AWM4

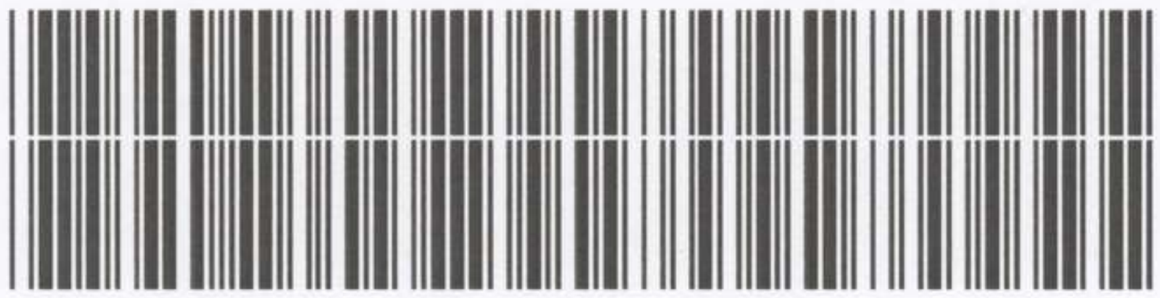
Australian Imperial Force unit war diaries, 1914-18 War

Engineers

Item number: 14/10/17

Title: Headquarters 4th Australian Divisional Engineers

June 1917



AWM4-14/10/17

Instructions regarding War Diaries and Intelligence Summaries are contained in F. S. Regs., Part II. and the Staff Manual respectively. Title pages will be prepared in manuscript.

WAR DIARY
or
INTELLIGENCE SUMMARY.
(Erase heading not required.)

Army Form C. 2118.

Hqrs 4th Aus Div Engrs

Place	Date	Hour	Summary of Events and Information	Remarks and references to Appendices
BAILLEUL	1/6/17		200 Pack crates for carrying water (Appendix I) made for Div. Pack Tpt. Troop. 10 mles. tracing tape purchased locally and issued to Inf Bdes for marking out routes and forming up places. ($\frac{1}{2}$" and $\frac{3}{4}$" tape is much cheaper and lighter than service tracing tape). Flag poles and mats for crossing barbed wire made and issued. Reserve Stores being pushed forward in readiness for forthcoming operations. Proposed stocks of R.E. Stores for offensive operations shown in Appendix II.	Appendix I
	to			
	6/6/17			Appendix II
			Field Companies and Pioneers employed on works for 25th. Div., N.Z. Div., and Corps Heavy Artillery.	
			At a Divisional Conference the reduction of No. of horses was considered. Reductions in case of Div. Engrs. shown in Appendix III	App. III
	7/6/17		C.R.E. and Adjutant moved to WESTHOF FARM with Advanced Headquarters of 4th. Aust. Div.	
			Map showing piped water system attached	App. VIII
			Map showing trench system etc. prior to commencement of operations herewith	App. IX
			Sketch of YUKON PACK issued to Infantry for carrying stores, and notes concerning improvements attached	App. X
	7/6/17	3.10 a.m.	Offensive operations commenced.	
			EMPLOYMENT OF UNITS	
WESTHOF FARM	7/6/17 to 11/6/17		12th. and 13th. Field Companies employed on Engineer Reconnaissance, digging Communication Trenches, building Bn. Hqrs. and R.A.P's, wiring, digging strong points, erecting notice boards, laying out preparing and marking mule tracks and dry weather carts tracks, repairing roads etc. etc. on the 12th. and 13th. Inf. Bdes. Sectors. 4th. Field Co., the reserve Coy., employed at Dumps, Corps Workshops, erecting notice and direction boards, water supply, mule and cart tracks, wiring etc. and generally assisting.	
			A detachment of 171 Tunnelling Company, R.E. was engaged searching for wells, dugouts, and booby traps in and around MESSINES.	
			A detachment of 3rd. Canadian Tunnelling Company was employed searching for wells, digging wells and general water supply work in the forward area.	
			List of water points at 6.p.m. 12/6/17 -	App. IV
			Specimens of reports on tests of water by Science Officer shown in -	App. V

A5834 Wt. W4973/M687 750,000 8/16 D. D. & L. Ltd. Forms/C.2118/13.

Instructions regarding War Diaries and Intelligence Summaries are contained in F. S. Regs., Part II. and the Staff Manual respectively. Title pages will be prepared in manuscript.

WAR DIARY
or
INTELLIGENCE SUMMARY.
(Erase heading not required.)

Army Form C. 2118.

Hqrs 4th Aust Div Engrs

Place	Date	Hour	Summary of Events and Information	Remarks and references to Appendices
WESTHOF FARM	7/6/17 to 11/6/17		The 4th. Pioneer Bn. were employed digging C.T's forward, one for the 12th. and the other for the 13th. Infantry Brigade Sectors. Latterly 2 Companies were detailed for the running, maintenance etc. of trench tramways in Divisional Area. Map attached shows various works done in Div. Area since commencement of operations -	App. VI
			STORES Dumps were established at points as shown in - Stores were worked forward by motor transport to STEENEBEEK (U.1.b.6.3.) Forward Dumps for the Right and Left Brigade Sectors were established on either side of MESSINES - stores being carried forward by a Regimental Pack Train (the personnel and animals of which were drawn from Field Companies)	App.II
			INTELLIGENCE Progress Reports were furnished each morning to C.R.E's Office showing work done for previous 24 hours. This information was plotted on a map, copies of which were furnished to Division "G" and "Q" Branches, and Chief Engineer of Corps.	
			GENERAL	
13/6/17			Handed over work, stores etc. etc. to C.R.E. 25th. Div. Approx stocks shown in - Field Companies and Pioneers moved back to rear Camps. Summary of Casualties from June 1916 to 13/6/17 shown in -	App. XII App. VII
14/6/17			Routine Work. 4th. and 12th. Field Coys. digging S.P's and M.G. Positions at night.	
15/6/17 to 19/6/17			Companies and Pioneers employed assisting 25th. Div. in laying tramways, improving, and duckboarding C.T's etc. List of members of 4th. Aust. Div. Engrs. awarded decorations or mentioned for good work shown in - - - - - - - - - - - - - - Report on Experiments with BANGALORE TORPEDOES shown in - Notes on Operations at MESSINES contained in Notes on Construction of Trenches by means of Explosives in Instructions issued in regard to digging during battle in	App. XI App. XIII App. XIV App. XV App. XVI

A5834 Wt. W4973/M687 750,000 8/16 D. D. & L. Ltd. Forms/C.2118/13.

Instructions regarding War Diaries and Intelligence Summaries are contained in F. S. Regs., Part II. and the Staff Manual respectively. Title pages will be prepared in manuscript.

WAR DIARY
or
INTELLIGENCE SUMMARY.
(Erase heading not required.)

Army Form C. 2118.

Place	Date	Hour	Summary of Events and Information	Remarks and references to Appendices
WESTHOF FARM	20/6/17 to 28/6/17		Field Companies and Pioneers employed upon preparation of Corps Line of Defence, digging C.T's and salvage of Engineer Stores from old Lines. A school of instruction for junior N.C.O's and Senior Sappers of Field Companies was formed at Engineer Headquarters, the length of thecourse to be 30 days. Syllabus for school shown in Appendix. XVII The number of Students provided for was 36 (12 from each Field Company) Instructors were drawn from the Officers and N.C.O's of Field Companies.	appendix XVII
	28/6/17 to 30/6/17		Took over work, Dumps etc. from NEW ZEALAND Division. Sector extends from La DOUVE River at Fm. de la Croix to le LYS River at C.17.a.0.8. Engineer Headquarters moved from WESTHOF FARM to STEENWERCK on 28/6/17. On 29/6/17 the 13th. Field Co. A.E. moved from T.16.c. to le ROMARIN (B.4.a.5.1.) 4th. New Zealand Field Company attached for duty from 28/6/17.	

A C Dow

Lieut. and Adjutant

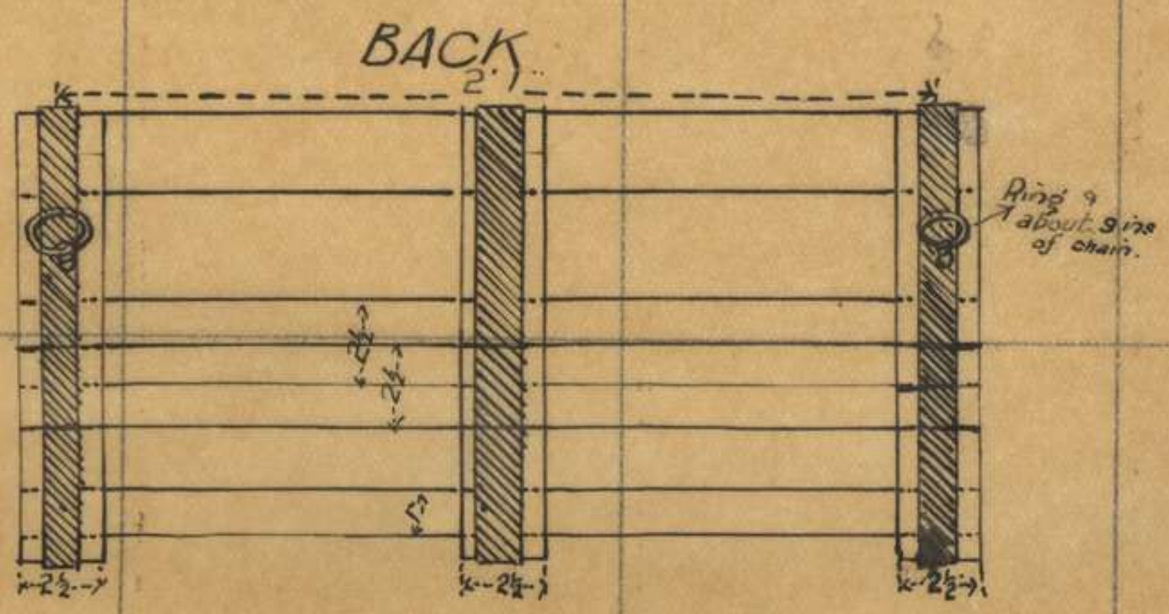
for C.R.E. 4th. Australian Division

T.134. Wt. W708—776. 500000. 4/15. Sir J. C. & S.

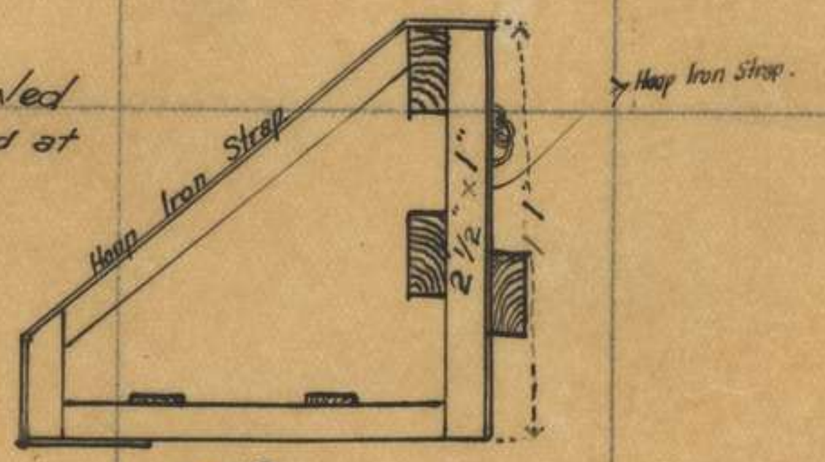
Appendix No 1

appendix I

Rough Plan of Water Carrier to hold 4 2gls Petrol Cans



Timber — 2½" x 1" Softwood screwed with 1¾' screws Hoop Iron strapped at ends 1" x 3/16'



END

305

Appendix No. 2
Appendix II

Secret

Headquarters,
4th. Aus. Div. Engrs.,
3/6/17

Headquarters, 4th. Aus. Div.
C.R.E., N.Z. Div.
4th. Field Co.
12th. Field Co.
13th. Field Co.
4th. Aus. Pionee Battalion
4th. Aus. Inf. Bde.
12th. Aus. Inf. Bde.
13th. Aus. Inf Bde.
CRA 4th AD

Herewith a List of Engineer Stores which it is hoped will be available in reserve for forthcoming operations at the Dumps herein named. In the event of a successful advance an Advanced Engineer Dump will be formed and its location notified to you.

Stores will not be issued from any of these Dumps prior to ZERO HOUR. After Zero, stores will be issued on presentation of an indent signed by

(a) C.R.E. or Adjt, 4th. Aus. Div. Engrs.
(b) An Officer of a Field Co.
(c) C.O., Adjt., or Coy. Commanders of Pioneer Battalion
(d) In exceptionally urgent cases, Staff Captains of Infantry Brigades and Div. Art.

The greatest care must be taken of all stores. They must not be wasted, since there is a shortage at present. Picks and Shovels must be carefully stacked in heaps after work. They are very difficult to obtain, and every effort must be made to prevent loss.

Lieut. Colonel,
C.R.E. 4th. Aus. Div.

Appendix II

305

DUMPS , Locations on Sheet 28 S.W. 4.

ITEM	SHRINE .(on main road) T.18.a.4.5.	CURRIE AVENUE T.12.b.5.5.	BOYLES FARM .(behind parados. Boyles Farm C.T) U.1.c.3.5.	GOOSEBERRY FARM (alongside Spring Trench) U.7.b.2.5.	TOTAL
Axes hand		30	10	10	50
Axes, felling		30	10	10	50
Axes, pick, complete		1000	500	500	2000
Bridges, artillery		2	2	2	6
Bags, sand, in bales of 250	60000	30000	15000	15000	120000
Canvas and Hessian, rolls		15	2	3	20
Camouflage, rolls		20	5	5	30
Cupolas, medium, English pattern complete sets	6	3	2	2	12
Casks, water		10	5	5	20
Dogs, sawyers, 9", cwts.		5			5
Dogspikes, tramways, cwts.		5			5
Drift Spikes, 8", cwts.		5			5
Duckwalks	200	200	50	50	500
Explosives	To be drawn from Tool Carts as required				
Gloves, hedging, prs.			50	50	100
Hoop Iron, feet		400	300	300	1000
Hammers, claw		50	25	25	100
Iron, corrugated, sheets	1000	500	300	300	2100
Mauls, complete		30	20	20	70
Notice Boards, plain, wooden		50	50	50	150
Notice Boards, Direction - posts on 5' angle irons.					
Nails, 2" to 6", cwts.		10	5	5	20
Nails, clout, cwts.		½	½	½	1
Pitprops, 6' to 8'	100	60	20	20	200
Pickets, forest, 3'.0"		450	100	100	650
" " 5'.3"		450	100	100	650
Pumps, L & F. COMPLETE with Hose			1	1	2
Paint brushes, small		8	2	2	12
" black, drums		½	¼	¼	1
" white "		½	¼	¼	1
Rope, 1½"- coils		1			1
" 2" "		1			1

Appendix No. 2 6

Appendix II

305

DUMPS - Locations on Sheet 28 S.W. 4

ITEM	SHRINE (on main road) T.18.a.4.5.	CURRIE AVENUE T.12.b.5.5.	BOYLES FARM (behind parados Boyles Farm C.T) U.1.c.3.5.	GOOSEBERRY FARM (alongside Spring Trench) U.7.b.2.5.	TOTAL
Saws, hand		60	20	20	100
Saws, hack, complete		8	2	2	12
" " blades for		50	5	5	60
Saws, crosscut		2	1	1	4
Shovels		2000	1000	1000	4000
Screw Pickets, long	500	500	500	500	2000
" " short	750	750	600	600	2700
Spanners adjustable		5	10	10	25
Trucks, tramway		6	2	2	10
Tramway tracks, yds.					
Tapes tracing, ½" and ¾", miles			1	1	2
Timber, 9 x 3 ft. run					
3 x 3		100	50	50	200
3 x 2		200	100	100	400
T & G		200			200
Wire Netting, rolls		60	20	20	100
" plain, coils		30	10	10	50
" nbarbed "	300	300	300	300	1200
" French concertina	30	30	30	30	120
Wire Cutters and Breakers		Dealt with by "Q" Branch, 4th. Aus. Div.			
X P M , Sheets		100	50	50	200

Tape, tracing and Hessian Duckwalks issued to Inf Brigades direct.

Appendix No. 2

505

Appendix No. 3 8

Appendix III

Hdqrs., 4th Aus. Div.

Reference reduction in Strength of Horses

The following suggestions are submitted for consideratio

Unit	Horses withdrawn from	Total reduction in strength of horses. R.	D.	P.	Total
H.Q.	Warrant Officer	1	-	-	1
4th Field Co.	Pack animals	-	-	4-	4
	Shoeing Smith	1	-	-	1
12th " "	do. do.	-	-	4	4
	" "	1	-	4	1
13th " "	do. do.	-	-	4	4
	" "	1	-	-	1
		4	-	12	16

It should, however, be noted that the organization of a field company is designed to allow of each of the four sections of which it is composed being split off as a self contained unit in order to work with a battalion, an advanced guard, etc.

Sections so separated should be capable of sending out a small party to do independant work and for this purpose the pack horse was provided to carry tools, explosives, and extra rations.

In the past there has always been considerable delay i in replacing horses which have become casualties, seldom less than a month being required. The pack horses were then used to carry on. It will, therefore, be necessary to expedite replacement of evacuated horses in the event of establishment being cut down as suggested.

Engr. Hdqrs.,
20.5.1917

C. Com Rosdell
Major,
a/C.R.E., 4th Aust. Division.

Appendix IV

FORWARD WATER SUPPLY — 4th Aus. Div. Area.

Map location	Method of storage	Yield	Science Off's Test	Remarks
U.1.b.65.88	Pond.	2000 gals per diem	2 scoops per water cart.	Pump being installed. 2/400 gal tanks installed.
U.2.c.12.75	Well, 8' to 11' deep, dug by Engrs.	1500 gals p.d.	2 scoops per water cart	1/400 gal tank & 1/60 gal barrel with pump installed.
U.1.b.95.18	Well 8' to 11' deep	1600 gals p.d.	To be done	1/100 gal tank & 1/60 gal barrel installed. Reed. rough test & thought suitable
U.2.d.91.80	Well being dug by Engrs. 3'½ 5'x 6' deep 5pm 10/6/17			No further details at present
U.2..c.2.5.	Well 9' deep, 5' water			Result test not to hand.
0.32.c.80.88	Spring	3000 gals p.d.	2 scoops per water cart	2/600 gal tanks & pump installed well camouflaged. 2/100 gal tanks & 2/60 gal barrels erected. Pump being installed.
0.32.c.4.6.	Well 15' deep, 3' diam. bricked		2 scoops per water cart.	Holds 13'6" water.
0.32.c.25.85.	Well dug by Engrs. 3'6" x 5'6"x 8' deep 5.30pm 8/6/17	6 gals per hour	1 scoop per water cart.	3rd test shews 7 scoops req
0.32c.25.85	Shell hole	6 gals per hour	2 scoops per water cart.	
U.3.c.2.7.	Well dug by Engirs in Ct 3'x 5'x 8', 11/6/17	12 gals per hour	4 scoops " " "	Test settled water fair 2nd test 3 scoops per water cart
U.2.b.5.9.	Well		6 scoops " " "	Test very poor - polluted.
U.3.b.20.80.	Well in Ct, completed 9 pm 11/6/17, 3'x 5'x 8' deep.	—	4 scoops " "	2nd test shews 2 scoops req

Appendix No 4

Appendix No 5

Appendix V

C O P Y.

SLOPING ROOF FARM 0.32.c.2.8.

Shell hole, same location.

Water clear - organic sediment slight, colourless
Taste - flat and musty.
Odour - musty.
Horrocks - ~~18/100,000~~ ~~xxx~~ 2 scoops per water-cart.
Hardness - 18/100,000.
Chlorides - 5.9/100,000.
Metallic poisons - absent.

(Sd) E.R. MARLE.
Lieutenant

Lille

305

Appendix No 5
Appendix V

11

FROM: SCIENCE OFFICER, 2nd.SECTION, 2nd.WATER COLUMN.

TO: C.R.E. N.Z. DIVISION.

1.
Samples accompanying wire M.C.D.12.

SPRING. 0.32. c. 70. 80.
Brownish and cloudy with suspended organic matter or humus.
Smell and taste - very earthy.
Horrocks - 2 scoops B.P.required per water-cart.
Chlorides - 1.6/100,000.
Hardness - 20/100,000.
Metallic poisons - absent.

FAIR

Pond. U.1.b.65.88.
Slight dirty grey colour, some organic suspension.
Smell - none.
Taste - slightly musty.
Horrosks - 2 scoops required.
Chlorides - 2.3/100,000.
Metallic piosons - absent.
Hardness - 10.5

FOR A POND -GOOD.

O. 32. c. 4.6.
WELL.
Dirty grey, suspended organic matter.
Smell and taste - slightly organic.
Horrocks - 2 scoops required.
Chlorides - 4.8/100,000.
Poisons (including arsenic) - absent.
Hardness - 35.

NEW WELL DUG BY ENGINEERS. U.2.c.12.75.

Dirty white, cloudy suspension.
Odour - musty.
Taste - flat.
Horrocks - 2 scoops required.
Poisons - absent.
Hardness - ~~1.6/100,000~~.25.5/100.000.
Chlorides - 1.6/100?000.
Water will improve, most likely, on settling and pumping.

E.R.MARLE
Lieutenant.

9/6/17

TO; Headquarters "Q" N.Z.Division.
C.R.E. 4th. Australian Division.
O.C. 2nd Field Coy. N.Z.E.

For your information.

S. R. Gridley
Lieut-Colonel R.E.
C.R.E. N.Z. Division.

9/6/17

copies to Coys 9/6/17

Appendix No 15. Appendix V 12

To C.R.E. 4th Aust. Divn.

From Science Officer, 2 Sec. 2 Wter Column.

Sample from new well, U.3.c.2.7.
On settling about 3" of sand and clay collected at bottom of bottle leaving water still slightly turbid.
Taste - none. Odour - earthy.
Horrocks - 4 scoops required.
Hardness - 28/100,000.
Chlorides - 4.9/100,000. (No Cl)
Metallic poisons - absent.

The settled water is fair.

Dugout. Oyster Trench, 0.32.c.0.1.

Dirty grey to brownish, Very cloudy, organic sediment.
Smell and taste highly offensive of rotten animal or vegetable matter.
Metallic poisons - absent.
Chlorides - 22.3/100,000.
Hardness - 47/100,000.
Horrocks - more than 20 parts per 10^6 for chlorine absorbed.

Very bad.

As above (2nd entrance)

Very cloudy, dirty yellowish white, much organic sediment.
Smell and taste very organic resembling faeces.
Metallic poisons - absent.
Chlorides - 22.6/100,000.
Hardness - 45/100,000.
Horrocks - more than 20 parts absorbed.

Both evidently very foul.

Sample sent with message EYD 223 of 11/6/17.

Well at U.2.b.5.9.

Dirty white. Taste & musty.
Odour - of pond water.
Horrocks - 6 scoops required.
Hardness & 50/100,000.
Chlorides,- 56.5/100,000.
Metallic poisons - absent.

Very poor. High Chlorides and high chlorine absorption suggest pollution from surface drainage or sewage.

12/6/17. (Sd) E.R. MARLE Lt.

Appendix VI

SECRET

4th AUSTN. DIVN.

PLAN

Messines Front

Scale 1 : 10,000

Reference	
Constructed & consolidated Trenches shewn thus	
Old enemy trenches not shewn	
Railway lines shewn thus	
Roads shewn thus	
Tracks shewn thus	
Wells shewn thus	⊙
Dug-outs shewn thus	■
Strong Points	⊛
Posts	□

12.6.17

1 : 10,000

NO MAN'S LAND

British Front

MESSINES

Spanbroekmolen

In de Spanbroek Cost

In de Kruisstraat Cost

L'Enfer

Wood

Lumm Fm

Wambeke

Deparis Fm

Gapeard

Bluff

Ploegsteert Wood

Bois Grenier

Le Rossignol

AUSTRALIAN WAR MEMORIAL

RCDIG1008554

4th AUSTRALIAN DIVISIONAL ENGINEERS.

Casualties from June 1916 to June 13th 1917. Appendix V11.

	4th Field Company				12th Field Company				13th Field Company			
	Offs.	N.C.O's	Sappers	Drivers	Offs	N.C.O's	Sappers	Drivers	Offs.	N.C.O's	Sappers	Drivers
KILLED	2	5	13	-	-	1	6	2	1	7	18	-
WOUNDED	3	8	36	2	2	5	19	5	4	14	60	3
SHELL SHOCK	-	-	3	-	1	1	3	-	-	2	4	-
TOTAL	5	13	52	2	3	7	28	7	5	23	82	3

Total Casualties.

4th Field Company.	72	
12th Field Company.	45	
13th Field Company.	113	
Hqrs. 4th Div.Engrs.	1	x

x 1 O.R. wounded.

Appendix No 7

Appendix No 8

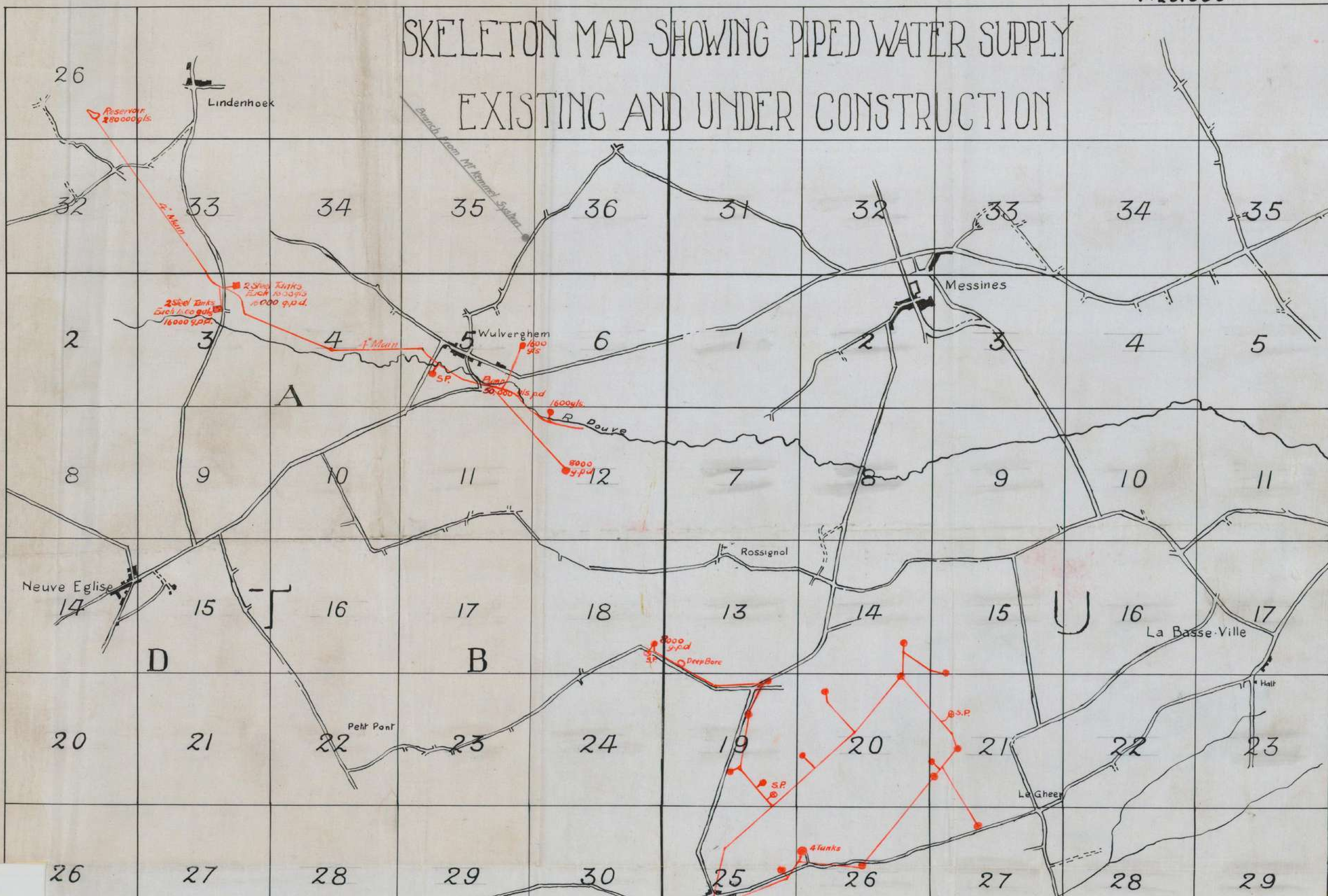
SECRET

appendix VIII

Copy No 5

15

1:20.000


SKELETON MAP SHOWING PIPED WATER SUPPLY
EXISTING AND UNDER CONSTRUCTION
Lindenhoek
Reservoir 280000 gls.
4" Main
Branch from Mt Kemmel System
2 Steel Tanks Each 1000 gls 16000 g.p.d.
2 Steel Tanks Each 1600 gals 16000 g.p.d.
Wulverghem
1600 gls
S.P.
Pump 50,000 gls p.d
1600 gls.
R Douve
8000 g.p.d
Messines
A
Neuve Eglise
D
B
U
Rossignol
8000 g.p.d
S.P.
Deep Bore
La Basse-Ville
Halt
Petit Pont
Le Gheer
4 Tanks
Ploegsteert
26
32
33
34
35
36
31
32
33
34
35
2
3
4
5
6
1
2
3
4
5
8
9
10
11
12
7
8
9
10
11
14
15
16
17
18
13
14
15
16
17
20
21
22
23
24
19
20
21
22
23
26
27
28
29
30
25
26
27
28
29

Appendix IX

Secret Plan No 4.

WULVERGHEM

MESSINES

ROSSIGNOL

HILL 63.

PLOEGSTEERT

Albuelle

Busschemeerschen

XI

Appendix X

Yukon Packs

Headquarters,

4th Aust. Divn.

I have tried one of these packs. They should be most useful, and am certain that the weight comes too low on the back. There is also no brow band - a most important part of a pack outfit. Anyone who has not packed or seen packers at work does not realise how much it helps to get the weight as high as possible.

C. Aust.

Lieut-Colonel,

17/6/17 C.R.E. 4th Australian Division.

O.C. 4th Co's report attached

RCE

Appendix No 10.

appendix X

To C.R.E.

The boy was not issued with YUKON packs, but it was very evident that carrying parties were able to carry heavier loads & with less fatigue than without them. They are excellent for carrying S.A.A. bombs, stokes bombs, rations, sandbags & screw pickets. For carrying barbed wire they should have two light battens fitted vertically. A man could then carry two small coils of barbed wire strapped to the pack.

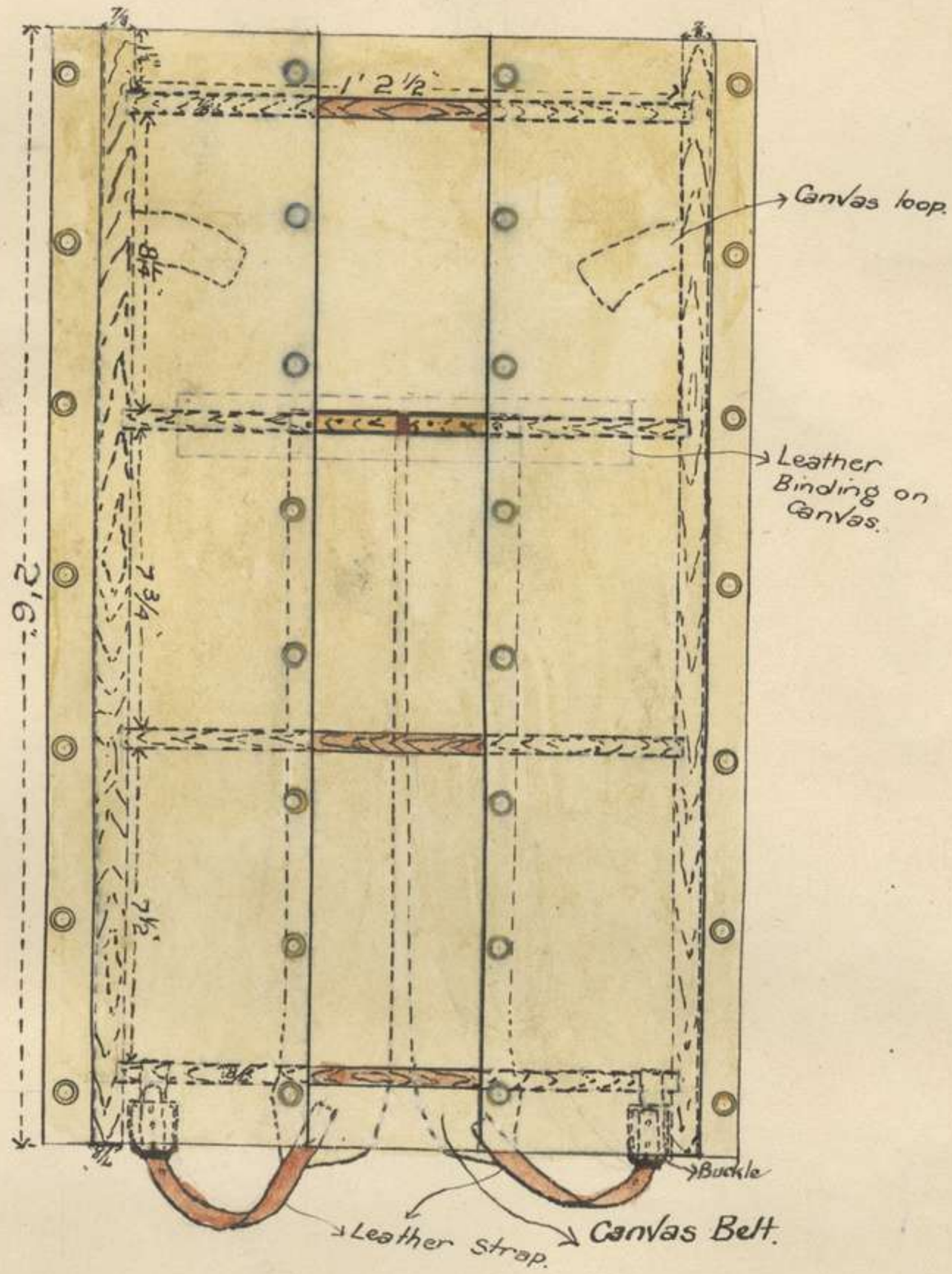
It is thought that they should be kept as R.E dump Stores, not issued as regular equipment to field companies.

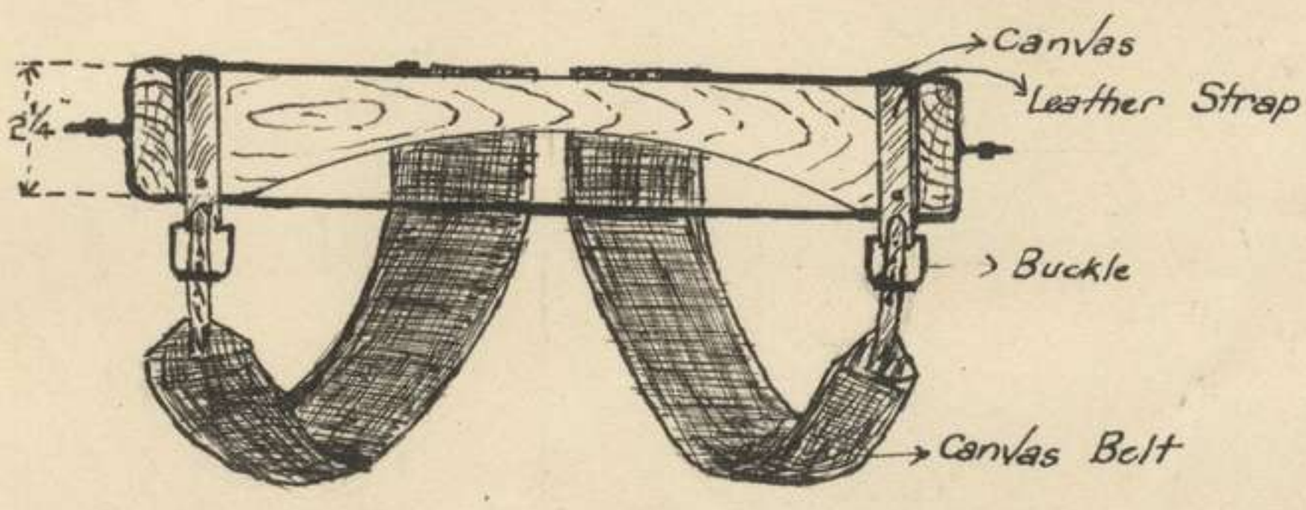
Holley Major
4th Fld Coy. AE
16-6-17

appendix X.

Sketch of Yukon Pack

Scale 1" to ½ foot.





HONOURS AND AWARDS OTHER RANKS

to 30/6/17

Number	Rank	Name	Company	Particulars of honour or award	Authority
4137	Sergt.	Park J. A.	4th Field Company	D. C. M.	Corres. 1st ANZAC 97 of 9/11/16
4105	L/Cpl	Wemyss J.	4th Field Company	D. C. M.	A.I.F. List 113, 22/11/16.
4082	Sergt.	Graham D.	4th Field Company	D. C. M.	A.I.F. List 64 , 22/12/15
4138	Corpl.	Rankin C.R.	4th Field Company	D. C. M.	A.I.F. List 30, 27/12/15.
4232	Sergt.	Shaw J,	4th Field Company	D. C. M.	Corres. 1st ANZAC 97 of 9/11/16
4068	Driver	Arnold T.	4th Field Company	Special Mention	Div. Order 65, 1/12/15.
398	Corpl.	Gabriel G.E.	12th Field Company	M. M.	A.I.F.O.368, 15/11/16. AIF List 127.
4137	Sergt.	Hark J.A.	4th Field Company	M. M.	D.R.O.188, 20/11/16, AIF List 127,16/1
1502	Sapper	Alexander H. de V.	4th Field Company	Gold Medal	A.I.F., R.O.388, 2/12/16.
1880	Sapper	Dufton W.	12th Field Company	Silver Medal	do do
4202	Sapper	Crane J.F.	4th Field Company	M. M.	D.R.O. 248, 28/12/16.
5437	Corpl.	Fleming W,	12th Field Company	M. M.	do do
4182	2/Cpl. (T.Cpl)	Welch E. V.	4th Field Company	Mentioned in C-in-C's Despatches	A.I.F. List No 138, 20/1/17.
22	Sergt.	Pentland G.	12th Field Company	Italian Bronze Medal for Military Valour	1st ANCAC Corps R.O.25 para 117,18/3/1
378	Corpl.	Stewart D.C.	12th Field Company	M. M.	D.R.O. No 323, para 1210, 15/4/17 and A.I.F. List 186, 5/6/17
5463	Sergt.	Whitehead T.H.	12th Field Company	D.C.M.	A.12/299 of 22/5/17.
3	W.O.Cl.1	Thompson A.	Hqrs. Div. Engrs.	Mentioned in C-in-C's Despatches	A.I.F. List No.186, 5/6/17
5447	2/Cpl.	Nelson E.J.	13th Field Company	do do	do do
5154	2/Cpl	Collyer S.	13th Field Company	D.C.M.	do do
6106	Corpl	Clark S.	13th Field Company	M. M.	
1847	L/Cpl	Arkins, T.W.R.	13th. Field Coy.	M.M.	2nd. ANZAC R.O. 1220 of 23/6/17
3019	Corporal	Fry, A.	12th. Field Coy.	M.M.	" " " " " "
4162	Corporal	Hill, R.H.	4th. Field Coy.	M.M.	" " " " " "
1880	Sapper	Pearce, L.W.	13th. Field Coy.	M.M.	" " " " " "
7041	L/Cpl.	Kydd, J.G.C.	12th. Field Coy.	M.M.	" " " " " "
4212	L/Cpl.	Kinred, H.C.	4th. Field Coy.	M.M.	" " " " " "
6317	Driver	Charlwood, P.S.	4th. Field Coy.	M.M.	" " " " " "

Appendix No 11

20

Appendix XI

No 30/0117

HONOURS AND AWARDS OFFICERS.

Name	Company	Rank	Particulars of Honour or Award	Authority
Cutler R.V.	4th Field Company	Major	Military Cross	London Gazette 3/6/16.
Mirams J.H.	13th Field Company	Major	Military Cross	No record.
Newcombe S.	C.R.E. 2nd A.D. late (4th Fd Coy)	Lt-Col,	D. S. O.	
Barber	4th Field Company	Captain	M. C.	
Potts W.E.	13th Field Company	Lieut.	M. C.	A.I.F. List No.138, 20/1/17
Mills C. F.	4th Field Company	Captain	M. C.	do do
Elliott G.C.E., R.E.	Hqrs. 4th A.D.	Major (Tem Lt-Col)	D. S. O.	
Elliott G.C.E.	Hqrs. 4th A.D.	Lt-Col.	Mentioned in Despatches	A.I.F. List No.138, 20/1/17
Riddell C.C.	12th Field Company	Major	do	do do
Reid H. A., R.E.	13th Field Company	Captain	do	do do
Dow A. H.	Hqrs, 4th A.D.	Lieut.	do	do do
Tolley H. G.	4th Field Company	Major	Mentioned in C-in-C's Despatches	A.I.F. List No.186, 5/6/17.
Minton J. P.	4th Field Company	Lieut.	do dov	do do

A665

Appendix No 11 21

Appendix X1 305

No 30/6/17

HONOURS AND AWARDS OFFICERS

Name	Company	Rank	Particulars of Honour or Award	Authority
Riddell C.C.	12th Field Company	Major	Congratulatory Card	4th A.D. A/12/50. 23/8/16.
Mirams J.H.x	13th Field Company	Major	" "	do do
Reid H.A.	13th Field Company	Captain	" "	do do
Mills C.F.	4th Field Company	Captain	" "	do do
Potts W.E.	13th Field Company	Lieut.	" "	4th A.D. A12/96 13/9/16.
Dow A.H.	Hqrs. 4th A.D.	Lieut.	" "	do A12/104. 16/9/16.
Carrick. R.S.	12th Field Company	Lieut	" "	do do do
Minton J.P.	4th Field Company	Lieut.	" "	do do do
Cribb E.C.	12th Field Company	Lieut.	" "	4th A.D. A/12/145. 19/19/16.
Tolley H.G.	12th Field Company	Captain	" "	Div. Headquarters Memo 19/12/16
Bell J.W.	13th Field Company	Lieut.	" "	do do

A1625

Appendix No 11 2D

Appendix XI 305

HONOURS AND AWARDS OTHER RANKS

E 30/6/17

Number	Rank	Name	Company	Particulars of Honour or Award	Authority
4137	Sergt	Park J.A.	4th Field Company	Congratulatory Card	4th A.D. A12/96 13/9/16
4105	L/Cpl	Wemyss J	4th " "	" "	do do
4182	2/Cpl.	Welch E.V.	4th " "	" "	4th A.D. A12/145. 19/10/16
5463	Sergt	Whitehead T.W.	12th Field Company	" "	4th A.D. A12/96 13/9/16
398	Corpl	Gabriel G.E.	12th " "	" "	do do
6106	Corpl	Clark S	13th Field Company	" "	D.R.O. 188 12/10/16
72	Sergt	Donaldson G.F.S.	Hqrs 4th A.D.	" "	Div. H.Q. Memo 19/12/16.
4208	Corpl	Hair R.W.	4th Field Company	" "	do do
4202	Sapper	Crane J.F.	4th " "	" "	do do
3	C.S.M.	Thompson A	12th Field Company	" "	do do
22	Sergt	Pentland G	12th " "	" "	do do
2352	Sergt	Lister W.H.	12th " "	" "	do do
5437	Corpl	Fleming W	12th " "	" "	do do
373	Corpl	Stewart D.C.	12th " "	" "	do do
2820	Sapper	Thompson E	12th Field Company	" "	do do
7041	Sapper	Kydd J.G.	12th " "	" "	do do
4246	Private	Lord J.E.	12th " "	" "	do do
5063	Private	Fildes W	12th " "	" "	do do
6106	Corpl	Clark S	13th Field Company	" "	dp do
5154	2/Cpl.	Collyer S	13th " "	" "	do do
5447	2/Cpl	Nelson E.J.	13th " "	" "	do do
6240	L/Cpl	Collins E.H.	13th " "	" "	do do
3434	L/Cpl	McLennan A.D.	13th " "	" "	do do
173	2/Cpl	Lawrence D.S.	13th " "	" "	do do
1276	Sapper	Shepherd J.M.	13th " "	" "	do do
720	Sapper	Jenkins E.J.	13th " "	" "	do do
5163	Sapper	Rowley J	13th " "	" "	do do
199	Sergt	Gray E.A.	13th " "	" "	do do
3276	T/Sgt	Crabbe J	13th " "	" "	do do

A685

Appendix No II 23

Appendix No 12 Appendix XII 24

GOOSEBERRY DUMP. (U.7.b.6.1) 12/6/17

Sandbags	4000	Gloves, hedging prs.	30
Wire, French	12	Saws, hand	10
" barbed	300	Hammers, claw	14
Bridges, trench	14	" sledge	5
Cupola B.E., sgts	40	Axes, hand.	9
Shovels	500	Nails, cwts	1
Picks & Helves	600	Corrugated iron shts.	100
X.P.M. sheets	100	Fascines	100
Direction boards	40	Pump L & F.	1
Screw pickets, short	200	Rope, 1½" ft.	200
" " long	400		
Mauls	10		
Wire cutters, pairs	10		

BOYLES FARM DUMP (U.1.c.4.4)

Picks	470	Wire cutters	3
Shovels	438	Wooden pickets	170
Saws	20	X.P.M. sheets	100
Hammers	20	Timber, ft.	1000
Axes, felling	10	Cupolas B. sgts	50
" hand	10	Trench bridges	20
Gloves, pairs	54	Water casks	5
Tracing tapes	25	Notice boards	50
Sandbags	27750	Camouflage, rolls	2
Screw pickets, long	1750	Canvas "	2
" " medium	1000		
" " short	1560		
Wire, barbed coils	366		
" plain "	2		
" French "	40		

STEENBEEK DUMP (U.1.b.6.3)

Picks & helves	200
Shovels	200
Sandbags	20500
Barbed wire	
Screw pickets, long	1100
" " short	1200
Axes, hand	1
Saws, hand	1
Hammers, claw	1
Galvanized bucket	1

~~3:/3:304~~

KANDAHAR DUMP (T.10.b.5.7) 12/6/17

Sandbags	1700	Duckwalks	100
Revetting hurdles 3'6"	30	" supports	350
" " 3'	21	Screw pickets, long	700
Angle iron pickets,		" " short	500
" " " short	190	B.E. shelters, sgts	120
" " " long	300	Wire, plain, coils	2
Barbed wire	600	Ammonal, lbs	100
Picks	450	X.P.M., sheets	100
Helves	700	Mauls	1
Pitprops	50	Hammers, claw	1
Wooden pickets	500	Saws, hand	1
Poles 12'	100		
Fascines	140		

Appendix No 12
Appendix XII

SHRINE DUMP. (T.18.c.5.8)

Cement, barrels	6
Sandbags	15,000
Revetting frames 6 x 3.	150
" " 3 x 6.	100
A Frames 5'6"	230
" 3'	584
Duckwalk supports	100
Pitprops	300
Windles	815
Wire, plain, coils	270
" barbed "	2530
" French "	630
" netting	20
Fascines	430
Nails, 2" to 6". cwt.	29
Bridges, trench, 16'	38
" " 10'	13
Poles, 6'	75
Picks & helves	300
Shovels	500
Screw pickets, long	500
" " short	450
Angle iron pickets, long	3000
Camouflage, rolls	6
Malthoid "	13
Steel rails 20'	5
" " 12'	17
Iron, round 1" lengths	60
Tar, barrels	7
Cement, casks	10
Pitprops	100
Steel girders, 18'	1
Piping 2", 10' lengths	35
Rope ladder	1
Bangalore torpedo tubes	74
Hardware, screw bolts, hinges, fittings, pitchforks, tarred rope (3 coils), paint, oxide, Staples 2 cwt. and sundry tools.	

CURRIE DUMP (T.12.b.5.6)

Axes, hand	40
" felling	25
Bridging sections (Arty)	10
Barrels, casks water	23
Iron, corr., bundles	51
Cupola, Eng. shelters, sects	2
Duckboards	300
XP.M., cases	10
Gloves, hedging, prs	60
Hessian, rolls	7
Hammers, claw	45
Hurdles	28
Mauls	35
Nails, 3",4",5" each, cwts	4
6" "	2
Screw pickets, long	100
Pitprops	100
Paint, B drums	1
" W "	1
Rope, 1" coils	2
Pickets, forest, 6'.	300
Shovels	2500
Sandbags	23,000
Saws, hand	45
" crosscut	4
" hack	4
Wire, netting, coils	94
" barbed "	120
" French "	100
" binding "	50
Wire windlass, complete	6
Picks	350
Trolleys, tram	9
Rope, Manilla, coils	1
Pumps, L & F	2
Pulley blocks, treble	2
" " double	1
Rope slings, 4"	3

FORWARD DUMP. Right OCTOBER TRENCH

Wire, barbed, coils	200
Screw pickets, long	300
" " short	450
Wire, French, coils	50
Sandbags	2000

do Left OCTOBER RESERVE

Shovels	150
Picks	80
Sandbags	3000
Pickets, long	150
" short	200
Wire, barbed, coils	320

Appendix XII

ST QUENTIN DUMP. (T.11.b.4.8)

Iron, corr., sheets		2813	
Concrete blocks		-	
Canvass, Hessian L.G.		39	
" " R.P.		5	
" S width		50	
Cement, Bls.		8	
Bridges, 12 ft		35	
" 10 ft		50	
Pickets, A.I. 5'		2070	
" " 3'		3500	
" screw 6'		300	
" M & short		400	
" wood, 2 M.		800	
" " 1½M		800	
" " 1 M.		700	
Nails, wire, lbs.	6"	1286	
" " "	5"	1232	
" " "	4"	1244	
" " "	3"	1554	
" " "	2½"	-	
" " "	2"	1558	
" " "	1½"	1456	
" " "	1"	336	
Clouts " "	1"	294	
Sandbags		8500	
Trench boards		2680	
" ladders		250	
T Board, Lgs		800	
" pieces		500	
Pitprops		120	
" split		20	
Timber, 9 x 3.		3325	
" 7 x 5 x 3		1100	
" 4 x 3 x 2		800	
" 5 x 4 x 1		1000	
" T & G		500	
" Forest	ft	4800	
X.P.M. sheets		1080	
Shelters, E type		60	
" B.E.		200	
Screwing pickets		66	
Wire, barbed		564	
" plain		50	
" French		133	
" netting		135	
Picks & helves		895	
Shovels G.S.		280	
Spades		50	
Malthoid, rolls		80	
Staples, 1½"		2	
" B.H.		2	
Cordage, 1½ & 2"		500	
Bangalore torpedos		40	

Paint, yellow ochre		
" green		14
" black		7½
" blue		14
" yellow		3
" khaki		-
" white		2
" oxide iron		8
Turps., gals		10
Axes, hand		100
" felling		90
Adzes		8
Augers, Ass.		30
Braces & bits		2
Brushes, paint		15
Bolts, barrel		6
¾ x 8"		1
¾ x 12"		1
3/8 x 3		3
½ x 5½		2
Braces, ratchet		
Crow bars		13
Wood chisels, Ass		40
Cold "		18
Brick "		18
Draw knives		14
Files, assorted		40
Gloves, hedging	prs	174
Hammers, claw		15
" fitters		33
Mauls & helves		119
Mallets, tent		54
Hooks, reap		50
" bill		55
Hinges T, ass		140
Planes		2
Pliers		13
Saws, hand		20
" X cut		6
Squares, carp's		3
Saws, hack, blades		48
Spoke shaves		6
Screws H		2
" 2" 14		3
" 3½" 12		3
" 5/8" 8		6
" 4" 8		½
" 1" 8		6
" 1" 12		6
" ¾" 6		11
Trowels		6
Taps, wood		36
Tapes, tracing		70
Fascines		30
Rev. frames		100
A " B		60
Tanks		9
Drums		24
Oven		

305

Appendix No. 27
Appendix A11

KIWI DUMP. (T.14.d.7.4)

Daily Return Sheet. 3 pm 11/6/17.

		Stock	Rec'd.	Issued	Balance
Steel Rails		6			6
Sand in bags		474			474
Split pitprops		36			36
Revetting hurdles, 5 x 5.		100			100
Sandbags		3000		2000	1000
Petrol,	gals	584			584
Lub. oil	gals	70			70
Kerosene	gals	29			29
Grease	tins	25			25
Burster forms		77			77
Round iron	lengths	500		150	350
Hoop iron	cwts	2			2
" " "		2			2
Latrine seats	(2)	1		1	-
Curline poles,	10 ft.	74		6	68
" "	14 ft.	26			26
B.E. Segments		9			9
Gravel in bags		16			16
Wire netting	rolls	4			4
Carbide	tins	20			20
Creosole	drums	2			2
Notice boards		13			13
Axe, felling		1			1
Water casks		2			2
Coal	tons	½			½
Hessian	yards	246		70	176
Grind stones		2		2	-
Anvil		1		1	-
Vice		1		1	-
Blower		1		1	-
Tools	boxes	3		3	-
Overalls	sets	3			3
Candles	box	1			1
Trench boards		323			323
" "	supports	1361			1361
Screw pickets		-			-

(Sd) Spr. H. Gray.

KIWI Dump 11/6/17

Wood pickets,	2"	846			846
" "	1½"	250			250
" "	1"	2230			2230
Wire, barbed		958			958
" plain		5			5
A Frames,	5 x 6.	160			160
"	3 x 6.	475			475
Pitprops,	6'	205			205
	8'	139			139
	10'	8			8
	14'	14			14
Iron, corrugated		100			100
E.P. shelters		19			19
Fascines		16			16
Tram track	ft	1640			1640
Staples	lbs.	107			107
Clouts	"	46			46
Nails	6"	43			43
	5"	152			152
	4"	98			98
	3"	150			150
	2½"	275			275
	2"	279			279
	½"	107			107

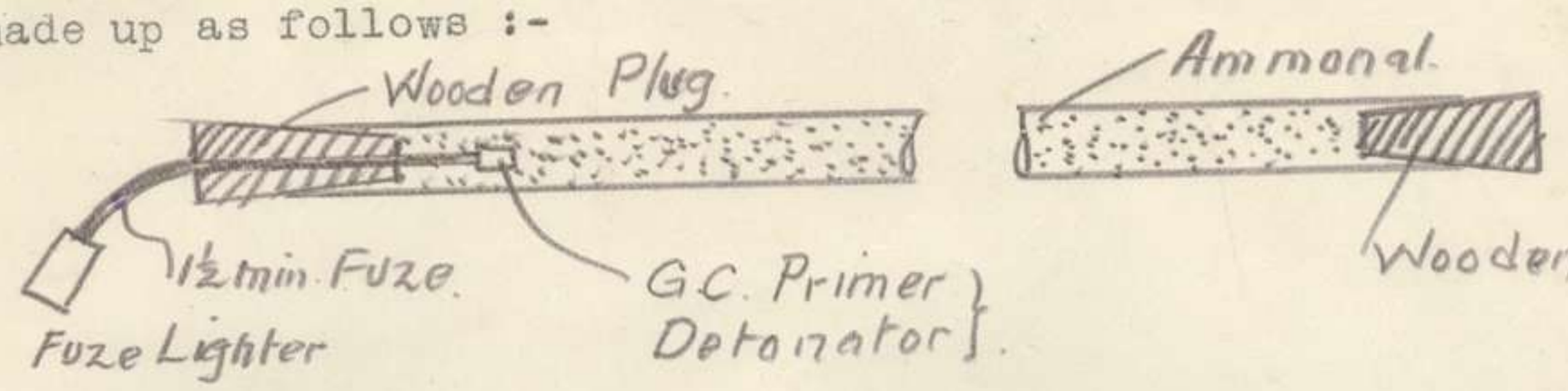
305

Appendix

REPORTS ON EXPERIMENTS CARRIED OUT WITH "BANGALOR" TORPEDO

Experiments (1) to (3)

In the first three experiments the charge was made up as follows :-



Tube simply filled with* explosives, a gun - -cotton primer, and detonator attached to 3ft. of safety fuze, a fuze lighter attached to end of fuze, and each end of tube closed with a wooden plug. Primer was 9" from end of tube. No further detonator inserted.

In experiments (1) and (2) the tube was not long enough to go right through the entanglement and only about 6" overlap* was allowed at the near end.

In (1) the tube was placed on top and along the line of posts. The result was as shown in Fig. 1. The entanglement was not affected on the far side of the tube i.e. where it did not lie actually on the wire.

Experiment 2. gave similar though rather better results. The tube in this case was laid on the ground.

In Experiment 3. the tube was laid on the ground and made just long enough to cover the entanglement without any overlap. The result is shown in Fig. 3.

In these three experiments the violence of the explosion seemed to be greater in the end containing the primer than in the far end.

Experiments (4) to (7)

In each of these the tube was made long enough to give about 18" overlap on either side. The charges were prepared similarly to those in the first three experiments, except that in addition to exploding *** primer and detonator, detonators were** placed in the charge at about 3ft. intervals along its whole length. This was to prevent the apparent dying out of the explosion towards the far end of the tube. The results can be seen from the figures 4. to 7. No attempt was made to provide an additional means of exploding a charge in case the primer failed.

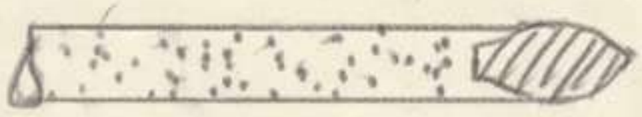
Conclusion

To obtain an absolutely clean gap with a minimum width of 20 ft. through any wire I would suggest the following arrangement -

Tube long enough to cover wire and give about 2 ft. overlap at each end. Tube to be placed on the ground. It seems to be immaterial whether it is placed along a row of posts or in any other position on the entanglement. By far the cleanest and best results are obtained by placing the tube on the ground. It can be placed straight across or diagonally without affecting the result. The sides of the gap will be parallel to the direction of the tube and at least 10 ft. on either side.

Appendix XI

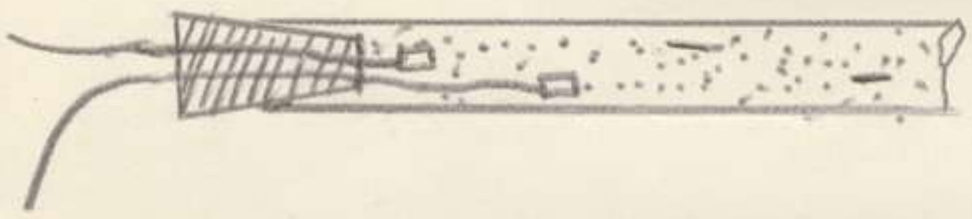
For placing, the wooden plug, in the end farthest from the primer i.e. the end on the enemy side, should project a few inches beyond the pipe and have a rounded point. It can then be easily pushed through the wire.

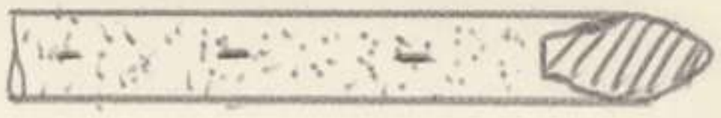


For carrying on to the job I think the tube should be made up into 6 or 8 ft. lengths ready charged and detonated. On one end of each tube a screw thread should be cut to take a union collar, on the other end of course the collar would be already in position, so that the lengths could be joined together. If 3 men were detailed for each tube a maximum length of 36 to 48 ft. of torpedo could be carried, which would be more than the amount likely to be required for one cut. A light wooden plug could be placed in the end of each tube to prevent the explosive falling out, and also to avoid the possibility of accidents when screwing up the unions owing to the explosive getting into the threads. Two or three detonators would be required in each length and in the end ones the detonating device and the rounded plug respectively. Of course the torpedo might be carried out in one length, but this would probably be awkward and in addition might not be effective as the width of the wire is generally not known.

Electrical detonators would probably not be satisfactory owing to the extra weight of the exploder and the long length of leads required. Besides the man carrying the exploder might become a casualty. When carrying the torpedoes in short lengths several spare men would be required to replace casualties.

For detonation I suggest that two separate primers with separate fuzes be used. If it is required to send off a number at a time, instantaneous fuze would be used connected to a common point.

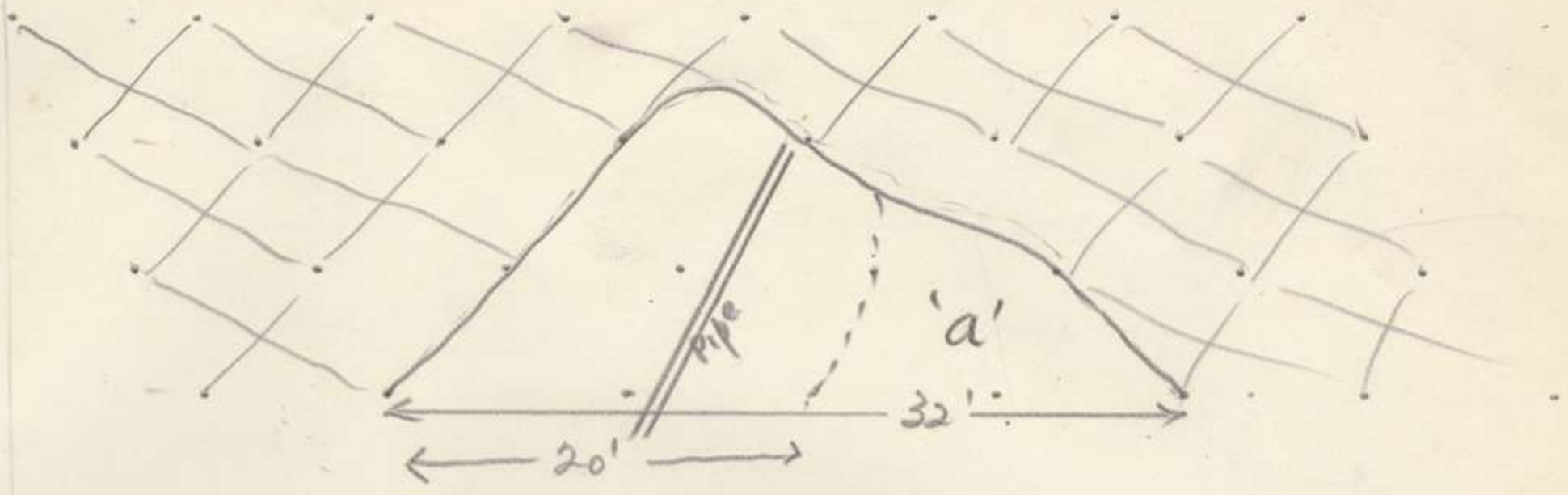




(Sd) W.E. POTTS, Lieut.
13th. Field Co. A.E.

Fig. 1

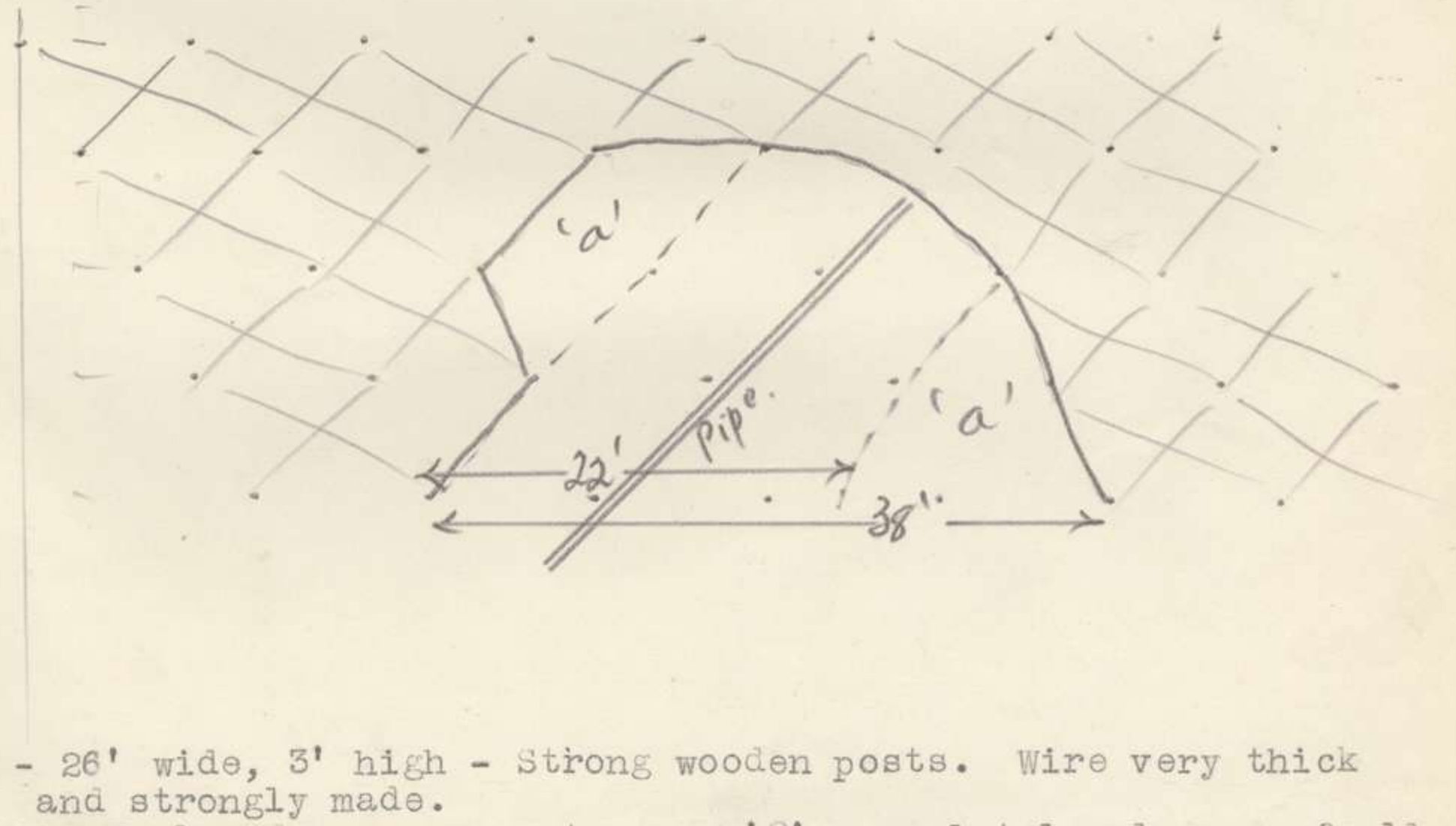
Tube 2" diam. gas pipe 18' long. Charge 26 lbs Ammonal.
Position - on top of entanglement along posts.



Wire - 18' wide, 3' high. Strong wooden posts. Wire very thick and strongly made. Posts about 10' apart each way.

Result - Gap, as above. Cut was not ckean ; posts are not properly cut level with the ground and there is a fair amount of loose wire, attached to stumps of posts, lying in the gap. Wire in area 'a' is not properly cut and still forms an obstacle. Ground not cut about.

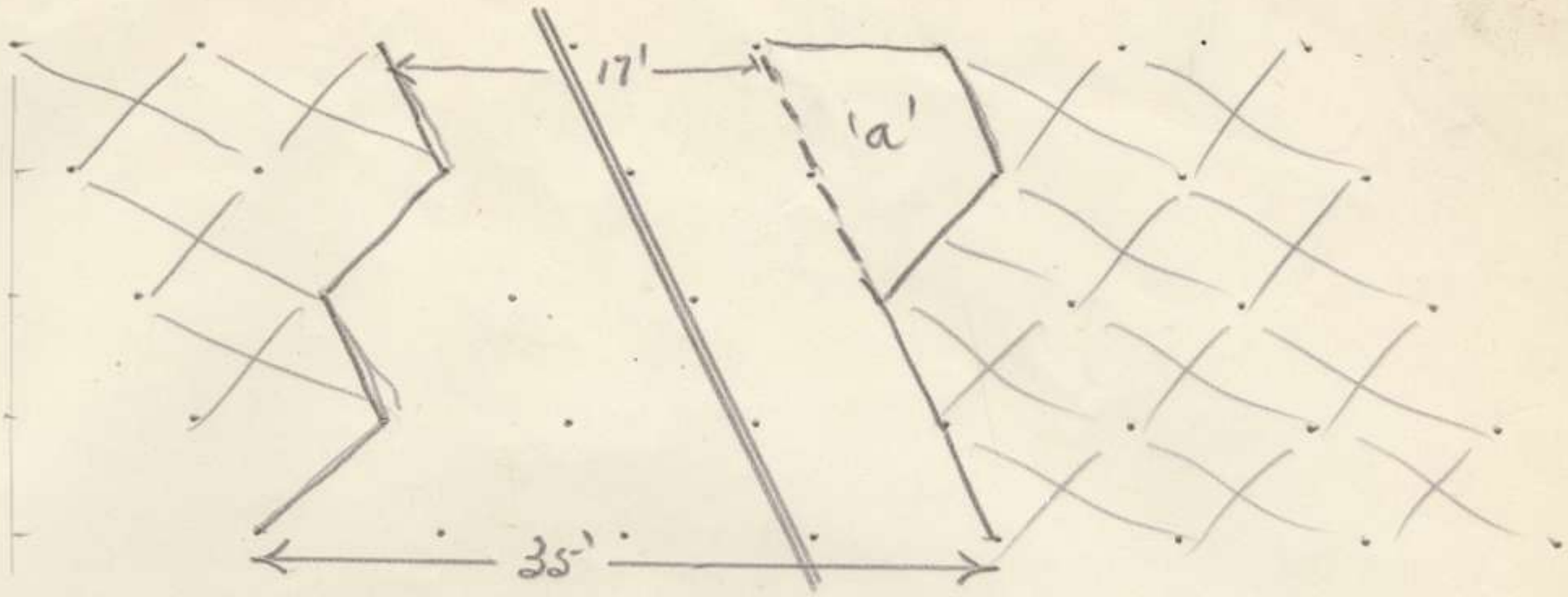
Fig. 2 Tube 2" diam., gas pipe, 18' long. Charge 26 lbs Ammonal.
Position - on ground laid beside posts.



Wire - 26' wide, 3' high - Strong wooden posts. Wire very thick and strongly made.

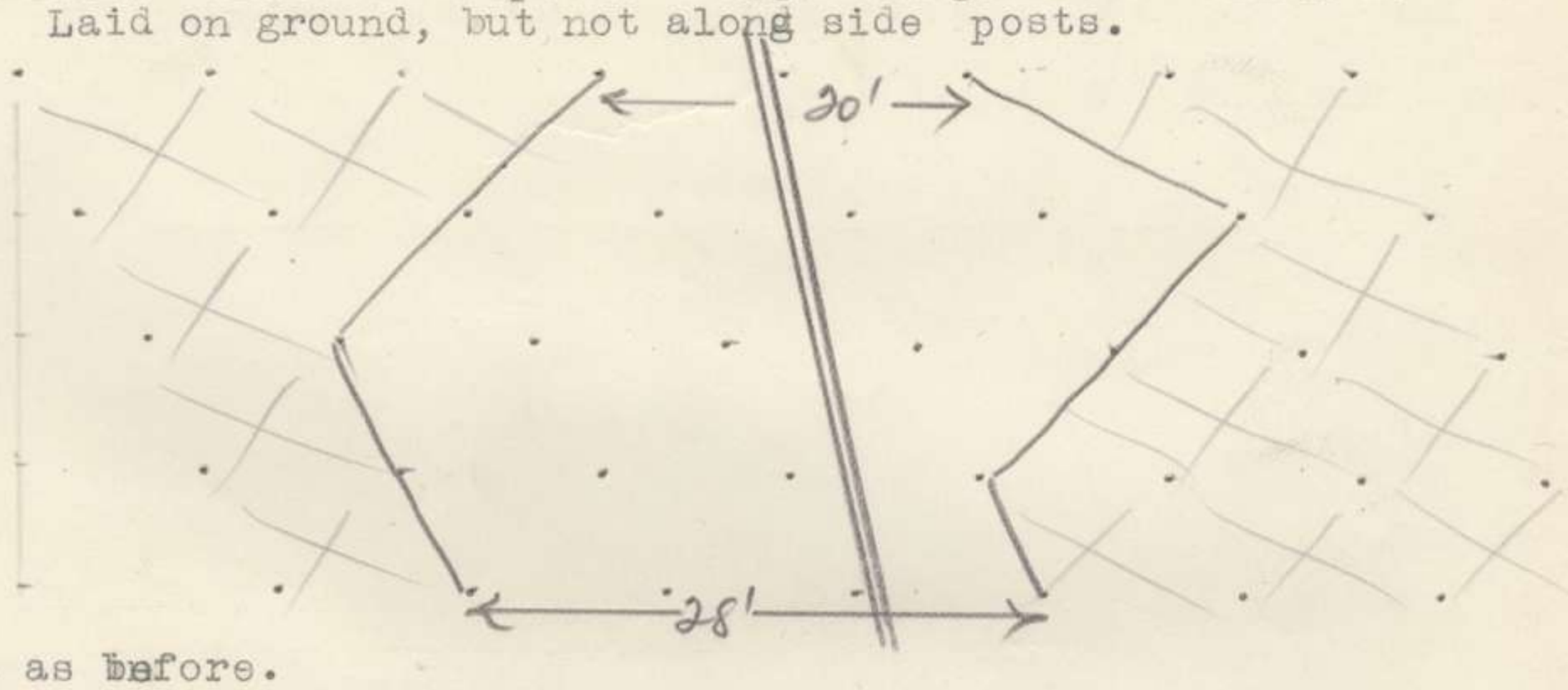
Result - Enclosed area, except areas 'a', completely cleaned of all wire and posts. Areas 'a' were not quite so clean, but formed no obstacle. Shallow trench in ground along line of pipe.

Fig. 3 Tube 2" diam., gas pipe 26' long. Charge 38 lbs Ammonal.
Laid on ground along side of posts.



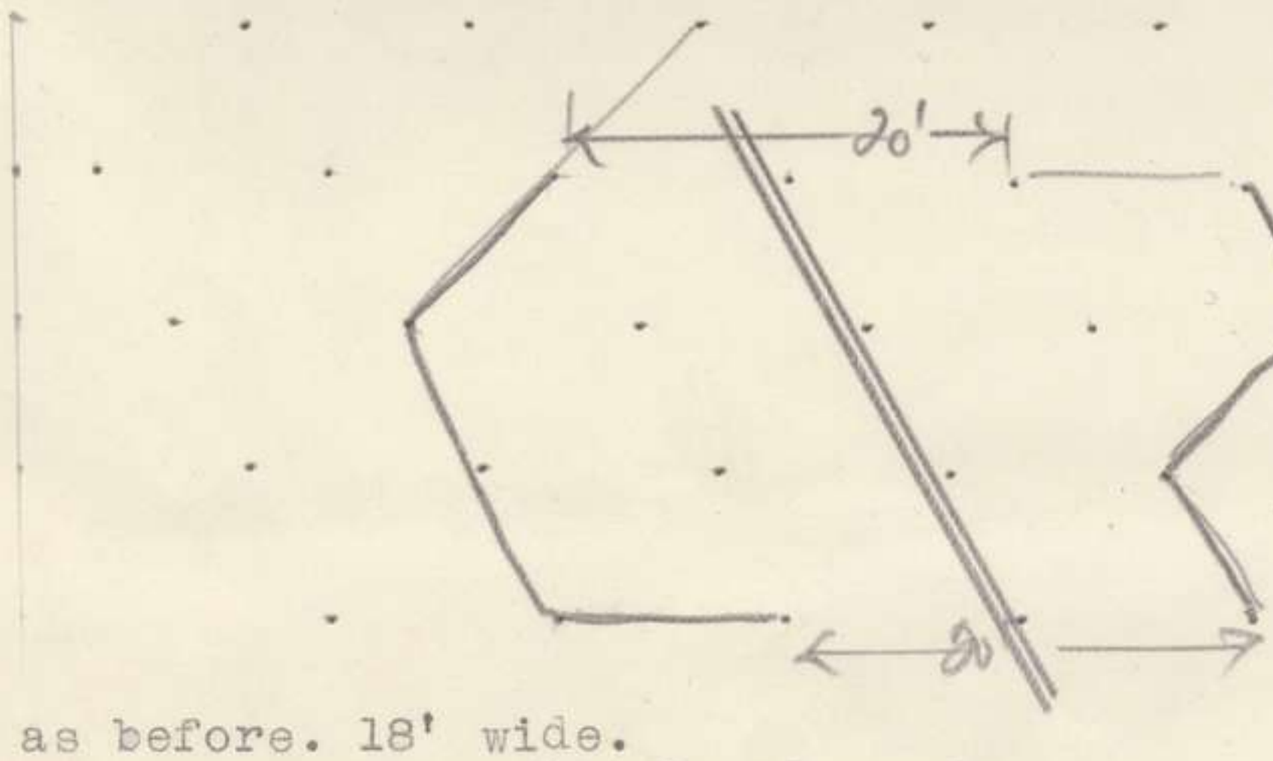
Wire - as in Fig. 2
Result - Area shown, except 'a', completely cleaned. Area 'a' fairly clean.

Fig 4. Tube2" diam. Gas Pipe 32' long. Charge 47 lbs Ammonal.
Laid on ground, but not along side posts.



Wire - as before.
Result - Area shown completely cleaned.

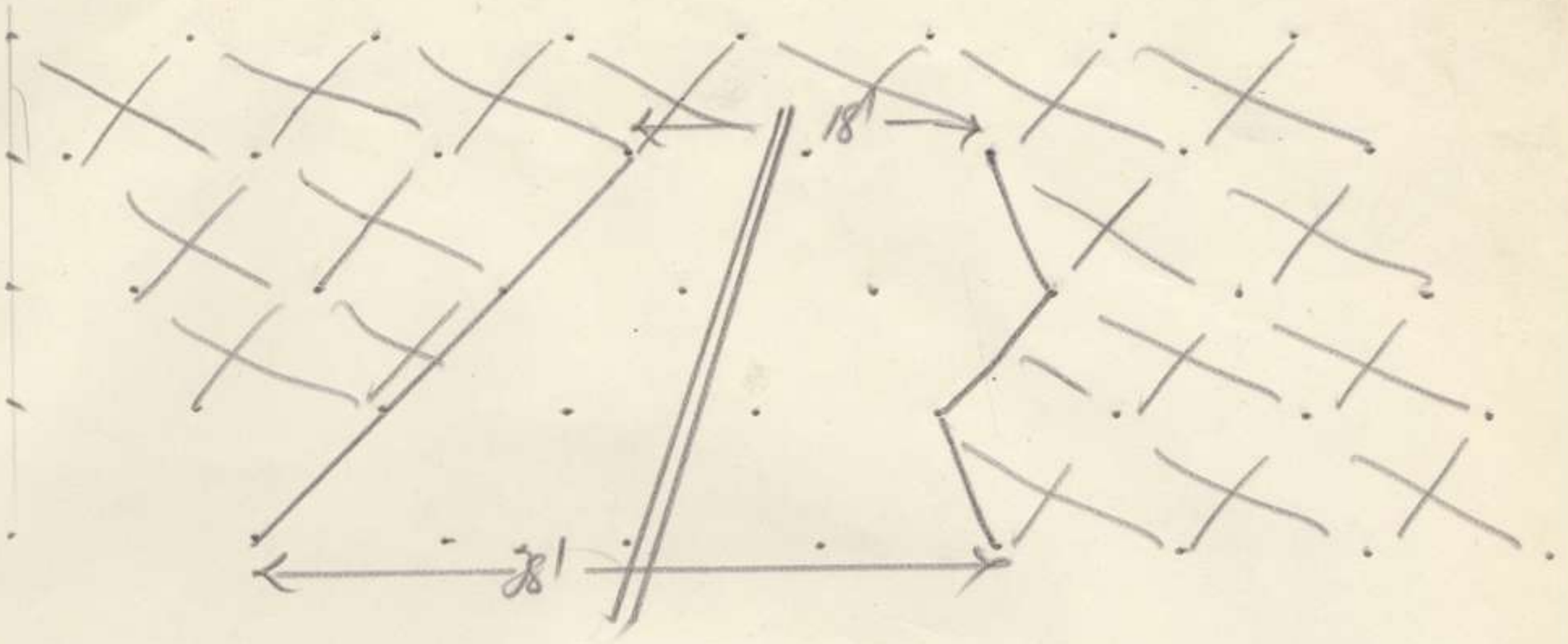
Fig. 5. Tube 2" diam. Gas Pipe 32' long. Charge 47 lbs. Ammonal.
Position - laid on ground alongside posts.



Wire - as before. 18' wide.
Result.- Area shown completely cleaned.

Fig 6

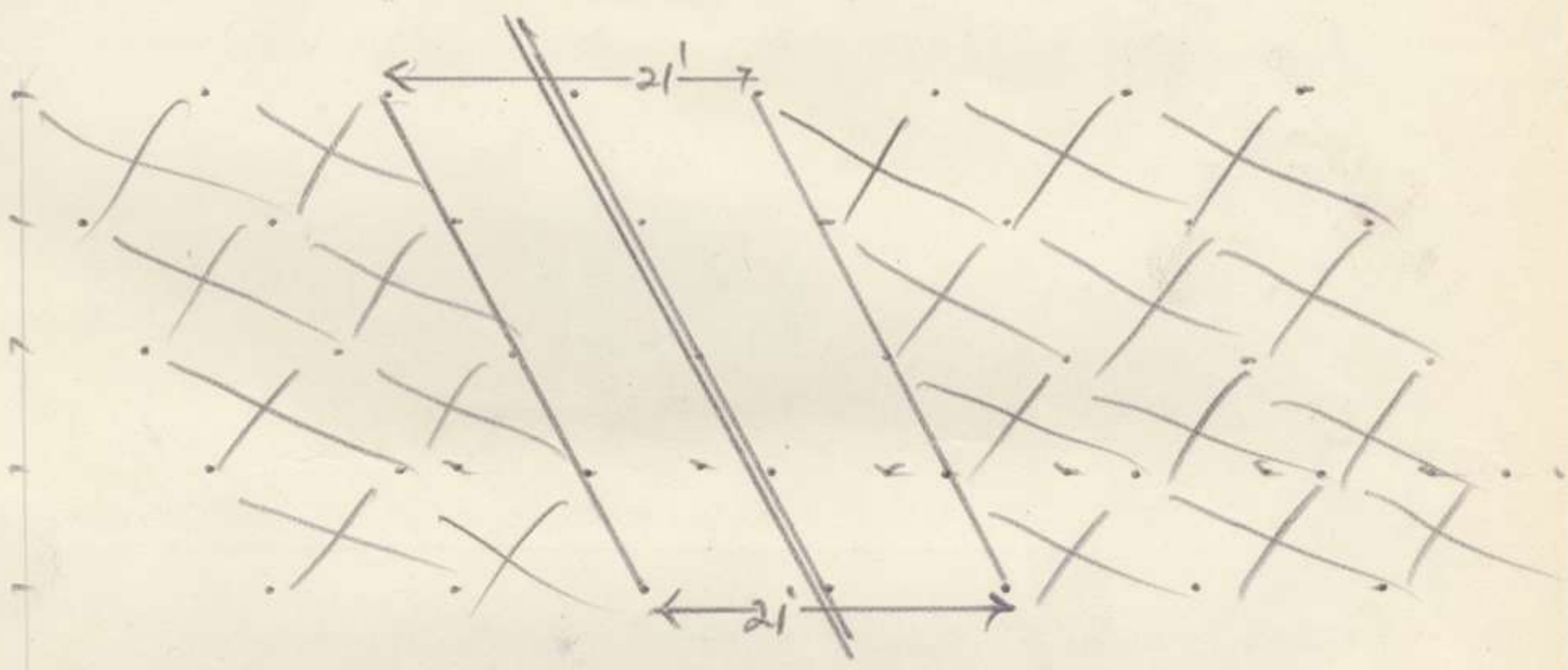
Tube - 2" diam. Gas Pipe 32' long. Charge 47 lbs Ammonal.
Position - laid on top of wire but not on top of posts.



Wire - as before.
Result - Affected area as shown. Posts and wire not thoroughly cleaned away. Enough remaining to trip a man.

Fig. 7.

Tube- 2" diam. Gas Pipe 32' Long. Charge 47 lbs. Ammonal.
Position - laid on top of wire and resting on posts.



Wire - as before

Result - Stumps of posts ### with attached wire still in position - not a clean job.

Appendix Nº 14
Appendix XIV 33

To C.R.E.

NOTES ON RECENT OPERATIONS.

Forward Communications.

Whilst the preliminary orders and arrangements for clearing roads and bridging trenches were good, the pushing forward of overland routes for pack mules carrying parties and runners and the identification of important points, the erection of location and direction boards were almost entirely neglected and on the second night after the advance there was still much confusion, and the carrying parties were lost for hours, whilst the communication between the advanced troops and Battalion Headquarters were so bad, that had the enemy attacked there may have been a disaster. The following suggestions are put forward ;-

(1) Previous to an attack, all road intersections, and junctions, farmhouses, junctions of trenches with roads or streams, and other prominent marks in the area included in the objective should be given names. It should then be decided, which points would be of most value as rendezvous at night, and illuminated signboards be prepared for same, also ordinary signboards (to be placed a few yards from the others so as to minimise the risk of a shell destroying the identification of any really important place), Signboards for the less important places should also be prepared. Maps should be issued to all Officers, with the points named thereon, the ones to be illuminated being underlined by a bright coloured ink.

The illuminated signboards should be made of biscuit tins painted service colour on three sides, The other side should be perforated with the lettering of the locality, and the name of the point as per example -

A 19255
CHATEAU
CORNER.

and then painted white. AAservice folding lantern fitted with a dark red glass and provided with an oil lamp capable of burning all night should be provided for each.

(2) The chief points of rendezvous having been decided upon, it is an easy matter to plot the approximate routes for mule and carrying party tracks on the maps. These should be marked at 20 yards interval by white painted stakes and tracing tapes just clear of the ground.

(3) Field Companies should hold sufficient of their personnel in hand fully instructed as to the routes to be followed, and supplied with the estimated quantity of stores as outlined as above. These Officers and men should move up fairly close to our front line trenches soon after the attack has been launched, and be prepared to move forward the moment that they are informed that the objective has been gained.

(4) Mule and carrying routes can be made passable by a very little labour, even through the worst shell devastated area, but it is advisable to hold at least a third of each Field Company for emergencies, so small parties of infantry should be attached to the sappers marking out the routes. It is thought that 30 to 35 men per mile of route would be ample.

(5) Having completed the marking of the routes, the sappers should assist the infantry clearing them, whilst the sapper officers and N.C.Os make a hasty reconnaissance to decide whether it will be best to develop the mule and carrying routes into limber tracks, or to select some other route.

Appendix

(6) Mule routes wil generally stop at the support line, and it will not be advisable to lay out runner's routes to the advanced post until the light is bad. As infantry Company Headquarters cannot previously be determined with anything like accuracy the Battalion Hqrs. should be supplied with sufficient tracing tape to lay runners routes from the support line to their Companies, and to prevent them being too prominent by day, they should be laid on the ground. Company runners returning to their Company could lay these tapes. The service tapes are too heavy, and in too short lengths. Reels of light white tape ¾" wide, from 200 to 400 yards in length would be better. The reels could be made of stiff cardboard or wood, revolving on spindle of fencing wire looped at each end to make hand grips.

R.E. Stores

The supplies of R.E. stores were excellent. It is suggested that a certain number of tanks for erecting on wells and streams be supplied with a T outlet pipe; each end of the T being fitted with 1" taps and the straight to have ¾" taps plugged into it. The tap combination should not be fitted to the tank until they are in position.

Camouflage

The camouflaging of battery positions was undoubtedly bad, and aeroplane photographs showed up battery positions, much more so than if the guns had been in the open. It is suggested that where guns have taken up positions behind thin hedges, that good cover from balloon view would be gained by laying branches and leaves between a double layer of wire netting and erecting a vertical screen through the hedge. It can be lowered, when the guns are in action without the leaves falling out. To screen the guns from aeroplane view or photography, a double thickness of wire netting erected horizontally, and extending well over the back of the gun to cover the shelves, and the bare ground around the gun shades would be fairly effective. There would be no shadows showing on the aeroplane photographs, and the guns would only be visible to observers when flying low, but it generally happens that a low flying machine has too much attention paid to it, for the observer to make accurate reconnaitsance.

(Sd) J.H. TOLLEY, Major,
4th Field Company A.E.

12/6/17

Appendix No. 15

appendix XV 35

Lavieville,
12th March 1917.

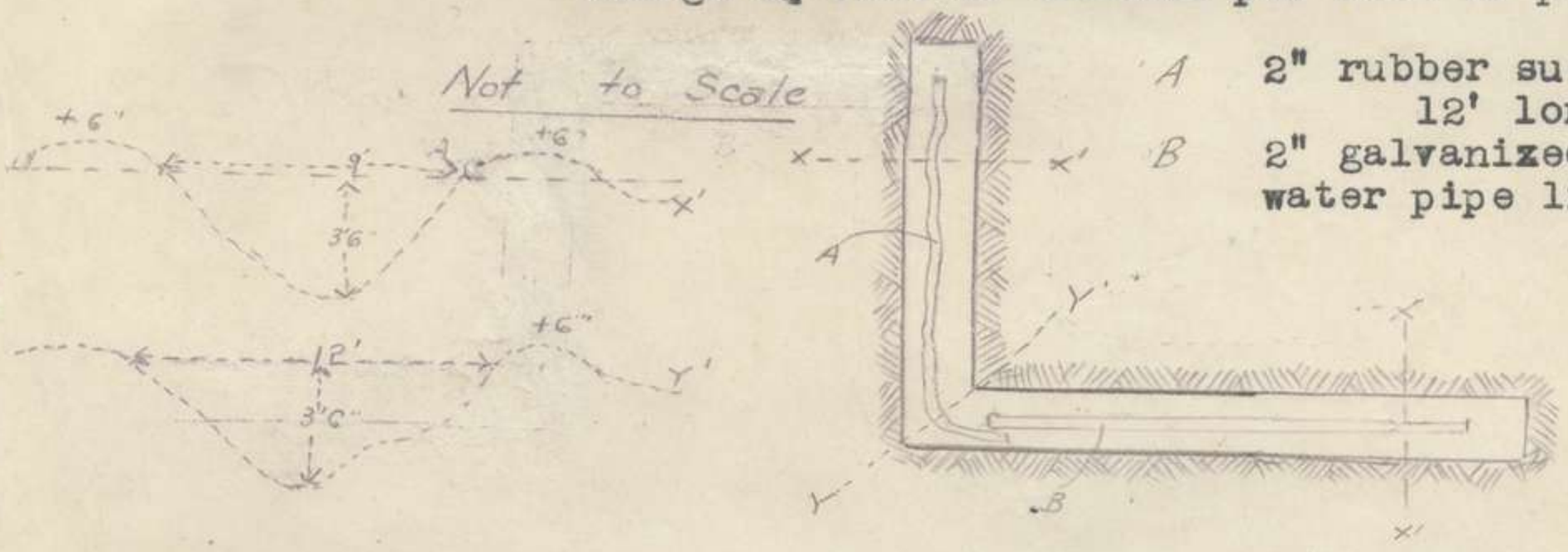
To C.R.E. 4th Aust. Divn.

Construction of trenches by means of explosives.

I have to report the results of two experiments carried out on 8/3/17 and 12/3/17 chiefly to determine the possibility of passing a detonation along a length of pipe filled with explosive under conditions approximating to those obtaining in action, when careful work is not possible owing to the darkness, haste and enemy fire.

Experiment 1 on 8/3/17.

Charge 1¼ lbs. of Ammonal per foot of pipe arranged.



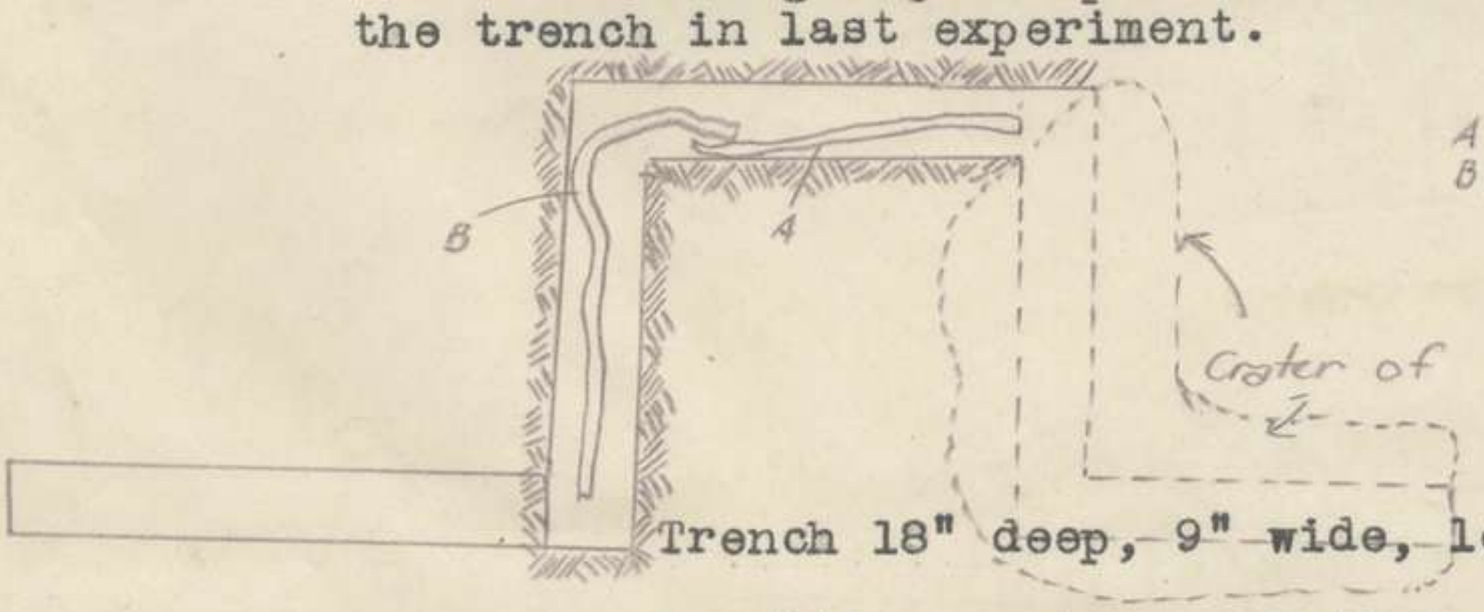
A 2" rubber suction hose, 12' long.
B 2" galvanized iron water pipe 12' long.

Trench 11" deep, 9" wide, loosely filled in.
Electric firing.

Resulting Crater. Full length of pipe, average 3'6" deep and 9" wide. At angle there was little debris on outside and the corner inside was largely sheared off by the pressure from either side (see section YY1) The ground beneath was broken up and loosened to a depth of 1'6", and could have been rapidly dug out without using picks, making a trench 5' below surface with a foot parapet sufficiently thick to be bullet proof.

Experiment 2 on 12/3/17.

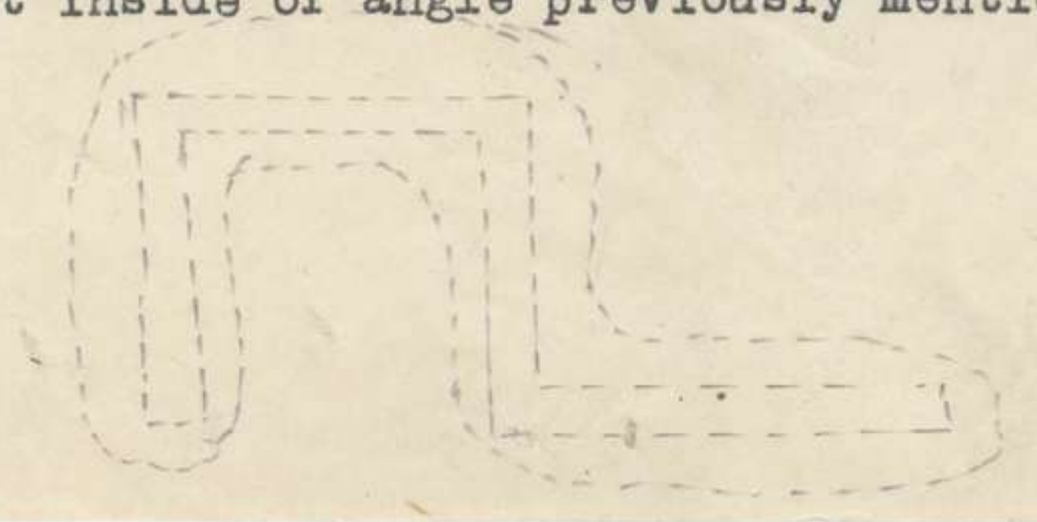
Charge 1¼ lbs per foot run arranged to continue the trench in last experiment.



A } 2" rubber suction hose,
B } 12' long

Trench 18" deep, 9" wide, loosely filled in.

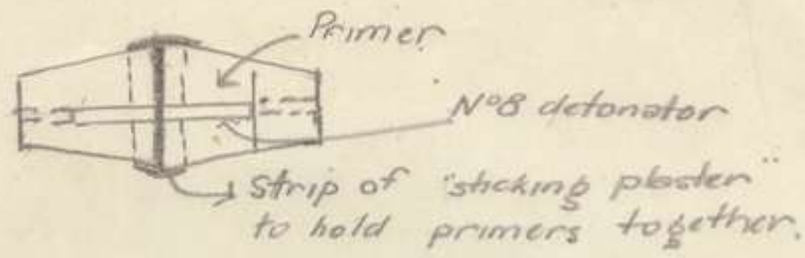
Resulting crater. Full length of pipe, averaging 4' deep and 9' wide, otherwise exactly similar to that produced in first experiment, including the planing off effect at inside of angle previously mentioned.



Notes.

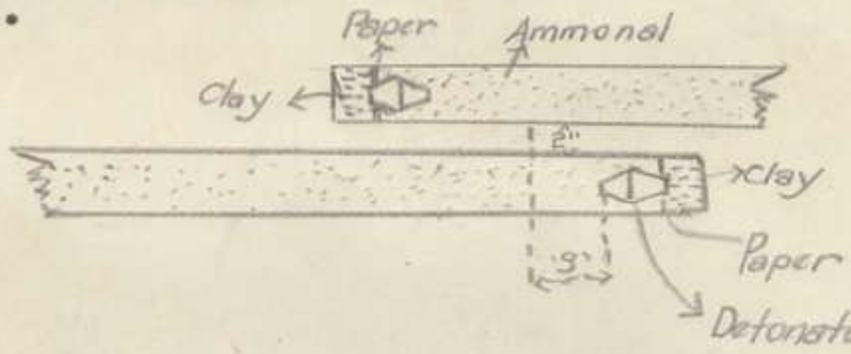
Transmission of detonation from pipe to pipe.

This promised to be the main difficulty and under active service conditions would be the main source of failure as, owing to the darkness, and haste, close contact would often not be obtained. The following method was tried to transmit the detonation :- In each end of each pipe was placed a pair of primers of dry guncotton enclosing a NO.8 detonator



This arrangement serves to protect the detonator, from mechanical damage, such as being trodden on or knocked and thus fired accidentally, rendering the tubes much safer to handle under adverse conditions, at the same time in the event of the detonator falling off with partial burning of the charge it will be rejuvenated when the detonator is reached and true detonation restored.

In experiment No. 2 the pipes were purposely placed 2" out of contact and the detonation appeared to be perfectly transmitted.



Use of Pocket Lamp battery to fire electric detonator. In both experiments the charge was fired by means of a single electric detonator and G.C. primer placed at one end of one pipe, and detonated by means of an ordinary pocket lamp dry cell battery measuring $2\frac{1}{4}$" x 7/8" x $2\frac{1}{2}$", containing 3 cells connected in series and used for lighting a small bulb 3.5 volts at 0.25 amps. This battery has been in use for one month on intermittent lighting but still gave a good bright light. The total lengthbof lead used was 420 yards of E2 Mkl cable consisting of 7 strands No. 22 wire, resistance 0.6 ohms per 100 yards from tables, making a total resistance of :-

Cable 2.52 ohms from table in Manual.
Battery 1 ohm estimated (no reliable data)
Detenator 2 ohms.
Total resistance 5.5 ohms.
Current actually used (from C= E/R)
C=3.5/5.5= 9.64 amps. This is nearly double the current that can just fire a normal detonator.

It is thus safe to use a pocket battery as above, which is in good order (that is lights a lamp brightly) to fire a single detonator (unless under sensitive) through 100 yards of E2 cable. As however many pocket lamps are fitted with 2 cell batteries, and as all small dry batteries rapidly deteriorate in use, they are not recommended except in emergency when better means are not available.

Conclusions. (a) The depth to which the pipe is buried need not exceed one foot and the earth need not be rammed down on top of it, it can be lightly filled in.

(b) Im-perfect contact does not prevent the detonation

passing from one pipe to another, provided the means already described are adopted.

(c) The number of men required to make the first trench and lay the explosive is about one tenth of the number required to dig an ordinary jumping off trench, thus avoiding casualties.

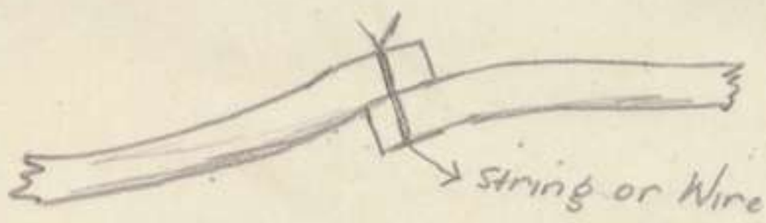
(d) The trench is not made until just before it is needed, thus reducing the risk of discovery by the enemy.

(e) One man can carry up all materials, dig, and lay charge for 10 yards of trench, the work taking less than one hour.

(f) The trench can be easily deppened.

(g) The men must be trained and the arrangements well explained first, particularly the making of the joints.

Suggestions. The charges should be made up in flexible canvas hose in 25' lengths, waterproofed by suitable means, and about 2" diameter, the charge being 1¼ to 1½ lbs per foot run. Total weight about 2 lbs of foot run. Each length of hose should have two strings or a piece of wire attached at each end to make a close joint with the next length.



Each tube must have a primer and detonator in each end to ensure proper firing of the adjacent tube. The arrangement is described on page 2.

The method can be used when it is not possible to crowd men on to work owing to enemy fire or where haste is essential.

(Sgd) C. Carre Riddell, Major,

12th Field Company, Aust. Engrs.

COPY

Appendix XVI

No. G.10/301

Headquarters,
4th Australian Division.
6th June 1917.

4th Aus. Inf. Brigade
12th " " "
13th " " "
4th Aus. Pioneer Battn.

Digging.

1. The G.O.C. wishes the attention of Officers N.C.O's and men drawn to the great importance of digging during a battle.

2. In many cases digging is more important than actual fighting, as the retention of a captured position frequently depends on the ability to dig communication trenches up to it.

3a When an Infantry party is detailed to the task of digging a certain length of trench, an R.E. Officer is as a rule told off to give technical advice in the matter, but this in no way relieves the Infantry Officer of responsibility for getting the work completed.

4. Casualties when digging under fire must necessarily occur, but an Infantry Officer who stops work for this reason incurs a grave responsibility and will be held personnally responsible for having done so.

The above is to be communicated to all Officers of Infantry and Pioneer Battalions before going into action.

(Sgd) D.K. BERNARD, Lieut-Colonel,

G.S. 4th AUSTRALIAN DIVISION.

Copy to C.R.E.

Appendix No. 17 Appendix XV.. 39

Memo re Divisional School for Engineers

N.C.O's.

Time Table

Reveille	5.45.a.m.
1st Parade	6.15. - 7.a.m.
2nd. Parade	8.30. - 10.30.a.m.
Lecture	11.a.m. - 12.noon.
Afternoon Parade	2.p.m. - 5.p.m.

Evenings free for working up notes and night work.

The above hours will be varied according to weather conditions and subject in hand.

1st parade will be devoted to communicating drill, dismounted drill and elementary musketry.

The other parades will be employed for -

3 days. Map Reading. Fixing positions on Map. Field Goemetry.

1 day. Reports. Reconnaissance in conjunction with above.

3 days. Laying out trenches and small works, and their concealment when made.

2 days. Handling working parties and rapid wiring.

2 days. Demolitions.

3 days. Knots and lashings. Blocks and tackle. Use of Spars.

5 days. Spiked trestles. Small floating and plank bridges. Bridge expedients.

2 days. Roads and drainage. Water supply, and use of levels. (work out a scheme of water supply for camp)

3 days. Recapitulation and revision and examination.

24 days.

(Sd) F.C.Elliott

18/6/17

Lieut. Colonel,
C.R.E. 4th. Aust. Div.