We hope the subjoined description of the mode of conversion will prove interesting to our readers.

The operation, which, in a few words, consists in enlarging the interior or bore of a cast-iron gun, and inserting a rifled wrought iron barrel of such dimensions as to admit of its being easily placed in position, and yet, on being fired from, capable of expanding so as to be tightly gripped by the cast-iron casing, is as follows :—

The barrel is formed of three parts, the "A" tube, "B" tube and "cup" for closing the breech end.

The "A" tube extends the whole length of the barrel, and is composed of a number of "coils" of wrought iron welded together,—each coil being made from a bar of wrought-iron, slightly trapezoidal in section. The bar from which the coil is to be made is put into a long furnace and heated sufficiently to admit of its being wound round an iron mandril placed in front of the mouth. The coiling is effected by attaching the end of the bar to the mandril, which is made to revolve on bearings, by this means the bar is gradually drawn from the furnace until the whole is coiled. The shape of the bar neutralises the effect of this process, which is to spread the interior and narrow the exterior. When the bar is coiled, the pin connecting it to the mandril is removed, and the whole (mandril and coil) placed in a vertical position, when the coil is knocked off by a few blows from a sledge hammer. The mandril is slightly tapered to facilitate the operation.

The coil is then re-heated and thoroughly welded under a steam-hammer. After a sufficient number of coils are thus formed, the ends of each are faced smooth, and joints formed, (male and female), the end of one coil being turned down so as to fit into a recess formed in the other. The corresponding ends of coils are then heated by being placed in a furnace constructed so as to give a great heat in a small space; while still in the furnace, a bar is passed through them, and by means of a nut working on a screw they are welded by pressure. this slightly bulges the coils on the exterior, and necessitates them being again placed under the steam hammer to be straightened. Another coil is then welded on in the same manner and the process repeated until the full length of the barrel required is finished.

The tube thus formed is fine bored and turned, and a recess in the breech end cut and tapped for the wrought iron cup, which is forged and stamped into shape under the steam hammer—it is then accurately turned, and a thread chased on the outside to suit that in the breech end of the tube, into which it is screwed tight home. The tube is then ready for the water test, which consists of forcing water into it until a pressure of 120 lbs. to the square inch is attained, which readily searches out any defect existing between the cup and tube. This test being satisfactory, the breech end of the "A" tube is turned over a length of about 35 to 40 inches for the "B" tube, which is formed in the same manner as the "A" tube, only two coils being used,—and a spiral gas channel, 0.05 inch deep and 0.01 inch wide, is cut round its exterior, communicating with star grooves cut in the end of the barrel, and a "gas escape" bored in the cast iron breech.

The "B" tube is shrunk on to the "A" tube with a shrinkage of 0,003 inch in the diameter,—this is done by heating the former until it is sufficiently large, and then lowering it over the "A" tube, which has been placed in a vertical position to receive it. The interior of the "B" tube and the exterior of the "A" tube have to be very accurately turned, being guaged in this operation to 1-1000 of an inch every few inches.

The cast iron gun which is to be converted by having the barrel formed as above, inserted in it, is examined as to condition of metal generally, and, if found suitable, the interior is bored out to the size necessary for the barrel,—which varies with different natures,—the play between tube and casing is not allowed to exceed 0.007 inch for a length of 24 inches from the breech, and 0.015 inch for the remainder of the length. The muzzle is recessed and threaded for a cast iron collar, which is screwed in after the tube has been inserted, and keeps it in position, (prevents it becoming telescopic). A small hole (gas escape previously alluded to) is then drilled in the breech at the right top of the cascable, when the parts are ready for being put together. To insert the barrel in the cast iron gun, the bearing surfaces of each are well oiled,—if the gun is placed at an angle, and the end of the tube inserted, it will be found to move into its place with very slight pressure,—the gas channel allowing the wind in the casing to escape. When the tube is in position, the collar is screwed in the muzzle, and a hole drilled and tapped about half-way between breech and muzzle, into which a screw is placed to prevent the barrel turning round.

The gun is then vented and rifled—the latter can be done before the tube is put in the casing if more convenient—when the gun is ready for proof.

Canadian Armaments.

From the United Service Gazette, February 14.

Apropos of the interesting work of Captain Colomb, just issued from the press, entitled "The Defence of Great and Greater Britain," it is extremely satisfactory to observe that the recommendations of Sir Edward Selby Smyth, which he has so persistently urged on the attention of the Canadian Government, are taking effect, and *proving the immense advantage to the empire of having* officers of high standing and merit in such important commands as those of the militia and defences of Canada.

To those who have good sense sufficient to regard Canada as a most powerful ally in case of need, both at sea and on land, it cannot appear otherwise than remarkable that such a command should not be looked on as secondary only to that of India, and treated as such It should be remembered that we have no longer the power to raise troops in Germany and Italy, as was done during the Crimean war. Those sources of supply are cut off for ever, and we must now depend more and more on the fighting capabilities of the empire itself. All praise, then, to such officers as General Selby Smyth, who, fully appreciating the store of first-class fighting material under the Canadian command, do their best to develop it under even discouraging circumstances—discouraging from the fact that the press and public opinion of England are so absorbed in Eastern squabbles and home politics that small attention is afforded to the grand reserve so capable of development in the Great West. Soldiers, sailors and ships—such ships as would make admirable armed cruizers-are there to befound in abundance as also a large number of well-trained officers and soldiers. Powder also is manufactured in the country, but Canada had no small arms cartridge factory, and she had not the remotest idea how to make a rifled cannon. Both have, however, become *faits accompli.* When the manufacture of rifled cannon was first mooted, it was pronounced impossible But General Smyth knew that he had under his command an officer of the highest scientific attainments in Colonel T B. Strange, R.A., the Inspector of artillery in Canada *and to him the matter was referred, with the result that the Canadians* have already tested a 64-Por. rifled gun, and with the further result, that twelve rifled cannon have been ordered to be made at Montreal, together with their carriages (suitable for sea service), and 6,000 rounds of shot and shell, the contract for which has been duly signed Two of the guns ordered are Palliser 7-inch long breech loaders, and the others 64-Por. converted guns. But the Canadians have also recognized the want of a small arm factory, and General Smyth has inspected desirable buildings at Quebec for this service, whence an officer of the Canadian regular artillery, and a bombardier are to proceed at once to Woolwich to go through a course of instruction for the factory. But Canada again is not stopping here. An excellent military college, under Colonel Hewett, R E., trains young gentlemen for the engineers, artillery, and the line, and two schools of artillery, one under Colonel Strange at Quebec, and one under Colonel Irwin at Kingston, complete the training of artillery officers. This is sound and satisfactory progress, building up from the very foundations the necessary elements of military power.

That Canada could, however, do much unaided by the mother country, we do not believe. She could, of course, defend her harbours, and materially assist the Royal Navy in protecting her merchant fleet. But something more than this might be looked for. What, we ask, would be the position of Canada in the empire if, after continued self-progress, such as we have pointed out, England were to subsidise her with two millions or three millions of money to enable her to put forth her full strength in case of war, and to take her part in the West, as India does so well in the East? *We believe that General Smyth, and the English and Canadian* officers under him, could give a very fair estimate of what Canada could do. When it is known that her supply of hardy sailors is almost unlimited; that her armed cruizers would appear in numbers in every sea, if required; and that an army corps complete would be ready to sail for any destination; less will be heard of war rumours, of volunteer fleets, and all such at present rather alarming threats—alarming, because the Western preparations of the British Empire are progressing, and not yet complete.

The Annual Meeting of the Dominion Artillery Association, will be held at Ottawa, on the 4th March.