might, but the matter of supplies for the guns has undergone a profound change. The very life of the modern rifle is shorter than was formerly the case, and the time needed to build it and the care required in its manufacture have increased many fold. These facts must be faced when we count upon maintaining the battle fleet fit for the protection of our shores, and they bear directly and vitally upon the effective arming of lesser fighting ships and the scores and scores of auxiliaries which would be needed in time of national peril. Gun power is the ultimate and decisive measure of a navy's fighting strength. The question is, Have we guns enough now for wartime service?



THE BREACH OF A BIG GUN CALLS FOR THE MOST ACCURATE WORK.

Further service, and it does not take a large weapon to achieve this damage. This is made very plain by Rear Admiral Sims. He says: "While the front plate of the turret is perhaps strong enough to keep a shot out, still the blast of the shell might be sufficient to interfere with the integrity of the gun. If the shell explodes and knocks a chip out of the gun muzzle, even though only as big as your hand, it renders the gun useless, because the shell will not go straight when fired out of that gun. It is the same thing as having a contest with a fellow in which you bet him you can beat him shooting, and, unknown to him, you cut a little nick in the muzzle of his gun so that the gas will get out and he will not be able to hit anything. I have seen a small piece of a shell knocked out and it has been rendered absolutely useless. That can be knocked out by the projectile striking the gun directly or the projectile hitting a part of the ship and exploding and a piece of the shell striking the gun. Some pieces of an exploded shell will weigh 150 pounds and the damage done by one of these flying pieces can be readily imagined."



MAIN GUN SHOP, NAVAL GUN FACTORY AT WASHINGTON.

sumable that the amount of wear will increase, but there will be no matter how leisurely you fire the shots, erosion for every shot fired."

This malady is not confined by any means to the big weapons. Take, for instance, a 3 inch gun firing a shell weighing thirteen pounds. Weapons of this sort have been worn out in a few minutes by rapid fire, although their theoretical life is estimated at several hundred rounds. These details should be kept in mind because our battle strength cannot be measured by the number of guns afloat but is very largely dependent upon the number of weapons we have in reserve upon which we can draw promptly for replacements when the rifles for one reason or another are no longer equal to the work expected of them aboard the ships carrying them. And of what does our reserve consist?

This is a matter that the naval authorities have sedulously striven to keep from the public, although every foreign Power is probably fully aware of the facts. This reserve to be effective must consist of a certain number of surplus guns for every battleship and those guns must be in the same length as those at present installed. The reason for the latter specification may not be clear to the man in the street, to whom all 12 inch guns or all 14 inch guns are substantially alike. The naval men, however, know better. The gun of 49 calibre length

is not as long as the 45 calibre gun and the latter is of course shorter than the 50 calibre gun. Increase in length means a longer time in which the shell is subjected to the accelerating impulse of the propulsive gases. This in turn means higher muzzle velocity, a flatter arc of flight and a further reach or range. Therefore, in salvo firing where all of the big guns are aimed at a common target and fired simultaneously from a single point of control any difference in the weapons would involve confusion and probably lead to a waste of ammunition.

Now let us see what we have in the way of reserve guns to take the place of those that may be injured in action or so worn in war service that they are inaccurate. Exact figures cannot be given, but the general situation can be stated with sufficient correctness. Just about a year ago Capt. J. S. Mc-

Keen, assistant for materiel in the office of naval operations, was asked: "What will be necessary in munitions and material of all sorts to make the present number of battleships of the utmost efficiency?"

Two items included in Capt. McKean's answer are of immediate moment. He said that we needed a complete reserve of turret guns, a one-half reserve of smaller guns and four reloads of ammunition for all ships. That is what we required twelve months back and that is substantially what we need now.

And where can we get these necessary weapons? The capacity of the naval gun factory at Washington has definite limits even when running night and day. It is possible to build there in the course of a year twenty 12 inch or twenty 14 inch rifles. As one dreadnought carries from ten to twelve of these weapons, the gun factory is not in a position to provide for the general replacements that might be called for immediately following a single great naval battle.

The plant at Washington has been engaged for some time in manufacturing guns of greater length for certain of our ships now under construction. These guns, for the reason already explained, could not be substituted for weapons of fewer calibres in length on the ships now in commission unless there could be in the case of any

formation desired Mr. Barba answered: "We do not." The time required to build guns of 12 inch and 14 inch calibres ranges anywhere from eight to nine months; and in the absence of an ample reserve it is evident just how long our dreadnoughts, particularly, might have to wait for new weapons before being able to resume their places in the defending battle line.

But the lack is not alone in guns of large calibres. Seemingly we are short in naval rapidfire pieces ranging from 4 inches to 6 inches in diameter of bore. The naval gun factory can turn out annually forty guns of these sizes, and it is weapons of these sorts that we shall need for our ocean shipping, for naval auxiliaries, and for other craft that we may have to muster into our defensive service.

In order to keep Watervliet and Washington engaged to capacity private plants have heretofore been neglected when there was not enough work left over after providing for the Government establishments. As a result up to March a year ago the great plant of the Midvale Steel Company had not manufactured any 4, 5, 6, 7 and 8 inch guns for the three years preceding.

The men previously engaged in these shops—especially skilled—were diverted to other lines of trade or lost to the ordnance of that concern. Where, then, are we going to get the rapidfire weapons that we shall need and also those special anti-aircraft guns without which we might find ourselves at a serious disadvantage? We have not enough guns to meet the so-called peace time needs of our navy, let alone supplying the guns that would be immediately called for in case of war for other craft. The naval bill now in Congress carries an allowance of the second half of a sum amounting to \$3,300,000 for batteries for merchant auxiliaries, the other half having been appropriated last August. Assuming half of these guns to be not larger than 5 inches in calibre, the appropriation amounts to a confession that we are to-day short of nearly two hundred guns of this size alone, and in weapons of lesser calibre the deficiency is greater.

The recent controversy between Mr. Daniels and the makers of projectiles has brought to light our shortage in the matter of armor piercing shells especially, and Capt. McKean's statement of our need of four reloads of reserve ammunition for all ships is equivalent to an admission that we lack these munitions for the battle fleet alone. How, then, are we going to get the needed ammunition for our merchantmen and the like if we have not enough now for the regular naval service?

Not long ago the chief of the Bureau of Ordnance informed Congress that "we have on hand and ordered about 41 per cent. of 5 inch projectiles for all ships up to and including the Pennsylvania and Arizona." The shortage in 4 inch ammunition was as recently as the foregoing a matter of 41 per cent., and the importance of this can be realized when it is recalled that the 4 inch gun is the principal weapon of our destroyers.

The shortage in ammunition for the 3 inch rapid fire guns at the same time was stated to be 53 per cent. of the regulation allowance. This quota, however, did not provide for four complete reloads, as recommended by Capt. McKean, in view of the lessons taught by the present conflict.

interfering with traffic further and further back into the country as the days pass. This matter of congestion very much concerns our fighting efficiency, because the battle fleet must be provisioned, cooled and provided with military supplies in order that the vessels can maintain their stations off the coast. How many citizens realize the weights expended by a battleship in action? According to Rear Admiral Sims: "Every time a battleship fires a broadside it means nearly ten tons, and if she carries a hundred rounds per gun, that is a thousand tons of ammunition." Immediately upon her return to port the dreadnought should find a reef awaiting her. As matters stand to-day we have not storage space at any of our navy yards for the housing of any considerable part of this ammunition. What we have of it is scattered broadcast at fairly widely separated points; and to be available it must be transported for the better part by rail.

This is particularly the case with our projectiles. Therefore freight congestion has a direct effect upon our ability to move from point to point the ammunition which we have available. Of course, this should not be the case. It is the result of a lack of foresight in providing increased storage facilities as the number of our fighting ships has grown. Theoretically, the powder used by the navy is supposed to have a life of ten or fifteen years; that is, that no serious change will take place in its ballistic properties within that time. As a matter of fact, it is found desirable to overhaul a vessel's ammunition

at much more frequent intervals in order to check up on possible deterioration in the propellant and to examine primers, etc., from time to time. Powder cases or cans may become leaky, and a leaky can is a menace, for the powder so exposed may undergo changes that would make it dangerous to fire the propellant in a gun or the powder may be affected in another way tending to reduce its propulsive efficiency. Therefore, whenever a ship returns to her station for general repairs or overhaul, it is commonly the practice to break out her magazines and to send all powder ashore for reexamination.

This work has been gravely hampered heretofore by unsatisfactory and cramped storage facilities, and conditions would be greatly aggravated should we find ourselves at war and laboring under the pressure and stresses of actual conflict. Where, then, are we going to handle our reserve of munitions, assuming that it may be possible for us to provide such a reserve? Within some limits it is possible to speed up the building of naval ordnance, and as a matter of fact the shops can be run well high continuously by employing three shifts of workers. But this is not an ideal state of affairs nor one that produces the best results, because, after all, the fitness of the final product depends upon exacting supervision, and the stress of working to meet the demands of war is very apt to reduce the standards necessarily set.

## THE NEWEST MOTOR SHIP

CONTRAST in shipping may be seen at the Brady wharf, Stapleton, Staten Island. On one side of this narrow, open pier is moored a four masted Russian bark, the Marlborough Hill, a vessel of the old type, built a quarter of a century ago at Dumbarton, Scotland, and depending solely on sail power for locomotion. On the opposite side is the most modern of motor ships, the Chile, a Danish vessel which has been in service securely a year and said to be the largest motor vessel in the world's trade. To those interested in this type of ship the Chile is well worth a visit. She typifies all that is modern and economical in the construction and operation of big ships for cargo carrying. On so comparatively small a cost can the ship be operated that Chief Officer Moeller, who is of the Danish naval reserve, has called her "the economical flagship."