

Reports

Publication/Creation

1907-1917

Persistent URL

<https://wellcomecollection.org/works/f3me2mv7>

License and attribution

You have permission to make copies of this work under a Creative Commons, Attribution, Non-commercial license.

Non-commercial use includes private study, academic research, teaching, and other activities that are not primarily intended for, or directed towards, commercial advantage or private monetary compensation. See the Legal Code for further information.

Image source should be attributed as specified in the full catalogue record. If no source is given the image should be attributed to Wellcome Collection.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

RAME 380/2/1

2, LINDEN GARDENS,
RINGWOOD, HANTS.

RINGWOOD 1821

Re this Report on the MK-VII
bullet. . 303.

As a boy my father some times
gave me two measurements, at
right angles to each other, in order to
check the angle at which the
hypotenuse went off. This I later
discovered was the deflection of the
bullet after it hit a carcass

In later years talking to my
father about the way gun stalks
deflected machine gun bullets, he told me

S. LINDEN-GARDNER,
СТИАН ГАРДНЕР
SILVER SPRINGS

that what had not been discovered in these experiments with S.A.A. bullets, was that ^{they} would follow the line of a muscle, especially that of a man hit as he was raising himself on his arms - as in press-ups -

~~first track~~
L.G.
19. n 68 -

Rome 380

2 Salisbury Road
Lamborough
Heads

8 Jan 61

My dear General.

My wife & I would be very glad if you could come over one day. Could you manage Sunday 22nd January. We could meet here, have lunch in The Tumble Down Dick, and return here for coffee.

Besides the going for you to see there are other items that may interest. And I also would like to consult you on another matter - of a rose bowl.

John Cambridge house was bequeathed by my mother in 1814, a box of Silver was put into folks Bank. And then the Revd. Martin

Looking forward to seeing you at the A.G.M. on the 26th.

Yours

remained till my father died, when it
was transferred to Gomshall Bank (my mother's
bank). A few weeks ago I had
the contents valued in connection
with my mother's estate. My sister
had told me the contents were a couple
of silver rose bowls given my father
by grateful patients, and we decided that
if either of them should inherit them we
would offer one to the RAMC and
one to King's College Hospital - possibly
to be walking trophies for running.
As a student my father had won a
number of long distance races.
The bowls are still at Gomshall till
probate is granted. One is engraved
"Major in P.S.C. from Porian".
I have no idea who is Porian. Very much

doubt it's
a boy to

3.

doubt it was Boer stoicks, who as a
boy was operated on by my father at
Woodstock. You could be interested

(formerly R. H.) who is a son of Dan
Cobell-Raine & who had long enough to have his
son (Ronan) had passed top his Woodstock
my father did not meet Ronan till again
or so before he (in 1914) died.

Anyways what news about one of these books?

You will (or may have) noticed a
blank in my father's Ladysmith
diary between 21 Oct & 2 Nov 1899.
I can now fill in that gap, as I found in
my mother's things a letter dated 1 Nov 1899
and delivered to her in Durban April 1900.
It is most interesting about the actions
of Reitfontein and Lombarts Kop. It might be
worthy of publication. If you can lay your
hands on Conan Doyle's "The Great Boer War"

dear. Merton

"Weeks instead
to follow,

Chapter III concerns Lombard's Kop. The author does not say that after the action a M.P.A. rode over to the Boer lines collecting wounded, nor of his conversations with Boers who were very helpless and feeble. Told him not to tie up his pony as it was safe to be finished - with a result. M.P.A. rode it into a farm house where Boers were waiting. They agreed it would be unwise to let the pony out of sight and added that the Red + brassard was too small to see and advised wearing a bigger one. M.P.A. writes that the Boers have no parade grounds, nor uniform nor Staff College yet they are more than a match for us.

Have you in the Museum or at different VR cyphers of the ponies the Boers had.

Yours sincerely
H. H. Stott

Aug)
Wing.

g.)
S.

nt

)

by Comm:

ection to
s of the
uction to

Duties 1
to R.A.M.C.

RAMC 380/2/1

ROYAL LABORATORY DEPT.,
ORDNANCE FACTORY,
WOOLWICH.

Bullets for
s.a. cartridges

DESIGN R.L. No. 15742



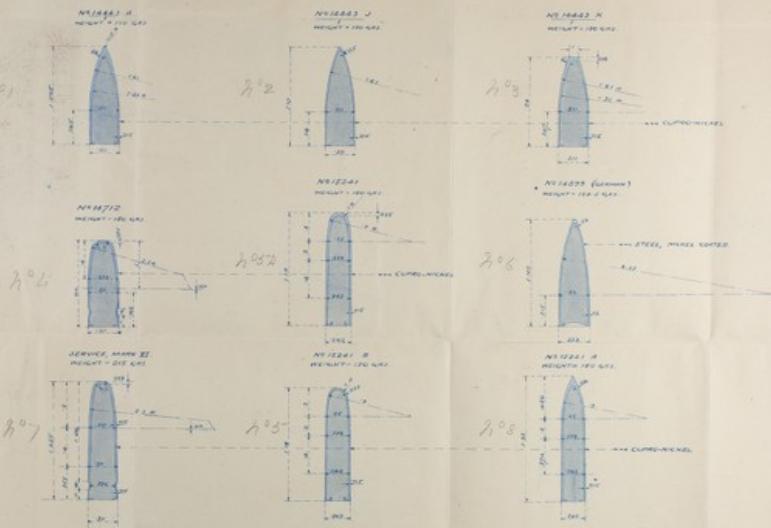
No 15742

13.3.07

ROYAL LABORATORY DEPARTMENT

BULLETS FOR S.A. CARTRIDGES

TWICE FULL SIZE
DIMENSIONS IN INCHES



13.3.07
J. B. [Signature]

ROYAL LABORATORY
DEPARTMENT



Über Klein-Kaliberschusse letzteren
von
Habicht Dr. Hettner.

1 und 2.

The "Stuntdynasten" used by the Russians and Japo differed little in calibre from the projectile used ultae by British Forces in the S.A. war. At short range the enormous hydrodynamic explosive power of the modern bullet caused the severest destruction to soft tissues & bone with large holes at entrance & exit, while marked splintering. The long tubular bones took place injuries to the skull were almost invariably fatal.

Over a certain distance, some 200 meter zone, the explosive power lessened, so that at 400-500 paces the bullet simply pierced the body with a round hole or slit at the entrance & exit. The last at a distance of 800-1000 paces, owing to the more irregular flight of the bullet became larger & at the same time the shattering effect on the diaphysis was noticeable. At 1000 paces the bullet frequently remained undivided & destruction of the bone seldom happened.

The large proportion of flesh wounds (during Japo-Rus. war) over those of joints, bones & vessels was very marked & was accounted for by the extraordinary smallness of the bullet.

Joints. It was observed ~~most~~ in joints as in other parts of the body, that at long range the entrance & exit were small & splintering, comparatively, seldom occurred.

Epiphysis In the great majority of cases simple holes were made with a tube like canal & no splintering.

Diaphysis At both long & short ranges in many of the diaphysis comminuted fracture frequently occurred.

3. No reference.
 4. The figures given in part 1-2 stand somewhat in opposition to the results gained by experiments with dead bodies. According to these the explosive power of the "ballmantel projectile" is lessened at a much greater distance - the bullet first remains embedded at 1600 metres. With reference to wounds of vessels the experiments on dead bodies show that "Gantel projectiles" cut sharply through the vessels - at a distance of 1000 m they tear them & beyond this the wounds take the form of sharp edged holes. In consequence of this one was led to suppose that bleeding to death from wounds of vessels would often happen in war but during the G.A. war the surprising discovery was made that soldiers wounded in vessels of the neck or coartencies, except at short range, rarely bled to death but recovered with a pre-dyspeptic prognosis. This experience received frequent confirmation during the Russo-Turk. war.
-

1

Mr. D. S.

4



Some results of Experiments with the "S" Bullet.

According to experiments conducted by Army doctors (Chief Surgeon Dr. Kranzfelder and Staff Surgeon Dr. Oertel) this new ammunition differs from the old one in its shooting power, form, weight, penetrating force, and more particularly in the expansion of the latter in its flight. "S" ammunition is a Vollmantelzeschossz. The mantel and kernels are made of the same metal, as the respective parts of the old one and they remain unchanged in form when going through obstacles. In 42 shots at bone, only one mantel reizer with flattened kern was to be found. This experiment was made when aiming at a distance of 1350 metres, at a thigh bone, the greatest obstacle in a human body (Linea aspera femoris) to which all the large thigh muscles adhere. This is the rock on which the old weapon and other Vollmantel geschosse of small calibre invariably make shipwreck. Experiments have been made with "S" ammunition by musketry experts on various portions of the human body, at a distance of 800 and 1300 metres. The following is the result of Dr. Kranzfelder's and Dr. Oertel's shooting trials:-

Although the "S" bullet may leave something to be desired when compared with other "Spitzogeschosse" (of greater length and weight) because of its shortness, lightness and lack of ~~the~~ capacity for wounding in some directions, yet , when one considers the distances which it can reach, it is a most excellent weapon, and quite satisfactory at even a distance of 1350 metres, which it has experimentally proved. It acts at a distance of 800 metres with a Ueberschuss of living power, which penetrates the human body, right through its strongest bony obstructions, and also succeeds in making most deeply seated wounds.

Lastly it is held that the "S" ammunition is available for distances which so far have been beyond the range of Infantry warfare.

oooooooooooooooooooo

Bran 6-06

From O.M.Z. (II) 12-12-1906. p. 1767.

On the question of the wounding effects of difference in calibre of small calibre rifles.

(Notes of experiences in the Russo-Japanese War, from a article by Major Dani, Austrian Military Attache, with Japanese 1st Army).

© 1906 by the Author

Major Dani, in conversation with Japanese officers, comes to the conclusion that the Japanese consider that the future rifle must be automatic, not so much in order to increase the rapidity of fire but to enable the soldier to continue firing without shifting his aim. The object of a new rifle will be to attain a straight trajectory for as great a distance as possible with a given powder and bullet.

As regards the calibre of the bullet the opinion of the medical officers did not appear to tally with the combatants. The former found wounds made by the Japanese rifle sufficient for this purpose; the latter say that they enabled the Russian wounded to return too soon to the ranks. Formerly the size of a bullet was determined by its capacity to make a man unfit for service for a long time and if possible for the duration of a campaign. This requirement, however, was not met by the larger calibre Russian bullet; and the course of healing of a wound, as was known, depends not so much upon the calibre as upon the part of the body hit and the distance at which it is hit. On this account Major Dani concludes that the object of the modern rifle will be simply to render a man unfit to continue fighting during the current battle; and not necessarily

necessarily for a long period during the campaign.

The question therefore is, what is the minimum calibre that will effect this? On this point Major Dani says that one has first to ~~consciously~~ consider what extent of wound will make a man give in and go to the dressing station or field hospital. His own opinion and experience is that no man willingly remains in the fighting line and will get out of it for the slightest wound. He instances this by the fact that men walked back wounded carrying all their pack and that one man received exceptional kudos for continuing fighting although wounded.*

Major Dani thinks that if this is the case amongst the Japanese then it is far more likely to be the case in European Armies, whose ranks are, by compulsory service, full of socialists, anarchists, and lovers of peace. These people, he says, will certainly show no desire to remain a moment longer in the fighting line than necessary, and therefore a very trivial wound will be made the occasion of getting out of it.

Another question however is closely allied to the above namely, does a man know that he is wounded at the time he is struck?

Major Dani brings forward instances to show that this is by no means the case and that a body of Japanese officers and men completely deceived the enemy by apparently going through a hot fire and showing no signs of being wounded, although at the end, when they halted under cover, forty out of the ninety were wounded, who were not conscious of being wounded at all, until they had arrived at that point. The fact of there finding out that they were wounded, at once had a stopping

effect,

* My own experience is that men who are seriously wounded, often walked back by themselves carrying their pack. I saw one instance of this, at any rate, during the battle of Mukden.

effect, and for the first time there was a sense of pain.

With these experiences Major Dani considers that the smallest of the small calibre bullet is quite sufficient for the purpose of making a man unfit for continuing the fight. He refers shortly to the complaint made by the Japanese that the Russians had used Dum-Dum bullets at Liaoyang. I reported on this at the time, immediately after the battle, and expressed the opinion then that the examples of wounds shown were easily explained by the explosive effects of small calibre bullets at short ranges. Major Dani now confirms this view on the authority of the Japanese themselves, who acknowledge that they were in error. At the time, however, Marshal Oyama, and especially General Fukushima and the Head-Quarter Staff, made a considerable fuss about the existence of these wounds, and declared them to be instances of the use of Dum-Dum bullets by the Russians.

Emblem

Specification of the new Infantry-ammunition
on War Surgery.

The fine arms supplied in 1890 have been retained for use with the new ammunition.

France in re-arming has aimed at improvement in the longer ranges - Germany on the other hand lays stress on the greatest effect obtainable at short range.

In most new forms of bullet the attempt is made to replace the so-called "ogivalen" pointed form by a cone shape.

The German "S-geochos" made in "mantel" & "kern" of the same material as the corresponding parts of the old one & retains in the same way its form after ~~penetration~~ in penetrating resistant bodies. Thus out of 42 bone shots only once was mantel & kern broken up & then in a shot at the Hiole at 1350 m in one of the most resistant parts of the human body the tibiae aspera femoris.

The penetrating power has been demonstrated as follows -

In dry pine wood at	100 m	... 60 (60) cm.
	400 ..	80 (48) ..
	800 ..	35 (26) ..
	1600 ..	10 (5) ..

Experiments made at the "Arms Trial Commission" on "anatomische Präparate" of human bodies at 800 - 1350 m. show first that the formation of wounds inflicted by various sharper & blunter pointed bullets varies but little from that inflicted by the Klein Kaliber - mantel geochos which is explained by the fact that the bullet retains its form regardless the resistance of the body - The grade

of the normal or the contrary, is affected in its breadth & depth by the sharp pointed bullet.

The unmodified possibility of the S. Gevolvers is apparently but little greater than that of the old "cylindro-ovivalen" or other longer & heavier "Spitz gevolvers".

If the S. Gevolvers in comparison with other "Spitz-gevolvers" of greater length & weight leaves something to be desired in its wounding power, it is still excellent even at 1350 m. as was proved at the trials.

At 600 m. it passes right through the body & its strongest bones are ^{capable} of inflicting further severe injuries ; by shots along the body, it has great penetrating power. A depth of 450 mm was noticed in compact muscle & in soft tissues up to 600 mm. The greatest penetration in corresponding resistance by direct shot was 380 mm. by indirect with complete ? cross placing of shot at entrance 150 mm in compact muscle. The length of the splintered area in the large tubular bones from the S. Gevolvers is nearly as great as from the old German cylindrical-ovivalen & other Spitz-gevolvers of greater length & weight of corresponding calibre. Thus the shaft of a powerful femur will be splintered for 160 mm., that of a strong radius 80 mm.

75
3
1485

Col. Macpherson R.A.M.C. says with bullets between .256 and .303, velocity is the important factor up to range where explosive effect causes, after that the part hit and the deformation of bullet.

Jap bullet seems to have been more fatal than Russian.

Desirable to ascertain:-

1. Minimum velocity to get explosive effect.
2. At same velocity whether ".256" or ".303" make different wound.

Col. de Frede, Russian Army, in Journal of Military Surgeons, U. S. A. says:-

Explosive effect of ".256" bullet on blood vessels noticed up to 150 - 200 paces. Bursting effect of bullet on ^{diaphyses to 800} epiphyses and spongy bones observed up to 100 paces, ^A on skull up to 200 paces, of the abdomen up to 200 paces, at 400 paces explosive effect hardly visible (*in abdominal wounds*)

75
12
1117

Shrapnel balls 41 to 1lb., 169 grains, diameter ".5", at extreme ranges to have striking energy of 60 ft. lbs., Ordnance Committee recommendation.

75
3
1484

A.M.D.2. asked "What striking energy necessary in rifle bullets .25" and .315" bore to produce similar effects to a shrapnel ball .5" diameter, weight 41 to 1lb, (171 grains) having striking energy of 60 ft. lbs.

A.M.D.2. replies he cannot say, experiments might help you to estimate.

1. Minimum velocity to give explosive effect.
2. Whether different sized bullets of the same velocity have different wounding power.

Unless explosive effect or bone splintering obtained, stopping power depends on part hit and deformation of bullet.

With small calibre bullets, he does not think size or weight matters, but that velocity counts.

75
3
1484

Bullets of .303" and .256" with velocities they have at 100, 200, 300, 500 yards were fired at lead jars filled with water. No explosive effect with either bullet with 500 yds. velocity. Effect of .256" at the other ranges tried, is same as .303" with velocity of 100 yds. shorter range.

A pointed H.V. .303" bullet of 151 grains with 2880 f/s velocity has less explosive effect on the lead jars filled with water than a service .303" bullet with 1518 f/s velocity.

On the other hand, a H.V. .303" bullet of 151 grains, with service shaped nose, and a velocity of 2736 f/s, has an enormous explosive effect.

77
15
4097

C. G. S. In favour of .315" bore, as against anything smaller.

M. T.S. says 7 powers have bores .3" and upwards, 4 powers have bores of less diameter. He encloses translation from Militar Wochenblatt,

Article by Surgeon General Korting in above paper, he quotes from "Wounds caused by modern weapons". Hildebrandt, Berlin. 1905". "Further experiments proved that the severity of wounds was reduced in proportion to the reduction of the bore of the rifle".

Kohler in "Modern Weapons" states that the Japanese Surgeon General Kikuzi arrived at the same conclusions. "The Italian Staff Surgeon Imbriano has also published an account of some recent experiments with the .256" bore, from which it appears that all wounds, even in bones are far less severe than those inflicted by rifles of medium bore.

In the Italian Campaign of Erythrea in 1896, the wounds inflicted by the 11 m.m. rifle of the Abyssinians were extremely severe, bones being pulverised, whilst in many instances individuals were hit several times by the Italian bullets before being put out of action. 80% of Abyssinian wounded came without assistance to the Italian Doctors who had been taken prisoners; and thousands of the wounds were quite

healed in a fortnight.

Ybarra remarks on the small amount of bleeding attending wounds inflicted by the small bore Mannlicher rifle in the Chilian War of 1891.

During the Insurrection in Cuba in 1896-7 the wounds inflicted by the Insurgent .45" Remingtons were extremely severe, while the Spanish .276" Mauser failed to incapacitate the enemy except in the case of wounds in the head or heart.

The effect of small bore rifles at short ranges is described as very great, but wounds in the fleshy parts of the body heal far quicker.

Kuttner considers the .303" bore the smallest permissible from a military point of view.

During a rising in Algiers 1901, the most serious wounds were made by .45" lead bullets, then by .393" hard lead bullets, lastly by .314" Lebel bullets.

In Russo-Japanese War 86% Russian, and 85.8% of Japanese casualties due to rifle fire. About 62% of casualties on both sides were slight.

The Muratu rifle bullet .314" had a very pronounced splintering effect when striking firm parts of the body such as the head, heart, stomach, and hollow bones, but there was considerably less with the Arisaka .256" rifle. Some eye witnesses assert this effect was produced up to 55 yards.

Among the Japanese in late war 1 killed (and died of wounds) to 5.82 wounded, or 1 dead to 4.73 wounded.

Among the Russians 1 dead to 3.06 wounded.

Aether considers it a matter for congratulation that their .314" rifle has not been changed for one of smaller bore.

D.G.A.M.S. 25.5.06 states Kikuchi is confirmed in his opinion by the War; the local and hydrodynamic effects of .256" at short range very great. It has more instantaneous effect than the Russian .3". Has heard that Germans get explosive effect with H.V. bullet up to 1000 yards.

A. G. considers .256" very small, suggests .315", .303", and .286" for experiments.

D. of A. arranges for experiments as at X of minute dated 15.1.07 by A.3. X. "It is very desirable however that a comparative trial should be made with the assistance of the Medical Authorities, against animals, of 150 grain bullets as under:-

A. .303" pointed bullets.

B. .303" bullets of present service shape.

C. .286" bullets of present shape.

The striking velocities to be those obtainable at ranges of 200, 300, 400, 500, 600, 1000, 1500, yards, with a M. V. of about 2600 f/s.

He states that the photos in 1484 and 1485 show that velocity is the deciding factor in producing hydrodynamic effect. Striking velocities at 100 and 250 yards viz:- 1900 and 1600 f/s produce explosive effect, thus bearing out Von Wredens statements about Japanese bullet. These velocities would be obtained at 350 and 500 yards with a 150 grain .303" bullet with pointed head. The pointed form of head has not such stopping power as the present form of head vide; 1484, minutes 6 and 14.

The above mentioned facts constitute a strong argument for a calibre of .256" against a .303", for with the latter, a pointed form of head is essential if a flat trajectory is to be maintained. The $\frac{W}{d^2}$ of a 150 grain .303" bullet is much lower than that of a .215 grain bullet viz:- .227 as against .325, and the pointed head is necessary if this defect is to be compensated for, whereas, with a .256" bullet of 150 grains, the $\frac{W}{d^2}$ is much less affected, being .314 as against .37 for the usual 162 grain bullet, and there is therefore less reason for departing from the cylindro-conoidal form on ballistic grounds.

D.G.A.M.S. appoints Lt. Col. Wright. R.A.M.C. to carry out programme associated with one or D. of A's Officers. It is possible that these Officers could extend their observations to other interesting and still disputed questions.

C. S. O. F. states. It is presumed that past trials against animals will be looked up before the present trials are undertaken; it seems at least doubtful whether any useful conclusions will be arrived at from them. There have also been many previous discussions of the man stopping question, e.g. S.A. Committee, Minute 574, these no doubt will also be considered. Col. Wright has joined here and has been informed. It is suggested that the Officers should meet here or at the War Office and draw up a programme.

Commandant, S. of W. states. I will arrange that Major De la Bère, Experimental Officer, S. of W. shall attend this meeting when a date is notified.

Any further communication on this subject should be addressed to—

The Secretary,
War Office,
London, S.W.,
and the following number quoted.



War Office,

London, S.W.

Confidential

66
15 A. M. D. 1.
4097

23rd November 1907.

Sir,

I am directed to acquaint you that Major M.P.C. Holt D.S.O., R. A. M. Corps has been detailed as a member of a Committee conducting experiments at the Royal Arsenal Woolwich.

Major Holt should be directed to place himself in communication with Colonel G.G.A. Egerton C.B. School of Musketry Hythe, President of the Committee.

I am,

Sir,

Your obedient Servant,

J.M. Lewis
Ldn
J. M. L.

The General Officer Commanding in Chief
Eastern Command.

Major M.P.C.Holt, R.A.M.C.,
u/c A.M.O., Woolwich District.

For information and necessary action,
please.

C.R. Tonrell

Lieut-Colonel,
S.O. to P.M.O. Eastern Command.

London, S.W.,
25/11/07.

Major M.P.C.Holt, R.A.M.C.

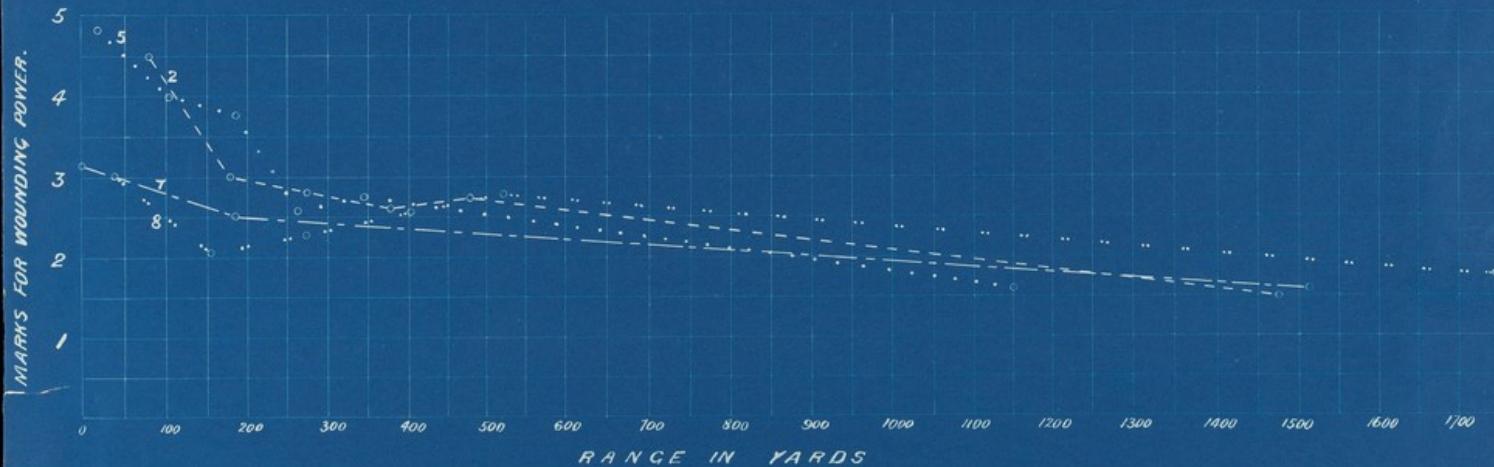
For your information and necessary action, please.

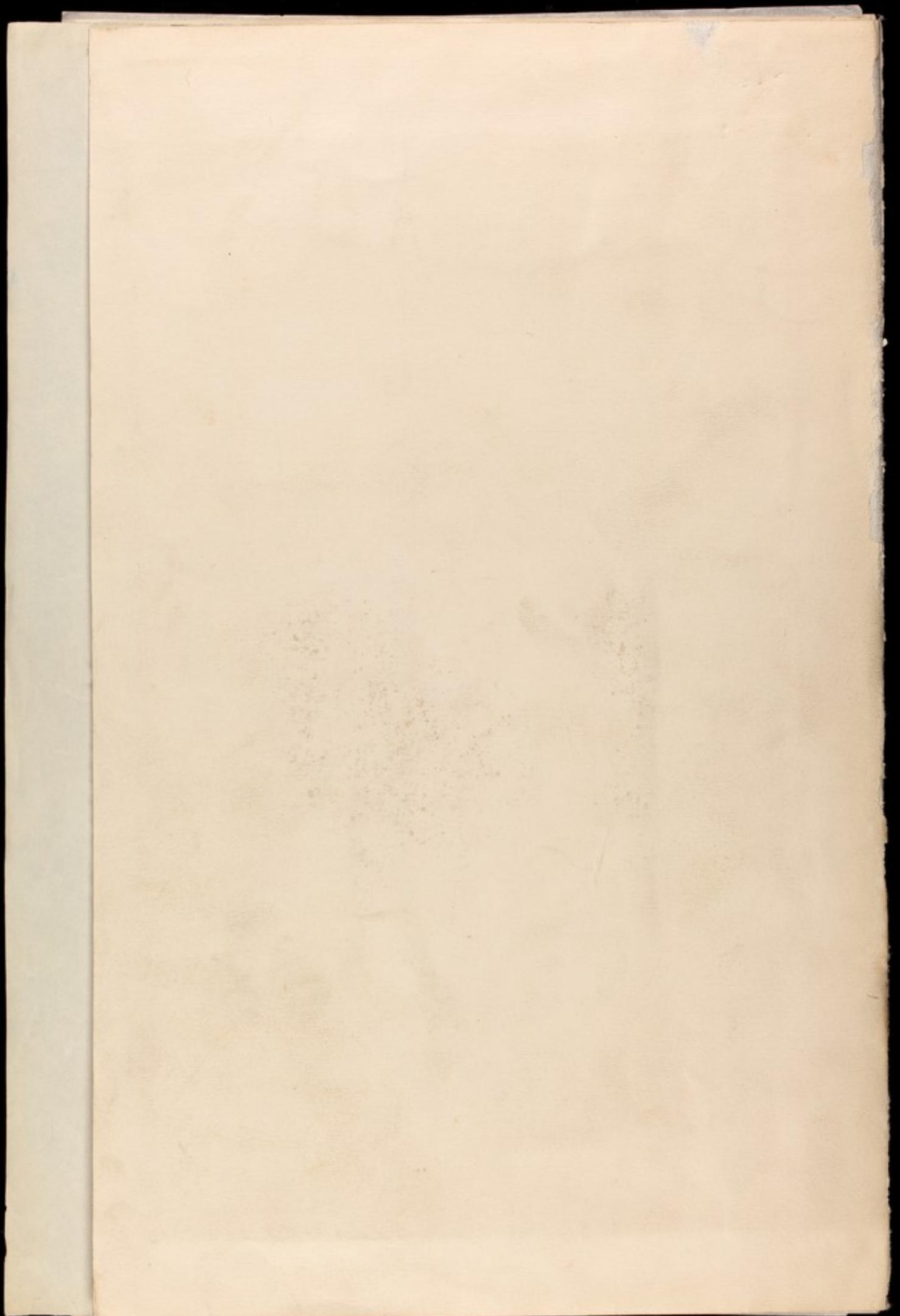
D.Wadsworth

Colonel A.M.S.
A.M.O. Woolwich District.
Woolwich.
27/11/07.

DIAGRAM SHEWING WOUNDING EFFECT AT THE ACTUAL RANGES THAT
WOULD BE ATTAINED BY THE BULLETS WITH THE REMAINING VELOCITIES
WITH WHICH THEY WERE TRIED.

N^o2 BULLET, .303 BORE, POINTED, WEIGHT 150 GRS = -----
" 5 " .256 " ROUNDNOSE, " " " =
" 7 " .303 " " " " 215 " = -----
" 8 " .256 " POINTED, " 150 " =







Copy of a D.O. (Confid) letter from Lt. Col. W. Fison to Col. B. 22.12.09.

Officer men still continue to be invalided home quite unnecessarily, such as the following instances show:-

a case of ununited fracture of clavicle wh. could perfectly well have been operated on in India was sent to England.

a case of tumour 5".

a case of debility after fever

a case of Cataract 2.

a case of debility, who was perfectly well when I saw him examined him, and acknowledged to be so by the M.O. &c, he was returned to duty.

These are only a few cases brought directly under my observation and judging by the very great diff. in the percentage of invalidism from different divisions I fear there is a great deal of unnecessary invalidism still going on.

Govt. having provided specialists, first rate op. & conv. Deptt. naturally expect us to make every use of them and where it is absolutely necessary, are invalids to be sent to E.

To send trivial cases home for op. reflects no credit not only on our surgical specialists but on the R.A.M.C. generally, many of whom are languishing for operation, the same applies to medical cases. Convalescence so splendidly in the hills and it is only in very exceptional cases they should be invalided.

Instruments and Medical Stores.

In almost every hospital I inspect I find the medical store much neglected and much work that should be done by W.O.'s delegated to medical. The expense book and inventories do not agree, large quantities of store are not accounted for at all. Medicines are indicated for while ample balance are in hand with the result that great waste and deterioration goes on, for instance C.H.L. over two years old was found in one hospital while every succeeding year more has been indicated for than could be used.

I frequently note drugs over ten years old are still retained. Spongiophilus generally exists in quantities far in excess of requirement and often cannot be traced in the books. Cocaine is a drug that requires careful

watching, in some instance arms are asked for.

Instruments.

Where there are Op. R's they should be kept there, & should be in charge of a Conv' Offr. - generally speaking, they are in a most disgraceful condition, put away, dirty, and daubed over with vaseline by a wardswoman, who on no account whatever should be allowed to touch valuable instruments. Silver and green catheters are all treated alike with vaseline. Steel sounds which should have the smoothest possible surface are often eroded with rust, and sand has been used to clean them. The rubber appliances are generally well looked after. I fancy they are best preserved in traps containing a tray of water at the bottom.

Some wool slant packages are opened one after another, till in some cases 2 years have been opened, and the contents are deteriorating from exposure.

Antitoxins & vaccines. . . I frequently find there has been neglect with regard to replacing these when past their recognized age of efficiency. The use of old antitoxins & vaccines is most reprehensible, the instructions as to their use often cannot be found - and in one instance improper use was associated with a fatal result.

Antityphoid inoculation. Jane McO's have gained a great reputation by the way they have worked at this subject and have inoculated nearly all their men, while others are doing nothing, some seem to expect that a specialist will come round and do the work for them. The results so far have been so favourable that inoculation of all British soldiers and his animals should be done as a matter of course.

W. St. Sheets. These should always be kept at St. H's or Regt. Rms as often as not they are still at the O. Rm & instructions contained in para 1914 K.R. are not carried out.

Purveyors Stores. The quantity of stimulants lying in these stores represents a very large expenditure which I think is unnecessary. The last St. H's I inspected kept none, & the O.C. informed me he never wanted any, my opinion entirely coincides with his. i.e. that wine - spirits & beer are a luxury, & not a necessity.

Bedding. I frequently find stained - badly washed - not properly washed for several cases.

boards. prescriptions should always be written in ink. In two

instances I have called for the book and have could be found.
Working patient is often neglected also the arms of bedding.

Report on the X-ray apparatus outfit at Ambala.

The outfit at Ambala has not turned out useful Skiograms of any of the deeper parts of the body; but with a long exposure ^{as a rule} it gives ~~satisfactory~~ useful Skiograms of feet - hands - occasionally of wrist joints - & more rarely of elbow joints; whereas shoulders - hips - knees - chest - head cases - have ~~frequently~~ been ^{generally} ~~unavailable~~ failures.

At the same time

~~invariably~~ Almost any sort of inferior Skiogram will give some, even though very hazy, indication of gross lesions - but it is these very cases that are but seldom in doubt; but on the other hand to get indications for treatment or prognosis in cases of doubtful nature - obscure obfuscation - fractures in bone - aneurysms - renal or ureteral stone & very many others much more is desirable unless cases are to be sent home for this purpose & government thereby put to much needless expense & the patient to much needless, maybe permanent, suffering and injury.

I can not do better to prove this point than by calling attention to the Skiograms made "Ambala" which have been quite lately received - & asking that they may be compared with the others not so marked - many of which were taken by little myself.

or by a Corporal Raine working under me at Warwick with his ~~supplementary~~ training before that he received during the short course at Hullbank and in my X-ray room at Warwick : ~~some~~ ^{the} others were taken by Mr & Mrs Bruce Raine in Dublin.

In comparison with the above ~~are~~ ^{accompanying} the sketches of the wrist (ambala) taken in the case of an Officer with obscure but undoubted injury to the wrist joint ~~they~~ are large indications of a sort of much release.

- (2) Those of the knee joint would be of no use if suspected true injury were being investigated (this is regarded as a rupture of patellar ligament)
- (3) Those of the elbow joint, - a case of doubtful obscure injury, are quite worthless for the purpose in view.

The apparatus as ambala is in reality ^{only} part of the outfit designed for field use. and is calculated to be portable ... To limit the needs, in this matter, of a whole division ~~by the aid~~ + during peace time over perhaps a long series of years - & covering maybe many hundreds of years to the ideal of a portable field kit is not by any means advisable - further, experience has proved that X-ray apparatus is of doubtful if any real use in the actual field - it can be of no use of to any advantage in base hospitals and a slightly heavier kit could quite as easily be taken there. To assist the Doctor who is consulted in difficult cases to get any useful opinion I think the following outfit is the minimum -

and this opinion is based on continuous experience and daily work with Stenography for just ten years and covering not less than 2000 cases.

18" Coil with necessary accumulators - and also space left for use whilst fish set being charged and to cover casualties.

Mercury break. Some operators prefer electrolytic break -

Couch or table with parchment screen window etc - fitted with mechanism for taking accurate stereoscopic plate -

"tubes" - not less than four. Very good work can be done with "Record" tubes - though hearing tube are undoubtedly better.

Localising apparatus - for foreign bodies - though if stereoscopic work is understood many surgeons dispense with this.

Plates - only good plates are worth using - only too often the work at Ambala has been uttered from defective or old plates - good ones seemed to be un procurable locally - Direct supply from a reputable firm in Madras would seem like the only alternative.

The feeble apparatus at Ambala necessitates an extremely long exposure - as much sometimes as 5 or even longer minutes - and to attempt to make an injured patient

perfectly
keep still

~~stand~~ for this length of time on a hard plain table is as
wasting time for the man begins to shake and move from
pain & fatigue - This is obviated by a proper couch - of
canoe - or fitted with sections cushions, and by the shorter
exposure - seldom indeed 120 seconds - requires of the
most powerful apparatus.

None of the Skeagrams sent for comparison were taken by any
more elaborate apparatus than that mentioned above. & all
the apparatus are those supplied ^{by the} War Office at the
hospitals named.

As to the portability of the apparatus - this is a very
peculiar question. Recently the apparatus was sent to
Dagkhai - taken personally by a fully skilled officer & men,
as I predicted at first likely, - it was quite useless like it
reaches there & for no result. The patient having subsequently
to go at his own expense to Simla - & then again the case
(Elbow joint) cleared up - ^{more} recently it was brought to Karauli
one day one Skeagram of a damaged ankle was taken
& then the machine part broke down & the remainder of
the work was useless - any Skeagram of a big bone as information
But again I have personally taken & know that Lt. Bruce

by rail

often enough took the whole of the apparatus alone all over Ireland.

I am most strongly of opinion that at all times the X ray apparatus should be present in the station where ^{there} is the surgeon who has to decide on treatment, & undertake ^{the} responsibility of giving opinions. It is of course his personal direction that he can get Skeograms taken precisely in such a manner as to give him the information he should be capable of interpreting. If at all busy and occupied with surgery he personally can not make the time to carry out the minor details of the work and developing of photographs - this can be well done ~~as~~^{even by an unqualified} person ~~but~~^{not} a surgeon. In the reading of skeograms correctly needs much experience otherwise the so called "fallacies of X rays" arise - & these are as frequent as those due to faulty position of the patient or fracture of the tube - If the outfit is at another station it is frequently impossible - or at any rate possible at great expense, to get such fresh skeograms taken & to have to clear up cases. Has the apparatus been in Karralil I should have had fresh plates taken of all the three cases recently taken at Ambala - ^{but} now the cases are all there up here.

Since my experience of the X ray work in Ambala has been mostly disappointment, and its been of little assistance as a rule - For the first few months the apparatus from one reason

or another was ~~generally~~ out of action - or at best some
nasty ~~bozphorus~~ ^{bozphorus} of a bone or two with ~~keyhole~~^{keyhole} too or
three others no produce which was perfectly useless.

An instance of defective plate can be seen in ^{the} plate sent
with this report - (table at Kasauli) but unless they have since
been destroyed many such can be seen at Amritsar

If all cases of doubtful injuries are to be cleared up and
to save future expense to Government, as is fracture are
to be controlled during war, as is almost invariably done
at home, and so perfect ~~was~~ ^{was} fracture caused a
considerable large amount will be required to cover the expense
of plates. These if bought in England - (and - I bought one
in Fort. St. George will cost no more than the original price in
England; but if bought locally are very expensive & less
the generally bad.

The Officer working the apparatus at Amritsar recently
reported that he was quite unable to get any results trying
to work an old injury to the lower jaw with ^{his} ~~the~~ outfit -

Enclosed prints of some head & a jaw which show what
can and should be done with ordinary serviceable apparatus.

Of course it is quite impossible to diagnose ~~any~~ ^{any} ~~abscess~~^{or necrosis} bone - case
& vertebrae - or early malignant disease in bone with inferior work.

Kasauli also a really good skin graft only care enough an emphatic
46th Aug. 05. negative diagnosis of bone injury to be first.

Copy

Report on lighting, heating and ventilating arrangements of the
Operating Room, Station Hospital, Amballa.

The lighting by night is not good, a portable Acetyline lamp over the operating table is provided, this I believe was designed for tent use it is not suitable for use in a brick or other solid walled building by reason of the abominable wellknown smell that comes from its use, the air in a theatre should be as fresh as possible, both for the patient and for all others necessarily present: the acetyline lamp gives a good light, not better than many oil lamps I have operated with, it is, however uncertain in illumination, jerky at times and has been known to fill the theatre with black soot more than once: it does not light up the rest of the theatre, consequently the various assistants, nurses and others cannot see what they are doing and things of the utmost value, not being then and there replaceable, are knocked over, broken or soiled on the floor, therefore it is necessary to add ordinary wall lamps at various places in the theatre, these have to be borrowed from the wards, and, if late at night, are found empty and there is much difficulty in getting oil from the store which is locked up and the key-holders not to be found. When an operation takes place at night it is always a matter of urgency and without previous warning and delay of an hour or two may suffice to turn the scale against the patient. All this should be obviated by having one large operating table lamp, and four bracketed wall lamps on charge, kept constantly filled and trimmed ready for immediate use, under lock and key in care of the Surgeon or Operating Room Sister.

Ventilation of the Operating Room does not exist, it does not appear to have been considered, though a window or two can be opened, but these are such that an undesirable view is given to the road close by, moreover during the cool weather when the theatre is constantly in use to open ~~one~~ of these large windows means a rush of so much cold air, especially at night, as to dangerously lower the temperature, they would also let in flies and could not be covered with fly-proof gauze without destroying their original purpose. If one attempted to accurately describe the state of the atmosphere in this theatre on either the 6th or 9th inst: when urgent Appendix cases had to be operated on after sundown one could fairly expect to be accused of gross exaggeration: it was with difficulty that any of us could respire without coughing, we could not see across the theatre, and the patient was continually coughing and choking: these were the ~~combined~~ effects of Acetyline lamp, four ward paraffin lamps, Primus stove for steriliser very free formation of Phosgene gas from presence of chloroform vapour in contact with naked flames, steamy vapours from boiled towels and gowns, the respiratory exhalations of (1) patient (2) surgeon (3) anaesthetist (4) assistant (5) nursing Sister (6) (7) two orderlies besides two or three onlookers including the Asst: Surgeon on duty, and all these influences were in a room where there was no ventilation and when the temperature outside was but little over freezing point. The P.M.O. has before now complained of the atmosphere in the theatre by day when there was a warm sun outside and a window could be opened with safety, but the state then felt falls far short of what it becomes at night time.

In continuation of ~~tentatives~~ of ventilation must come that of heating there is no heating apparatus in this theatre beyond that offered by lamps and steriliser heaters which of course burn up the air in the theatre and discharge their products into the room. Many, if not most Surgeons on the Continent of Europe and in the British Isles as well as America recognise the absolute danger of opening the abdomen, or doing any major surgery, especially in partially collapsed patients, at a low temperature whereby shock is enormously increased if not actually induced. Some prefer a temperature not below 75deg - 80deg Mar: before they will open the abdomen of a patient ~~with~~ an intra-peritoneal catastrophe, and here one must operate at a temperature of 40deg - 45deg Mar: All this dangerous condition of affairs could be rectified by a simple set of hot water pipes round three sides of the room and eight ventilators in the wall, much the same as any man growing valuable plants at home would have put in his greenhouse. Gauze fly-guards should be fitted to every door and ventilator, just as has been done to cookhouses. It is equally important to keep out flies from an Operating Room.

Suggested requirements.

(1) Artificial lighting.

Provide one large hanging lamp, say Ditmars (fig 6875) Rs 75.

" Four bracket ^{wall} lamps, Rs 15 (about)

Credit the cost of the Acetyline lamp by taking it on charge for field units.

(2) Heating apparatus for room temperaure.

Put in two radiators of sufficient size to raise the temperture of this room from below 40 Far. to 75 Far. within 1½ hours. Rs 400(about)

(3) Ventilation.

Put in eight ventilators, ~~ofesbe~~ opened and shut from inside, protected by flyproof gauze. (size 30/15 inches) Rs 6 (each)

(4) Fly proof doors outside theatre door.

Rs 40.

Amballa.

Major. R.A.M.C.

S.H.O.

Ambala.

The following criticisms on plan
of operating room forwarded in compliance
with request of A.C.R.O. Ambala.

1. The lighting window space is
inadequate, nobody but a Surgeon
who has been in difficulties
owing to want of light can
appreciate the dangers which are
thus unnecessarily caused.

a. There should be large windows
on three sides of the theatre as
already built in the theatres at
Ambala.

2. The heating apparatus should
be a radiator or two radiators -
not an open fire place: the
dangers are to naked fire or
flame coming into contact with

be seen in any manufacturers or instrument maker's catalogue should be fixed up in place of basins. I sent a photograph of what was done by the Royal Engineers at Woolwich for the R. Herbert Hospital to the A.C.R.E. Ambala lately, a similar but smaller apparatus was put up by the R.C. at Royal Infirmary Dublin

d. Substitute modern hand-washing apparatus for so called aseptic basins.

5. Is there any slope planned in the floor of operating room? A sufficient slope should be given to allow of free swelling down, with an outlet at lowest point: this is a very necessary provision and costs

costs nothing if allowed for during construction.

- e. Slope floor sufficiently for swilling down.
- f. Fly proof gauze should be fitted over all ventilators or parts of windows that open for ventilating purposes, also fly-proof doors over the doors. The role of flies as dirt carriers is quite recognised in the matter of food supplies. It is impossible to prevent flies settling on a piece of exposed intestine, or on the surface of an exposed joint occasionally when they get into a theatre, and yet a momentary contact on either the patient or on an instrument may be enough to set up virulent *Escherichia coli* infection.

g. Put fly-guards to

blow bubbles with
lighting.

to ventilators and doots.

7. The space in the theatre is inconveniently and unnecessarily small, inconvenient owing to the hindrance afforded to the people working in the theatre due to insufficient floor space, and unnecessarily if not dangerously small from the point of view of breathing space. At any ordinary large operation there are necessarily present :-

1. Patient.

2. Surgeon.

3. Surgeon's Assistant.

4. Anæsthetist.

5. Theatre Sister or Nurse.

6} At least two orderlies to do the necessary fetching and carrying

8} 9} Generally at least three
10} onlookers. Medical Officers

and

9. In the case of Divisions or smaller units being separately engaged, the above principles will be adhered to as far as circumstances ~~will~~ admit, the senior officer of the A.G's branch of the unit present being responsible for the arrangements.

When formations remain in the vicinity of a battlefield, the number of troops mentioned in paragraph 8 should be, if possible, increased, and every endeavour made to clear the field without delay.

10. When circumstances do not admit of troops other than those of Medical Services being employed, Medical Officers in charge of parties will endeavour to carry out the instructions in paragraphs 4-5 and 6 as far as possible.

(sd) A.Cavendish Colonel,
for Major General.
Adjutant General, Expeditionary Force.

23/8/14.

Se agne. Peccatas quiescere sicut collum tu secum sit. Et
tunc secundum modicam tuam agitatem et illius negligenter evocis est
quiescere. Tunc ad te monstra d' A et te recipio vocem et tunc
admetuere et id cedimus.

redire ostenditur ad te quiescere et tu nescias neque oportet
mea resonemus. si dicesque it et binome d' Amorem tu nequit oportet tu
valde tristia habere oportet enim invenire que
Iscidam tu secum quis sentit agere tu tunc non est secundum modicam tuam . Et
illius negligenter agitur ut secundum modicam tuam . Secundum quiescere
est ut tu secundum modicam tuam et tu vivas ut respondebas
si dicesque se

ferolet deinceps. M. (sa)

ferolet rotam non

ferolet granitum et latonem et ferro. SA

✓ 1875

Clement & Battlefield.

NOTES ON THE DARDANELLES.

2.

The historic Interest of the Straights.

Some particulars are here added to the previous notes on Troy. Probably the most artistic find of Schliemann was the Metope or stone relief of the Sun God, Apollo; this belonged to the Greek Ilium of 700-0 B.C. and is 6½ feet in length and 2 feet 10 inches in height. It shows the god rayed and crowned springing forth from the gates of day and driving a team of chariot horses. The calm mastery of the driver and the straining eagerness of the horses are features which belong to the noblest specimens of Greek art. The relief was taken by Schliemann to Athens. Schliemann also discovered what he believed to be the treasure of Priam, this contained among other finds a round copper shield, a copper cauldron, a globular bottle of gold, several cups of the same metal, (one a splendid specimen of Homer's two handled cup), some silver knife blades and vases, gold diadems and ear-rings, also lance heads and axe heads of copper. The inscriptions found in the excavations are chiefly of a late date and most of the coins are belonging to the early centuries of the Christian era; they are chiefly copper coins of neighbouring places such as Ophry-nium, Tenedes, and Alexandria Treas, (the Treas of the Acts of the Apostles C.xvi), and not later than Constantine 2, that is about 350 A.D. The shells and small mussels found in the upturned soil were regarded by Schliemann that the Trojans were very fond of shell-fish. The site of Troy ceased to be inhabited after 500 A.D.

2. The Greek Ilium or Troy was visited by Xerxes, King of Persia when setting forth to conquer Greece in the Spring of 480 B.C. He bivouacked with his immense army at the foot of Mount Ida. On reaching the Seamanter (says the Greek historian Herodotus) Xerxes ascended the Pergamus of Priam since he had a longing to behold the place.... He made an offering of a thousand oxen to the Trojan Athene, while the Magians poured libations to the heroes who were slain at Troy. The night after a panic fell upon their camp, but in the morning they set off with daylight and skirting on the left hand towns of Rhoateum Ophrynum, and Dardanus which borders on the Abydos. Rhorteum (the modern Intore) was situated east of the tomb of Ajax which can be seen today on the ridge of Rhorteum promontory. Ophrynum lies near (possibly on the site of) the modern village of Erinkeyu (Ronkoi) which even in its present ruined condition reminds one of a stone built village in the north of England. Standing high on the North of Troy, it is a conspicuous landmark when viewed from either Hihhanlak plateau or from the entrance of the Straights. Here lived for years before the war a hard-working and prosperous community of Greeks. About the time when Turkey entered the War, the Turisk Military Authorities after only a few hours notice expelled the inhabitants and systematically destroyed the houses. The villagers were driven down to the beach and after a fortnight's exposure they were deported by sea to Greece. Near the road there is a charnel full of bones of the ancient dead of Erinkeyu—a gruesome feature occasionally to be seen in Greek villages. Dardanus, the third place mentioned by Herodotus was situated probably on or near, the site of the ridge which is so named today and which looks over to the Straights about five miles south of Chanak. Lastly Abydos is probably to be identified with the modern Nagarea promontory from which the famous bridge of boats (a kind of pontoon bridge) constructed by Xerxes spanned to Helles Pont and Sestos on the opposite coast. It was from Abydos that Leander used to swim across the straits to visit Hero the priestess of Aphrodite, at Sestos. The legend relates how one night he was found drowned on the shore by Hero, who threw herself into the sea and was also drowned. From Abydos the poet Byron, a passionate lover of Greek legend and literature, swam across the Helles Pont in imitation of Leander's feat. The story of Xerxes expedition is one of the most famous in history. He sat on a throne of white marble and watched the crossing of his colossal army even then numbering according to Herodotus, and not counting later accessions, one million, seven hundred men. The bridges consisted of ~~heata~~ 360 boats on the north side and 314 on the south side joined together and moored with great anchors, a gap was left in three places to give passage to small craft. "When all this was done, they made the cables taut from shore to shore by the help of wooden capstans...trunks of trees were sawn into planks... brushwood was arranged on the planks...earth was heaped on the

brushed and the whole stamped down into a solid mass".(Herodotus).
The expedition so ambitiously conceived ended in disaster. In the bay of Salamis near Athens the Persian fleet was defeated and the following year 479 the Athenian states in Greece had been united and had saved the Western world from the Eastern invader. But 50 years later the straits were the scene of an Athenian defeat. It was the climax of the Peloponnesion War which had gone on for 25 years between Athens and Sparta for the supremacy of Greece. At Agespotami(Geats Stream) a few miles north of Sestos, where the Athenian fleet had disembarked, Lysander who commanded the Spartan forces inflicted a crushing defeat upon the Athenian forces with the result that Sparta became the supreme state in Greece. Lysander's base was at the town of Lampsaeus(the modern Lampsaku) on the opposite coast to Gallipoli.

3.

Gallipoli was the first European town to fall to the Ottomans, who secured it nearly a century before they captured Constantinople in 1453. The Byzantine Emperor John Palaeologus to comfort himself for its loss said "he had only lost a jar of wine for a sty of hogs". Nevertheless it was an ancient fortified town and a part of great value owing to its position on the route from Brusa to Adrianople. Hardly any traces or monuments of the old town have been preserved. One further event of ancient history makes the Straights famous. In B.C. Alexandra the great king of Persia, crossed from Helles Pont and won a victory over the Persians on the river Granicus which enters the Straights near Lamsaki, and commenced operations which ended in the conquest of Asia as far as India.

4.

The name Helles-point, which was the ancient name of the straits of the Dardanelles (so called from Dardanus, the first King of Troy) arose from the following legend. Helle the daughter of Athamae, King of Orchamom Bocosis was carried off along with her brother Phrixus by their mother Nephele(Cloud) on a ram with golden fleece, the gift of the god Hermes. Phrixus was about to be sacrificed and Nephele rescued him, taking also Helle with her. Between the Sigaeanum and Cape Helles, Helle fell in to the sea, which was henceforth known as the Helles point or the sea of Helle.

R.Martin Pope.
(Staff of Civilian Adviser on Education).

NOTES ON THE DARDANELLES.

TROY.

The story of Troy is one of the most famous in the world. Even to many who have never read a line of Homer or Virgil the name is familiar and they know that the ten years fight between Trojans and the besieging Greeks is the subject of the greatest epic poem in literature, the *ILIAD* of Homer. The title of this poem is based on the ancient name of the town, which was Ilium or Ilies. It was also known as Dardania, from its founder, the Trojan King Dardanus, hence the name of the straits known as the Dardanelles. Dardanus lived at the foot of Mount Ida, (not to be confused with the mountain of the same name in the Island of Samothrace): Ida is the "many fountained Ida" of Tennyson's Poem *OEnone* and the poet draws the epithet direct from Homer. It is the snowy height which dominates the horizon S.E. as seen from the Hill of Troy. The founder of Troy was succeeded by Eriksenius, Tros, Ilus, Laemondon and Priam.

(A) The chief heroes of the great conflict may be mentioned for the purposes of reference. On the side of Troy stands Priam, sixth and last King of the city. The Queen is Hecuba and their son Hector is the leader and champion of the Trojans: Hector's wife is Andromache and their son is Astyanax. Paris (also called Alexander) is another son of OEnone and as the ravisher of Helen was the legendary cause of the Trojan war. Another member of Priam family is the faithful figure Cassandra who was endowed with the gift of prophecy but as a punishment for her rejection of the passion of Apollo it was ordained that no one any more should believe her prophecies. Along with Hector is to be mentioned ~~is to be mentioned~~ AEneas, the son of Anchises and the goddess Aphrodite. AEneas was one of Troys greatest defenders and the hero of Virgile majestic epic, the *Aeneid*. on the side of the Greeks we may mention first Agamennon, who was the Commander in Chief, and the King of Myconao, an ancient town in Angolia, southern Greece, whose magnificent remains were discovered by the excavator of Troy, Schliemann.

(Note the epithet "Nyoermean" which denotes the period 1500-1000 B.C. to which Troy also belongs). Agamennon's brother was Menelaus whose wife was Helen, the greatest beauty in Greece. The abduction of Helen by Paris led to the expedition of the Greeks against Troy. The chief actor in the Trojan drama, however, was neither Agamennon nor Menelaus but Achilles the champion of the Greeks and captain of the Myrmidones, a body of Thessalian warriors. His friendship with Parriclus is as famous as that between David and Johnathan and the death of Patroclus at the hands of Hector is one of the moving incidents in the *Iliad*. The desire of avenging the death of Patroclus led Achilles into the field after a long period of inaction due to the slight which he believed Agamennon to have inflicted on him. Other Greek heroes are Ulysses(Greek-Odysseus) the hero of Homer's *Odyssey*, King of Ithrace and the most resourceful and crafty of the warriors who fought against Troy: and Ajax son of Telemon(in Greek Ajas) who was defeated by Ulysses in the combat for the armour of Achilles: he is always represented by Homer as second only to Achilles in bravery.

The chief deity of both Greeks and Trojans was Zeus (Latin-Jupiter from Dyaus-piter sky father), the father of Gods and men, whose home was Olympus, the highest mountain in Greece, but who watched the conflict of Troy from the heights of Ida. The issue of the fight was largely determined by the relationship between the deities who befriended the heroes on either side. An appeal to Zeus either delayed or prevented the success of the combatants. Athene(Latin-Minerva), the goddess of wisdom and knowledge whose symbol was the owl, was the defender of the Trojans: while Hera (Latin-Juno) the spouse of Zeus was hostile to them. Aphrodite Latin-Venus who received the prize from Paris (see Tennyson's *OEnone*) was naturally supported the Trojan cause, while Poseidon (Latin-Neptune) was an implacable hater of the Trojans. In reading the *Iliad* we are constantly in touch with this super-natural background, the action and interaction of the celestials in the course of the struggle affecting the issue of individual combats and the destinies of the heroes.

(B) The legend of the taking of Troy,

There is no legendary literature so rich as that by the Greeks. Around every name that has been mentioned above lies the halo of romance. Each hero and heroine has a history full of picturesque episodes which have

been wrought into the lore of antiquity and enrich the undying record of "old unhappy far-off things and battles long ago".

It is impossible here to reproduce in detail the vivid incidents of the conflict on the plains of Troy as depicted by Homer. The taking of the city was due to a stratagem which is said to have emanated from the fertile brain of Ulysses. He pretended that they were making preparations to sail away from Troy and withdrew their ships to Tenedos. The Trojan plain was to all appearances evacuated, but an extraordinary image in the shape of a wooden horse could be seen from the town walls. In this the

Greeks had hidden a company of their brave warriors including Menelaus and Ulysses. The Trojans regarding it as a gift of the gods were prepared to take it into the city. Laocoön a priest of Apollo tried in vain to dissuade them. He flung his spear into the flanks of the horse which appeared to tremble under the shock and to emit an unearthly groan, and as if the gods were indignant at this daring sacrilege, Laocoön suffered a terrible fate. As he was preparing to sacrifice to Poseidon two hideous sea serpents swam ashore, coiled on Laocoön and his two sons and destroyed them. The living story of a captured Greek called Sinon sufficed to allay the superstitious fears of the Trojans, who drew the horse into the city. At midnight the heroes were released by the help of Sinon and set fire to the Trojans houses. In the end the city was totally destroyed, the chief warriors including the aged Priam slain, and the women and children taken captives. Helen was recovered by the Menelaus; her little son Astyanax was hurled over the city walls and slain; Cassandra was assigned to Agamemnon. (those incidents form the subject of Euripides' most pathetic drama "The Trojan Women"). But Aeneas escaped to find a new Troy on the banks of the Tiber, the famous seat of the world empire of Rome and the story as told in Virgil's immortal epic, the Aeneid.

C. The meaning of the legend.

The story is not all romance, nor wholly the creation of the vivid Greek imagination. It has a historic basis. Standing on the plateau of Hissarlik you look down on a plain which thousands of years ago did not extend so far into the waters of the Hellespont as it does today. The peninsula of Gallipoli here runs out at Cape Helles - for ever famous in British honours. To the left of it you see Imbros, above which rises the Mount Ida of Samothrace.

Further to the west stand out the summit of Mount Athos or Monte Sante, famous for its monasteries and for the traces of the great canals which Xerxes built at its northern base, in order to avoid sailing round the stormy Cape Athos. Returning to the plain, on the right you see the Promontory of Rhoetoum with the sepulchral mound (or tumulus) of Ajax; exactly opposite, at the foot of Cape Sigaum, is the tumulus of Patroclus and on a spur of the same that of Achilles. To the left of the latter on the promontory itself is the village of Yenishche, in the plain still flows (though on a different bed) the river Seamanter, which is near the village of Halil-eli. This is joined by the equally famous Simois, so familiar to the readers of the Iliad. The position of Troy is unique. It is as de Loaf says, the natural meeting place for the traffic of the Black Sea with the Aegean. The lands about the Euzine (as the Black Sea was called by the Ancients) furnished the chief wheat supply to the city states of the Aegean and Greece. Troy was thus "a fort", a palace and a warehouse".

D. The site of Troy and the romance of its excavations.

There has been some controversy as to the exact site of the ancient fort or town of Troy. The solution narrows itself to two alternatives.

I. The N.E. point of the plateau of Hissarlik and

2. The heights of Bynarbashi, some 3½ miles to the south.

The claims of the latter site were strongly supported by Le Chevalier and others. But the majority of competent critics believe the question was settled once and for all by the researches of the German Archaeologist, Dr. Henry Schliemann. The story of his excavations reads like a romance; it is told in his "Troy and its Remains", which has been translated into English. In his boyhood Schliemann suffered great privations and hardships. But by sheer energy and commercial ability he rose to a position of wealth and at the age of 41 was able to devote resources to travel and research. He taught himself Russian and other languages and finally acquiring the Greek language, he gave himself up to the investigations of the remains of the Homeric civilisation of Troy and Mycenae, thus fulfilling the dream of his life, for from his boyhood days he loved the legends of the Greek heroes, and was fired with the desire to explore the ancient classical wor-

He commenced his excavations in the site of Troy in 1871 by cutting deep trenches in the N and N.W. of the hill. He discovered many objects of ancient art, inscriptions, potteries, jewels, coins and the like, which were conveyed to the museum of Constantinople and elsewhere. He believed that he had discovered the treasure of Priam and the remains of the ancient Pergamus or citadel of Troy, the palace and the Scaean gates so often mentioned by Homer. Finally he came to the conclusion that Troy had been built on the foundation of an early Aryan settlement. It was thus the second settlement; above this could be seen traces of two others, and above the famous Greek Ilium of 700 B.C. which merged into the Roman city of the first four centuries of the Christian era with its theatres and temples of Athene, (Minerva). To Schliemann will always be given the glory of being the pioneer Trojan explorer; and his labours, his disinterested generosity in devoting his fortune to this investigation, and his boundless patience and enthusiasm, will always command admiration. Recently another German scholar, W. Dorpfeld entered upon a thorough examination of the remains of Troy, on the results of which were considerably modified. Dorpfeld's book "Troy and Ilium" (which has not yet been translated into English) is illustrated by most striking photographs and diagrams. His classifications of the settlements is as follows:-

1. Very ancient settlement	3000- 2500 B.C.
2. Pre-historic fort.	2500- 2000 B.C.
3-5. " Villages.	2000- 1500 B.C.
6. The Homeric Troy.	1500- 1000 B.C.
7. Two Pro-Greek settlements.	1000- 700 B.C.
8. The Hellenic (Greek) Ilium	700- 0 B.C.
9. The Acropolis of the Roman Ilium.	0- 500 A.D.

according to Dorpfeld the clearest remains of the Fort of Troy are those of the walls which extend along the S.W. line of the remains and continue in an easterly direction; in those he discovered the foundations of at least one great tower, gates, and the floor of the hall of the palace (Megaron). Since Dorpfeld's book was published in 1908, the site has doubtless suffered the inevitable effects of weather exposure, overgrowth of vegetation and neglect, and it may not be easy to identify the existing remains from the photographs which were taken over 16 years ago. But his researchs were of supreme value in supplementing the pioneer work of Schliemann, and place beyond doubt the conclusion that the foundation of the famous fortress of Troy, which was sacked and burnt 3000 years ago have been revealed to the modern world, and that the city, which according to the ancient legend, "rose like a mist into Towers" to the music of Apollo's lute, has yielded its secret to the energy of modern science.