

W of Breadwell
 In 1880
 No 1-816

2 816

3 808

4 816

5 812

6 814

7 180

8 806

Ex No 142234

Daniel Treadwell
Cambridge Mass
14 Jan 1858

Transmits an Abstract
of recent trial in England
of 4-9 pr Gun made
of different materials
in different methods,
& suggests that some
experiments be made
by American Govt.

P 28

Ordinance Office
Jan 16th 1858.
Referred to the Ordnance Board
for consideration.

W. C. C. C.
Recd 16 Jan 1858

Cambridge Jan^y 14th 1858

To Col H K Craig
Chief of the Bureau
of Ordnance

Sir

I take the liberty of transmitting to you an abstract from what appears to be an official minute, forwarded to me by Captain Blakely of the British Artillery.

"Comparative trial at Shoeburyness of four 9 pounder Guns, being a Brass service gun - a Cast iron service gun - a gun made by Mr Dundas of Staves and hoop of wrought iron - and a gun made by Capt Blakely of cast iron strengthened with wrought iron.

They were fired as follows -

2 rounds with 3 lb of powder 1 shot 1 read						
86	"	"	3	"	"	1 " 0 "
26	"	"	4	"	"	1 " 1 "
5	"	"	5	"	"	1 " 1 "
5	"	"	5	"	"	2 " 1 "
3	"	"	6	"	"	2 " 1 "

At this stage of the proceedings Mr Dundas's gun burst. The cast iron ^{gun} was fired 107 rounds, additional, with the last charge, of 6 lb of powder and 2 shot. It then burst. The Brass gun was fired 171 rounds more than Dundas's, with this charge, when it was found unserviceable. Capt Blakely's was fired with the same charge - 315 rounds more than Dundas's, or 208 more than the

cast iron gun and 144 more than the brass gun, but being, even then, uninjured, the charge was increased as follows

1 round with 6 lbs of powder 3 shot 1 round

1 round with 6 lbs of powder 4 shot 1 round

1 " " 6 " " " 5 " 1 "

1 " " 6 " " " 6 " 1 "

1 " " 6 " " " 7 " 1 "

1 " " 6 " " " 8 " 1 "

1 " " 6 " " " 9 " 1 "

150 rounds with 6 lbs of powder 10 shot 1 round

Capt Blakeleys gun was precisely the same in shape and weight as the cast iron gun" [end of the minute]

This gun of Capt Blakeley owed its superiority to a series of wrought iron hoops shrunk upon a cast iron body; a construction the same as that pointed out in my memoir published in 1856, this form of construction having been proposed by Capt Blakeley and myself, independently of each other.

Now, as it appears by the preceding account of trials, that the British government are carrying this principle of construction into triumphant practice, I have thought it might not be improper to suggest that the American Ordnance should direct a few decisive, but not expensive, experiments to be made, by which our country may claim whatever

belongs to it of the credit of ^{developing} so important an improvement, rather than take it at second hand from the English

I have the honor to be
With much respect
Your obedient servant
Dant Treadwell

Ex--1a - 115

Daniel Treadwell
Cambridge Mass
15 July 1844

Recapitulates proceeding
relative to the purchase
trial of his wrought iron
and steel guns - 6 pdr -
and urges that a large
number be ordered of him
&c &c

BH

Ex - 1

Received 18 July 1844

Cambridge July 15th 1844

Lt Col. George Talcott
Chief of the Bureau of
Ordnance. Department of
War

Sir.

It is well known to you, that in March 1842 I submitted to you, at the instance of the Sec. of War, a proposition to manufacture for the Government, by a method which I had then recently invented cannon which should be formed of wrought iron and steel. Although opposed to these materials for this purpose as heretofore used, you thought so well of the method proposed by me, which was confidentially communicated to you, that you recommended to the secretary to contract with me for a small number of six pounder field guns, which contract was entered into accordingly. The guns were finished in July 1843, and having borne the inspection and proof agreed upon, were, with one other gun, which was made of inferior iron, accepted and paid for. They were then taken to Fort Mifflin, to be subjected to such extensive and severe experiments as were deemed necessary to as-

2 ascertain their power of enduring long continued firing, and their absolute strength; with any other qualities, either good or bad, which actual service might develop.

The first experiments were made on Nos 1 and 8. At the 60th fire, No 1 commenced turning in its breech band, and after the 150th, it was laid aside, for this cause, as no note is made of any other injury. The turning in the breech band here noticed is no more than the turning of a nut upon a screw bolt, as the whole inside of the band forms a female screw which is turned on to a corresponding male screw formed upon the outside of the cannon.

Now it seems that the shock, or jar, of the recoil caused one to turn a very little upon the other. No man possessed of the least acquaintance with machinery would consider this as of any serious moment; as by drilling a hole, as big as a pipe stem, parallel with the bore of the gun, and inserting a bit of iron wire to fill the hole thus made, its future recurrence will be prevented with absolute certainty, so certain that it is not worth wasting a second thought upon. At the 450th fire No. 8 became unserviceable by the opening of one of the welds. I have before stated that this gun was made of inferior iron. This however had nothing to do with the defect which rendered it unserviceable. I knew of the existence of this defect which arose from enclosing sand and scoria, from the bottom

of the furnace, when the pieces were put together. The foreign³ matter thus enclosed showed itself when the gun was finished running nearly half way round the gun. By a complete change in the instruments used in putting the pieces together, the recurrence of a like accident must be forever prevented.

The second experiments were made upon guns Nos 3 and 4. No 3 was subjected to 1218, and No 4 to 1501 fires with common service charges; the object-being to test the hardness and durability of the guns. The result appears to have been completely and decisively in their favour. The wearing in both cases was quite insignificant; so that on a minute comparison and calculation, made by one of your officers, it appears that the best bronze guns are worn 8 or 10 times more than these steel guns, by the same number of discharges, and what is quite remarkable, the vents are reported as still servicable.

The next experiments were made with No 2, a gun not before used, and No 4, which had stood 1500 rounds service charges. These experiments were intended to test to extremity the strength of the guns; the charges were —

20 rounds 2 lbs powder 1 shot 2 wads

20 rounds 3 lbs powder 2 shot 2 wads

10 rounds 3 lbs powder 3 shot 2 wads

10 rounds 6 lbs powder 7 shot 2 wads

No. 2 at the last fire showed a crack on the left of the chase

4 extending nearly half round, 21 inches from the muzzle, which was not increased by again firing with a charge of 3 lbs. and 5 shot. No 4 bore all the charges uninjured. There is I believe no instance of any gun, of any kind, before, bearing the charges borne by both of these guns. In the account of trials made at Fort Munroe in 1841. The English gun burst with 13 fires 3 lbs. powder and 2 shot, the West Point gun with 19 fires same charge, the Liège, and one kind of Swedish gun, with 7 fires 3 lbs. powder and 3 shot; another kind of Swedish gun, with 9 fires 3 lbs. powder and 3 shot, and, lastly, one kind of Swedish gun stood 1 fire of 6 lbs. powder and 7 shot, but burst at the second discharge. On a full examination, therefore, I think that you will agree with me, that these guns are not only stronger, but very much stronger, than any gun ever before made. Moreover, it should be borne in mind that it is only now and then, by mere chance, that a cast iron gun is found to bear high charges, but these wrought guns may always be relied upon as certain not to burst. Even in the case of the defective gun No. 8 no harm resulted from its failure, and neither you ~~nor~~^{nor} I would now fear to stand by it with service charges until it should be separated. As to comparing these ^{guns} in point of strength with bronze; it would be like comparing bronze with lead or clay. Moreover, it should be considered that these are the first guns made by this

method and that it is the course of the useful arts to improve. Indeed it was not unknown to me that many of the welds of these guns were imperfect compared with what I can now produce, and this you will recollect I wrote to you many months since. But the experiments prove ^{that} the principle of the manufacture is so excellent, that any considerable defect in the process, is not fatal. In other words, there is such a surplus of strength when the work is well done, that if it be badly done, it will yet possess strength sufficient to oppose the force of the powder. But there is no need of having the work badly done, and I feel confident that with a little more practice, ordinary workmen will produce guns which shall not contain a single weld so imperfect as the best weld in these guns which have stood the high charges

In strength and durability therefore, the only important qualities in cannon, we may take it as established that these wrought iron and steel guns are decidedly superior to all others, and their adoption for the service of the Army, it would seem, ought to follow as a necessary consequence. To place this in a clear light, suppose that these wrought guns had been known and used for ages, and that Bronze cannon were unknown, and that I should call upon you and say "Sir, I have a new cannon to

6 offer to you, for use, and which I wish you to take into the service; it is made of bronze, I can sell it to you at the same price which you now pay for wrought iron and steel cannon, it will stand about one quarter the charge which your present cannon will bear, and wear or endure something like one eighth part as long." What would you answer? would you not suppose me an insane man, and call the messenger of your office to find my friends that I might be taken care of? and yet this gives the true state of the case, the difference of usage only being reversed. The bronze being the guns now in service, and the wrought iron and steel, those proposed for use.

I have made the preceding summary statement showing the superiority of these guns, preparatory to calling your attention to the subject of continuing their manufacture. As it is a subject entirely national, no private individual being a purchaser of cannon, it is from the Government alone that I may expect a return for the time and money expended by me in forming this manufacture. I am at present employed in finishing a small order for the Navy, for an experiment with these guns, when this is completed, in a very few weeks, it will be of great importance, indispensable indeed to the continuance of the manufacture, that I obtain an order from you for more guns, that I may keep together and

employed, the workmen who are now skilled in the various⁷ operations, and who if once scattered cannot be again collected without much trouble and great pay; and as to going over the experiments again and teaching another set of men to perform the operations, I doubt if I have enthusiasm and spirit enough left to do it. In addition to the importance of the order being immediate, in time, it is desirable that it should be somewhat large in amount.

Hitherto my operations have been experimental, to ascertain whether I could make the guns as proposed, and their qualities when so made. The expenditure of a few thousand dollars more or less was no object, compared to the end to be attained. The practicability of their fabrication and their superior qualities being established, it is now important to me, and permit me to say, that it is important to the government, to establish their manufacture in a business like way. To do this it is essential that so many pieces, or such quantity, be required at each process, that proper preparation may be made for it, and that our time be not consumed in changing from one operation to another, as each operation requires different machinery, which must be adjusted and arranged for every set of guns made. The first pieces operated upon, moreover, are rarely so perfect as those produced after we get well at work. Each gun

therefore of a large number, made together, will be more perfect than when a small number are made at a time.

It is not necessary that I should add to this statement any claim to the special favour of the government founded upon the long period of time and the very large amount of money which I have expended in perfecting my invention. Fortunately the superiority of the cannon, to all others, must be considered sufficient to warrant the action of the government in adopting them, and I shall be satisfied if you pursue that course ~~of action~~ which most completely accords with the interests and defence of the Country; and of your disposition, and that of the administration, to do this, I can have no doubt.

— I am Sir with great
 respect Your Obedient
 Servant
 Dan Beadwell

Boston & An.
Coe & G. Talbot

Per spec. for

forward a report of the
eight iron steel guns, in a
instructions for the inspec-

Ex - Mr. Treadwell was any
whole number made. The
more composed of different
and differ in construction
cluded. It would be add
the whole number -

Ex - 107 Jan 27.
Evidently open before the
again tried to day. For
further trials with the
be satisfactory to the de-

Mr. Treadwell was quite
the gun broken apart
We find it with

Ex. - 1 a - 13/3 Ex. R. - 1 - 52/7

Myers Baker & Wade
Boston 18 Aug 1843

Transmit Inspection
Report of Mr. Treadwell's
iron steel guns, accom-
panied by remarks. -

13/3

Boston Aug 18. 1853
 Col G Talbot
 Ors sep

Sir I have the honor to forward a report of the inspection of eight Iron & Steel guns, in obedience to your instructions for the inspection & proof of dx -

Mr Madwell was anxious to have the whole number made, tried, and as they were composed of different kinds of iron, and differ in construction we concluded it would be advisable to test the whole number -

Gun No 7. which was evidently open before the first fire, was again tried to day, presuming some further trials with that gun would be satisfactory to the Department -

Mr Madwell was quite willing to have the gun broken apart -

We fired it 1st with 3^{lb} powder & 2 balls, 2nd with 3^{lb} powder & 3 balls, - 3rd with 3^{lb} powder & 4 balls, 4th with 4^{lb} powder and 5 balls, and lastly with 5^{lb} powder & 6 balls

EX-1a-1903-8.2-1-50

at which fire the chase was completely severed from the rear of the gun.

Previous to the last fire the increase of the opening, the small was gradual and much of the force of the charges escaped at it -

The fracture exhibits a very imperfect weld. the parts having been united only by a small portion of their surface -

This gun was made of common puddled iron -

N^o 8 is of the same metal, and to further test the comparative quality of the guns. Mr. Bredwell desires the Department to receive the whole number of his guns - seven -

I have the honor to be
respy, yours

W S Baker

Maj. Gen.

P. S. Not having a form at command
our Report and Certificate must
necessarily vary from the Regulation
P. L. B.

Remarks.

Mr Gradwell presented eight guns, and requested that they might all be inspected and proved - No 7. was evidently defective from an opening in front of the trunnion band, indicating an imperfect weld -

This opening includes about one half the circumference of the gun, and its length was not perceptibly increased by the discharges, although it became rather more open by the forcing out the cinder or oxide, or whatever interposed to prevent a more complete weld -

This gun, on being filled with water after the firings, leaked at the opening - The opening is equally visible in the bore.

No 5. exhibits several seams on the surface but no appearance of opening - and in fact the exterior of all the guns present the cross marks or seams caused by the peculiar manner of forming the mass.

Upon No 6. on the top, and about seven inches in rear of the trunnions is the appearance of an imperfect weld, but it was not opened or in any wise affected by the firings.

The vent of No 3. is placed 0.62 of an inch to the right of the centre.

The material, and form of

construction of the eight guns, as
furnished by Mr. Fiddwell, is
as follows. viz

Nos 1 & 2. Interior rings equal parts of
iron and steel - Ends of rings conceal
body of rings, or outside turns of old
sable iron.

Nos 3, 4, 5 & 6. Interior rings all steel;
ends square - body of rings, or outside
turns of old sable iron.

Nos 7 & 8. Interior rings, equal parts of iron
and steel - ends of rings square - body
of rings common puddled iron.

The guns received on Mr Fiddwell's
contract, are the six, numbered from
One to Six inclusive.

Boston Aug 16th 1843

W. Wadsworth
Ed Baker
My Or

EX-10-10770

EX-10-1-512

Daniel Readwell
Cambridge Mass

24 Aug 1843

File Ex-10-105

Forwards Certificate of
Inspection given for the 6
years made by him previous
that a 7th one made of
particulars can be also record.

Proper that further trial
with these years would be made
as early as practicable for

and office
25 Aug 1843

I recommend that the same be
to be also made & subjected to trial

in the
summary shown 3
Stallan
Stallan

Received 25 Aug 1843

2418

Approved

Manuscript 3
Sept 43
Importers

War Department

213

Received 12 Sept 1843

Cambridge August 21 1841

Col. Talbot

Dear Sir

I enclose the certificate of Major Baker and Trade, of the inspection and proof of Cannon and the receipt of Capt. Treble for the same with my account according to the contract. I suppose that Majr Baker and Trade have sent you a particular report of the result of the trials and the appearance of the guns, with the account of the fracture of one of them, with the defect which occasioned it, apparent before the gun was fired; and which was from the great charges required to open it, a proof of strength and not of weakness. I am now extremely anxious that the extreme trials should be made at Fort Monroe as soon as possible, without inconvenience to yourself or your officers, as I think that the result must decide you to adopt these guns for most, if not for all, uses. I wish moreover, that you would take gun No 8 which is made of puddled iron, being one more than the number contracted for. My desire that you should take it is, not only that I may be paid for it, when after the great sums expended, I need, but that

EX-10-10721 6.11-32

2448

you may see what charges inferior iron is capable
of resisting when wrought in this way, a knowledge
of which is highly essential in directing us to the
true qualities of iron required in the manufacture
It was for this purpose that I made two of the
guns of this poor iron, and not for the trifling
savings in price, which compared with my other
expenditures is but as a drop to an ocean.

Very Respectfully Your
Obedient Servant

Samuel Beadwell