



**BRITISH MINING
DURING
WW I**

References

- They Called it Passchendaele
- Passchendaele and the Battles of Ypres 1914-18
- The Marshall Cavendish Illustrated Encyclopedia of WW I, Volumes 4 & 7
- A Storm in Flanders, Tragedy and Triumph on the Western Front
- The Battleground Europe Series: Ypres, Hill 60

Outline

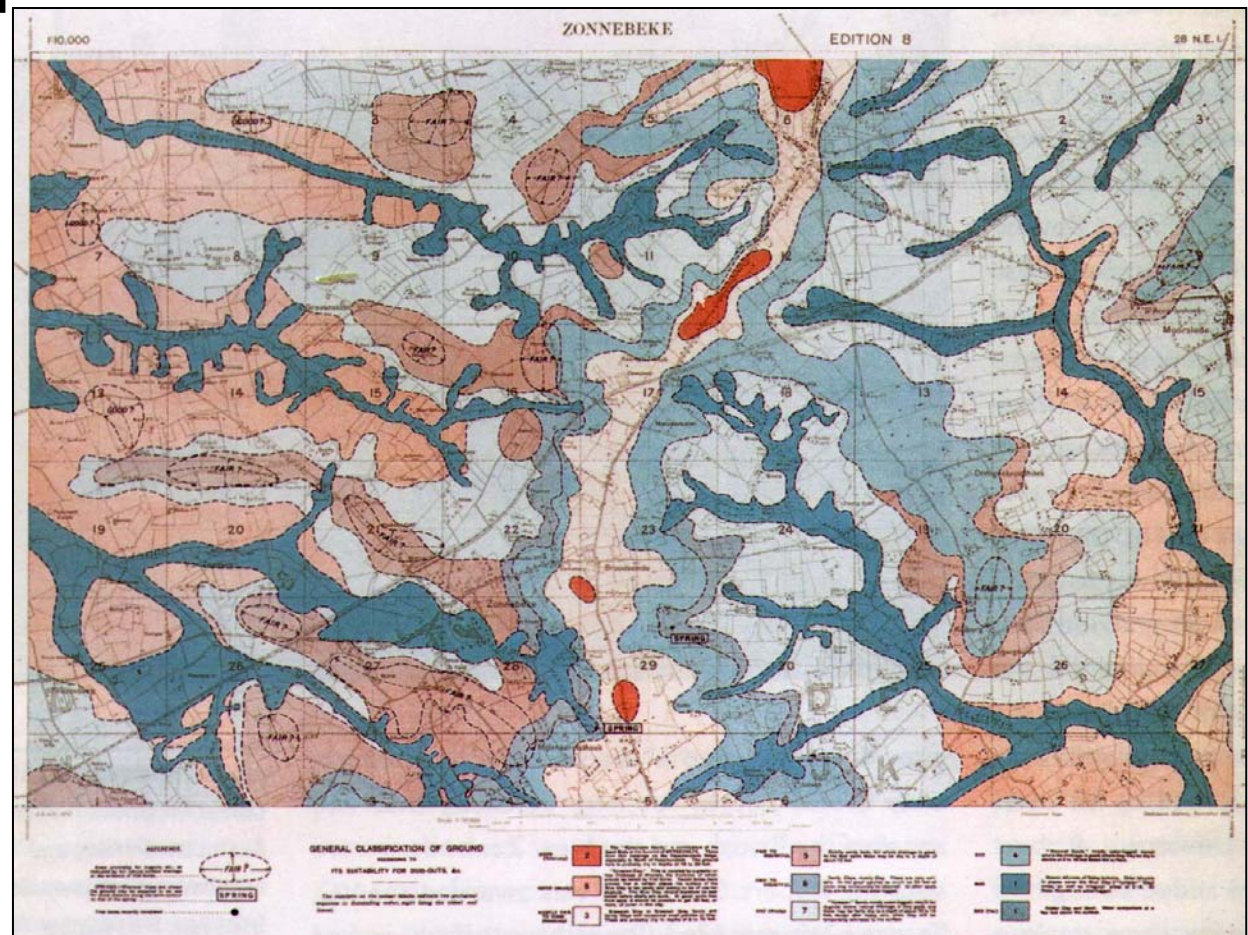
- History of Mines
- Mine Construction
- Mines in Combat
- Case Study: Messines Ridge, 7 June 1917
- Summary
- Conclusion

History of Mines

- Medieval Sieges
- Decline of Mining
- WW I German Offensive Mining

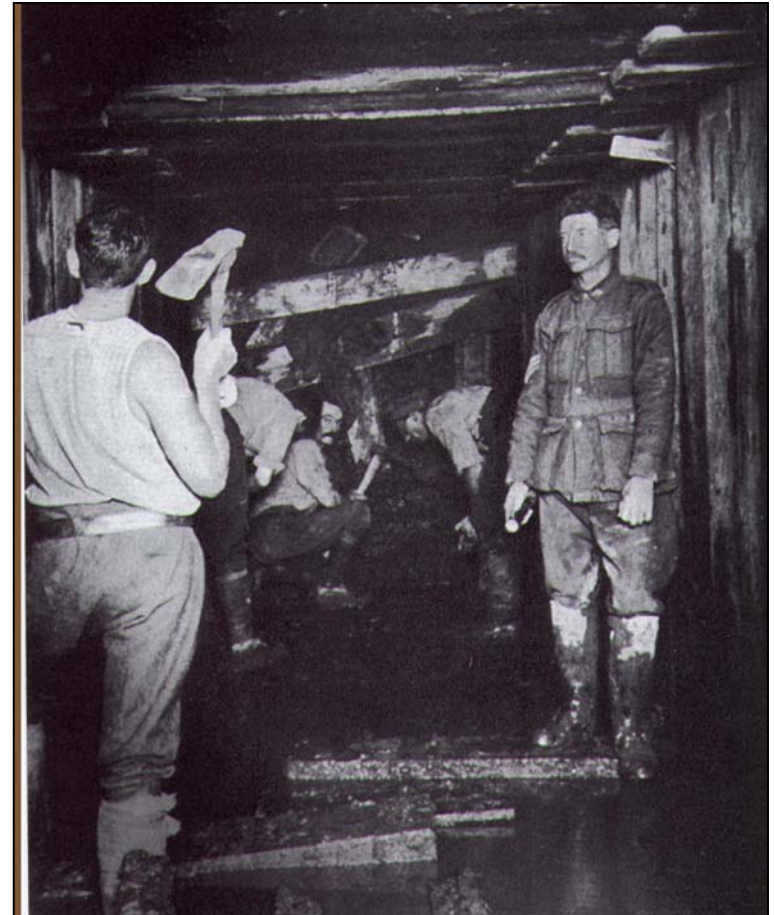
Mine Construction

- Exploration
- Geology



Mine Construction

- Mining Technology
 - Shoring
 - Lighting
 - Pumping
 - Warning



Mine Construction

- Digging Techniques
 - Pick & Spade
 - 6 ft per 8 hr Shift



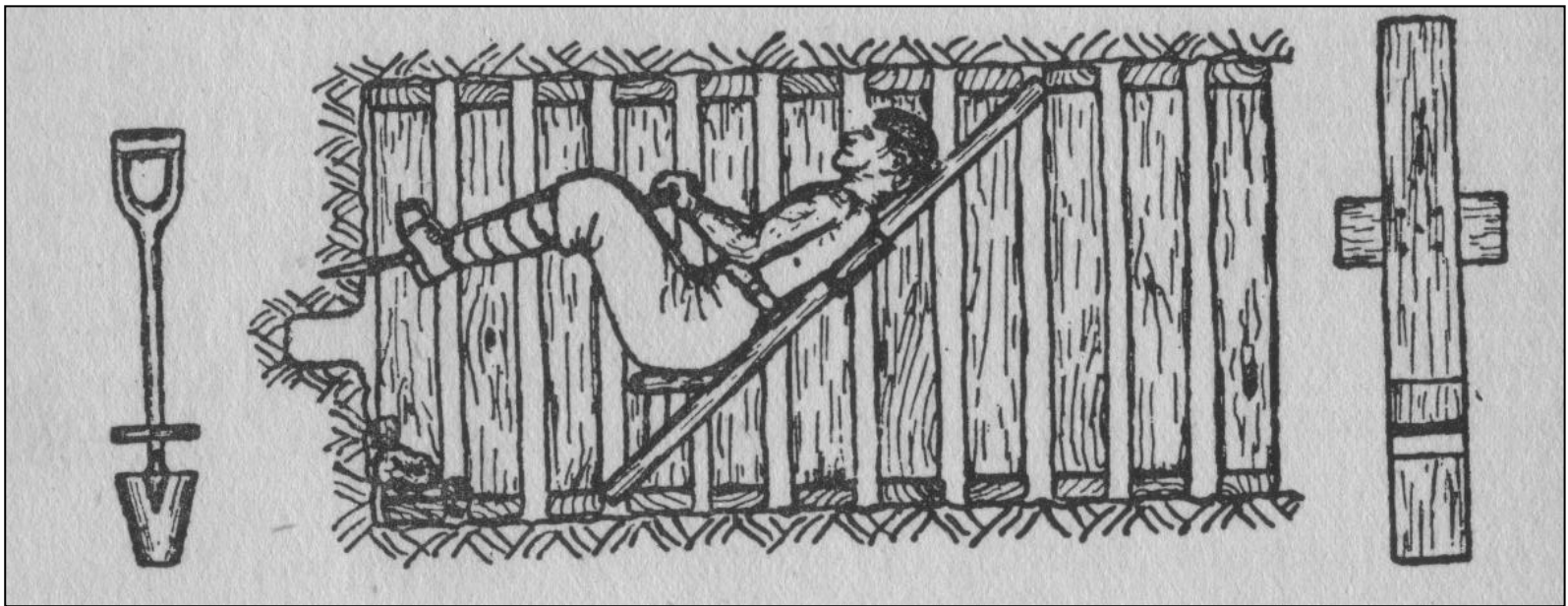
Mine Construction

- Digging Techniques
 - Transporting the Spoil



Mine Construction

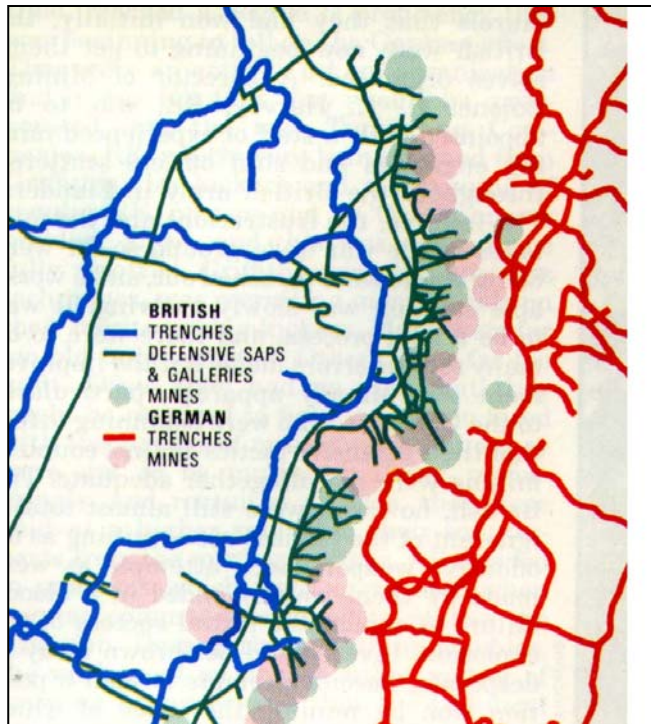
- Digging Techniques
 - “Clay Kicking”



- 12-14 ft per 8 hr Shift

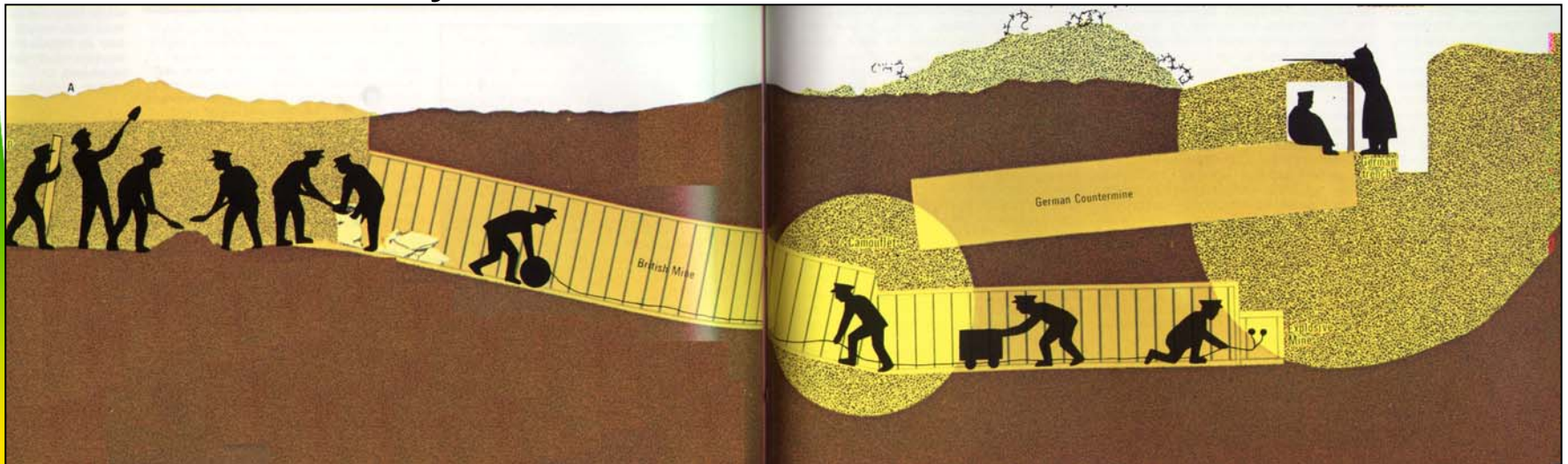
Mines in Combat

- Defensive Mining
 - Geophone
 - Camouflet



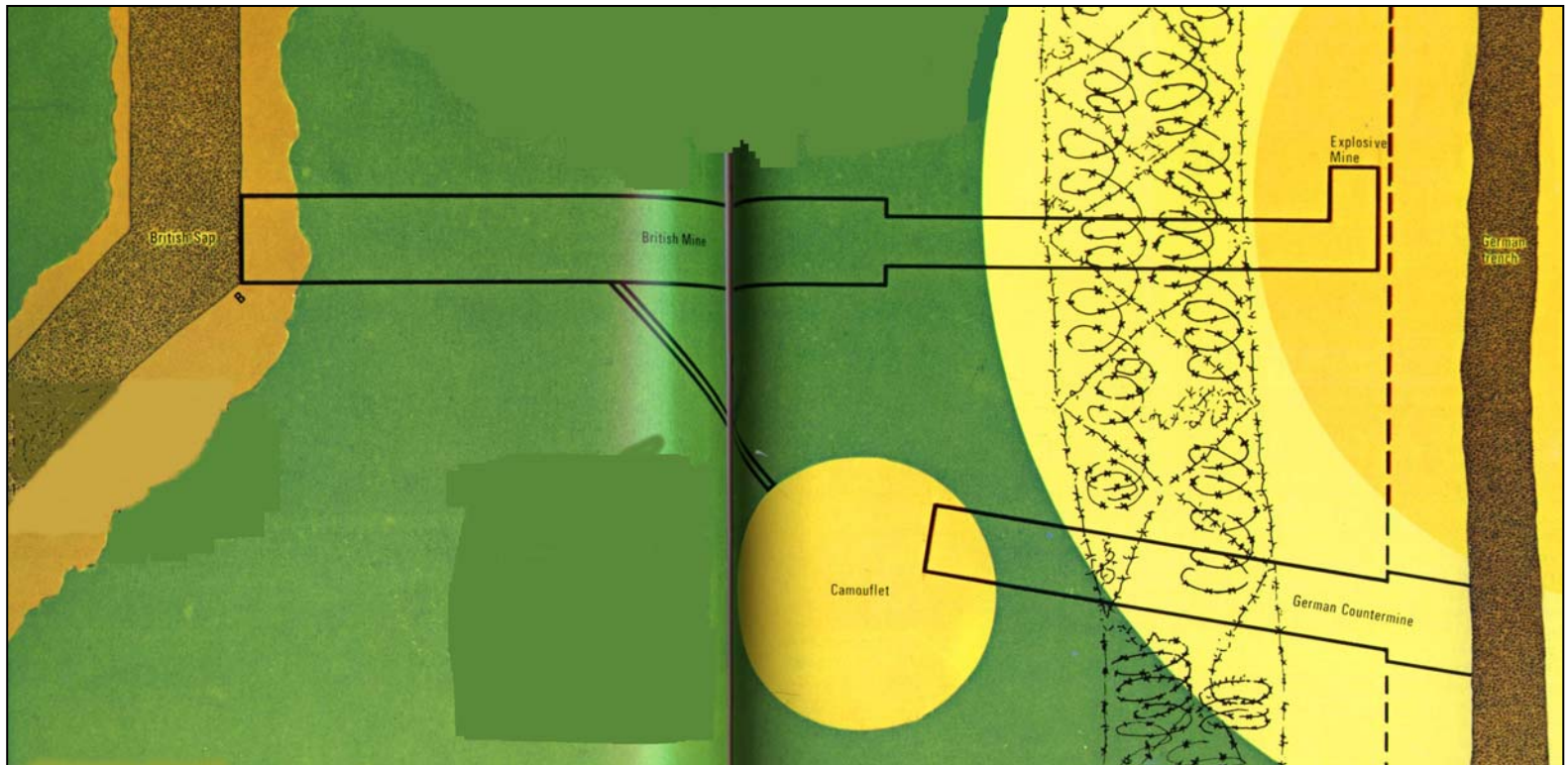
Mines in Combat

- Offensive Mining
 - Cut-away View



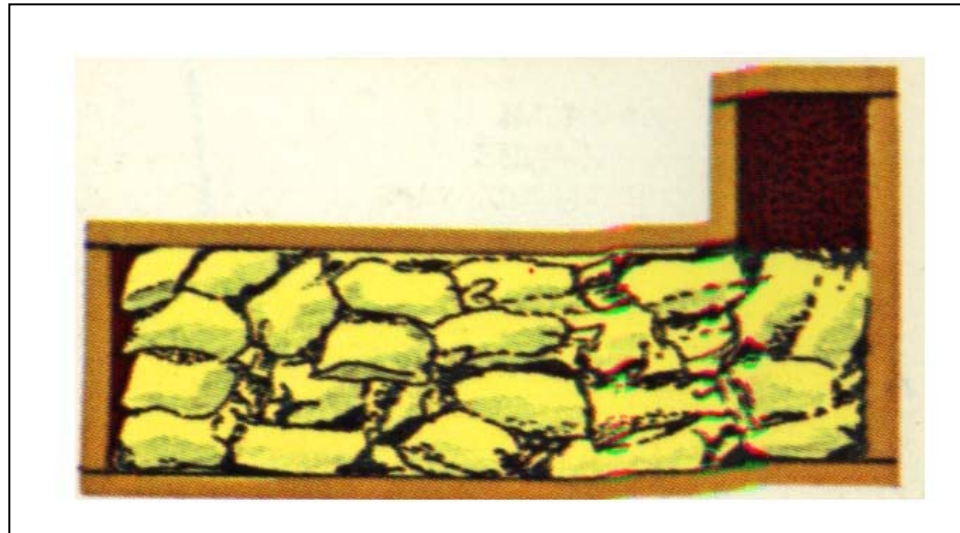
Mines in Combat

- Offensive Mining
 - Plan View



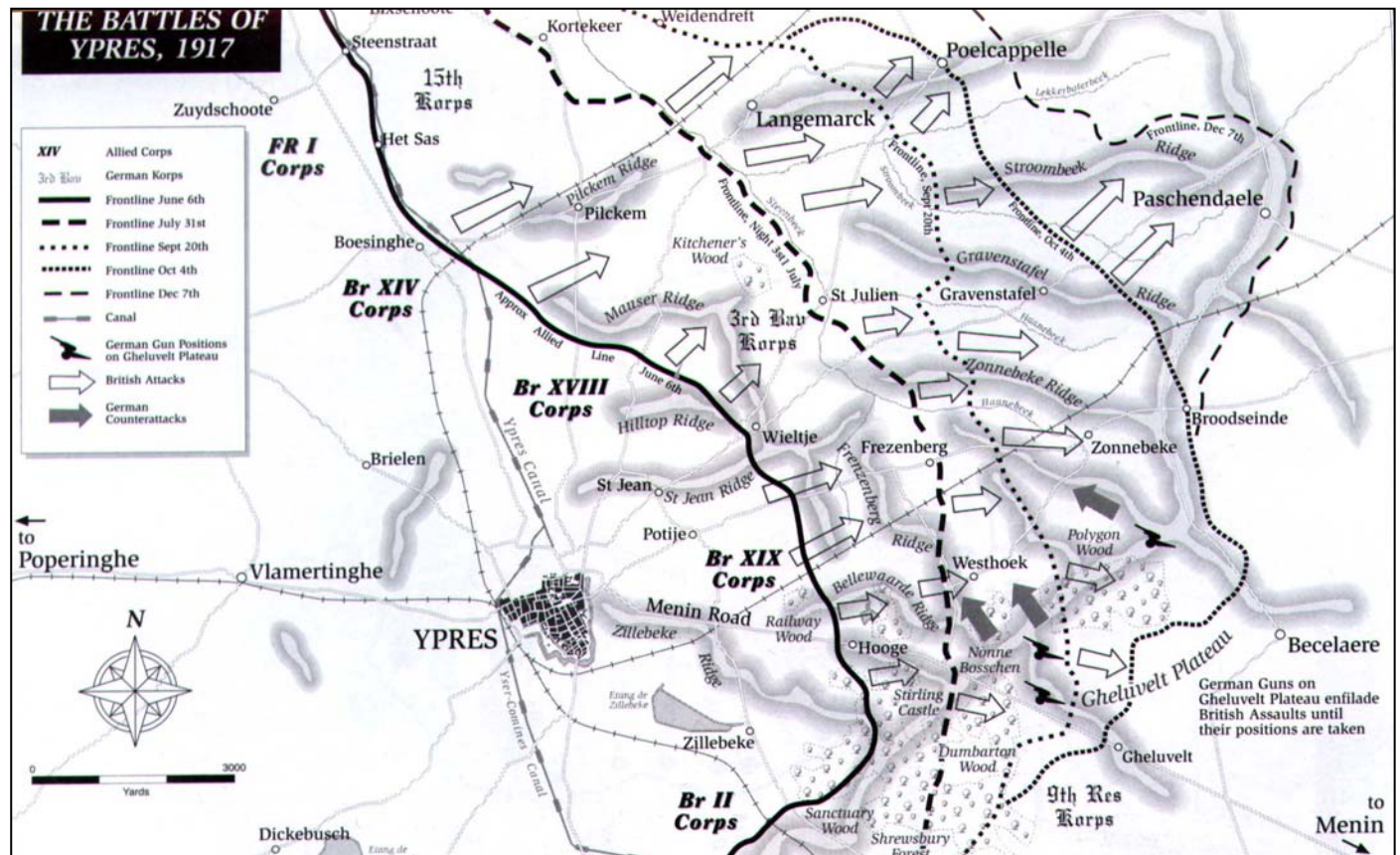
Mines in Combat

- Offensive Mining
 - Explosive Charge
 - Ammonal
 - Tamping



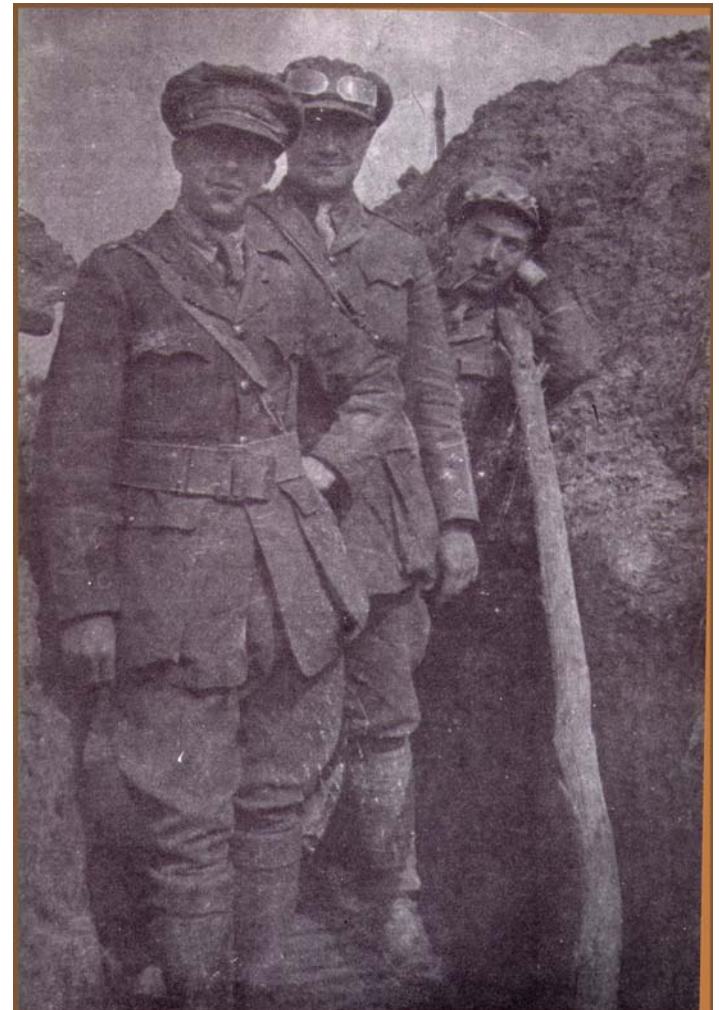
Case Study

- The Third Battle of Ypres: Messines Ridge



Case Study

- Units Involved
 - 171 Tunnel Co. RE
 - 175 Tunnel Co. RE
 - 3rd Canadian Tunnel Co.
 - 1st Australian Tunnel Co.



Case Study

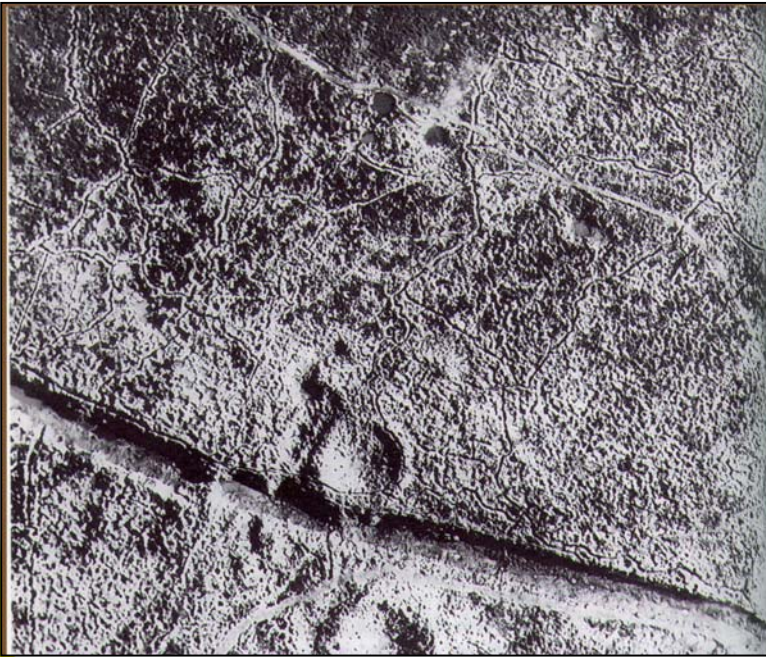


- Mines
 - 21 Mines
 - 200 – 2000 ft in Length
 - 50 – 125 ft in Depth

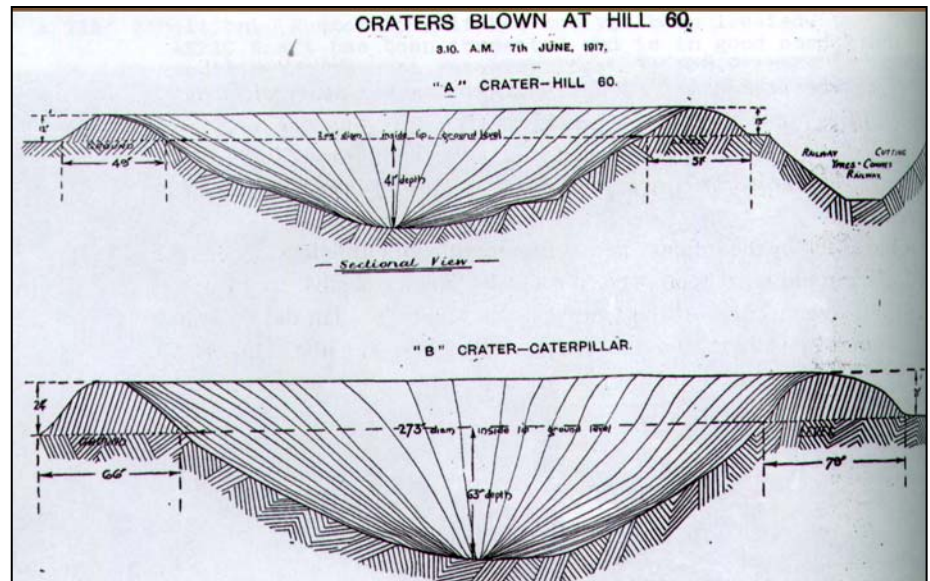
- Explosives
 - Over 1.2 million lbs



Case Study



- Aftermath



Summary

- History of Mines
- Mine Construction
- Mines in Combat
- Case Study: Messines Ridge, 7 June 1917

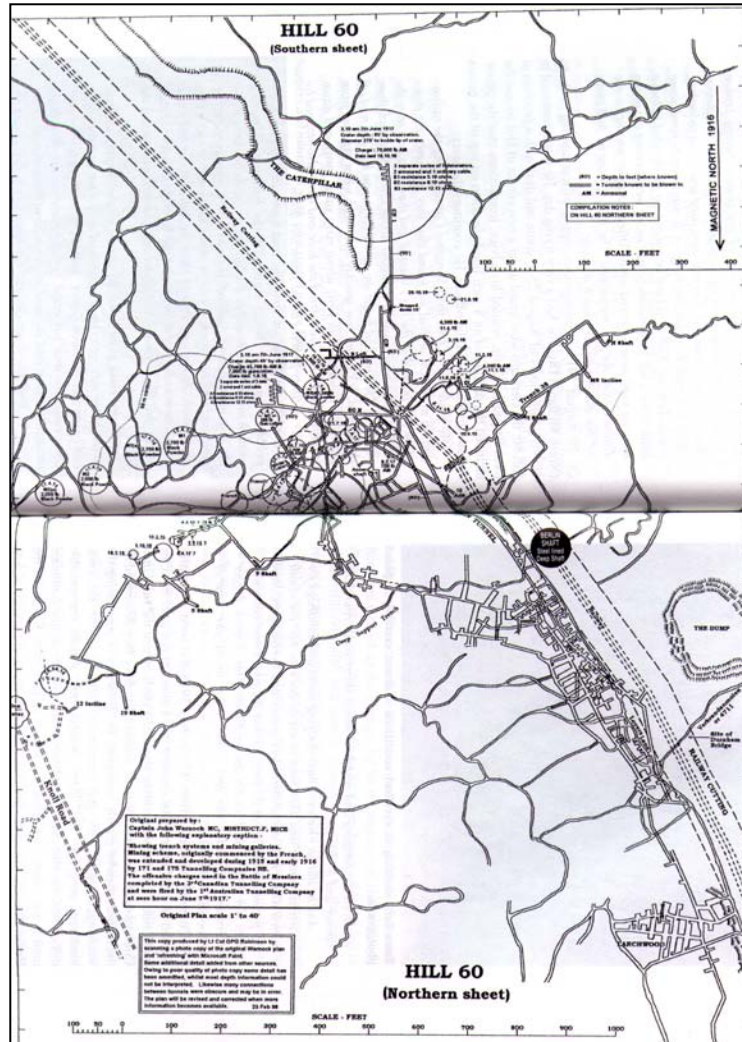


Conclusion

“It was tremendous. One almost felt “Good old England.” You wanted to wave a little Union Jack. Thanks God we’ve done something. It had a tremendous moral effect.”

- 2nd LT J.W. Naylor, Royal Field Artillery

Case Study



Case Study

- SECOND ARMY OFFENSIVE MINES 7.6.17. -

TABLE 9

1	2	3	4	5	6	7	8	9	10	11-15					16	17
										DIAMETER AT GROUND LEVEL	WIDTH OF RIM	DEPTH BELOW GROUND LEVEL	HEIGHT OF RIM	DIAMETER OF COMPLETE ORBITERATION		
ORDER NORTH-SOUTH	NAME OF MINE	% EFFICIENCY ENGLISH FORMULA	CHARGE LIB.	DEPTH IN FEET	CIRCUITS AND PRIMERS	METHOD OF FIRING	DESIGN OF CHAMBER	PACKING	TAMPING	DETAILS OF CRATER IN FEET					REMARKS	
2	ST ELOI	70	95,300 Amm 3000 GEL	123	THREE CIRCUITS - EACH 10 DETS. EACH DET IN 13 3/8 STICK GELIC EACH PRIMER IN 50 LB AMM TIN	EXPLODER ON EACH CIRCUIT ALL FIRED TOGETHER		AMM TINS DETS BADLY SPACED	150 SOLID - 10 AIR - 300 GEL TOTAL 600 P	176	77	17	8	330	NIL	THE DETONATORS WERE PLACED ALONG THE GALLERY AND WERE THE MOST CENTRAL THE RIMS WERE 77 1/2 DEEP IN YPRESIAN CLAY FOR WHICH THE SOIL FACTOR SHOULD HAVE BEEN 2 INSTEAD OF 1.7. THESE TWO POINTS DIRECTLY AFFECTED THE RESULT.
3 ^B	HOLLANDSCH ESCHEMUIJ NO 2	76 1/2	12,500 Amm 2,400 BLAST	58	TWO CIRCUITS - EACH 5 DETS ONE DET IN 50 LB DYN. REST IN ONE 3/8 STICK DYN IN RUBBER BAG IN 50 AMM TIN	EXPLODER ON EACH CIRCUIT FIRED TOGETHER		AMM TINS DETS WELL SPACED	300 SOLID	105	55	14	7	215	11	THIS CHARGE HAD PROBABLY DETERIORATED, WHICH ACCOUNTS FOR ITS POOR RESULT.
5	MAEDELSTEDE FM	80	30,000 Amm 4,000 G.C.	96	THREE CIRCUITS (2 1/2" 12" AND 3" MARK DYN) 2 TWO - EACH DET IN G.C. PRIMER IN 50 LB AMM TIN. 1 THIRD - EACH DET IN 3" PIPE 15 1/2" TWO WITH BLAST ONE WITH GELIC.	POWER ALL CIRCUITS		AMM TINS DETS WELL SPACED	550 SOLID 100 AIR 120 SOLID TOTAL 570 P	205	90	23	12	385	NIL	THE DETONATORS ON THE THREE CIRCUITS OF THIS CHARGE WERE NOT BALANCED, AND THIS PROBABLY ACCOUNTS FOR REDUCED RESULT.
1A	HILL 60 A	91	45,700 Amm 7,800 G.C.	90	THREE CIRCUITS - EACH 5 DETS WITH EACH DET - 1 G.C. SLAB, 5 G.C. PRIMERS AND 4 NO 8 DETS. EACH PRIMER IN 10 LB AMM TIN	POWER ALL CIRCUITS		4 GALL PETROL TINS G.C. FILLING DETS BADLY SPACED	90 SOLID 100 AIR 180 SOLID 200 AIR 60 SOLID TOTAL 630 P	191	47	33	11	285	10	THE DETONATORS OF THIS CHARGE WERE PLACED ALONG THE GALLERY. BETTER RESULTS WOULD HAVE BEEN OBTAINED IF THEY COULD HAVE BEEN PLACED CENTRALLY TO THE CHARGE BUT ONLY SPACING WOULD HAVE MADE THIS POSSIBLE.
1 ^B	HILL 60 B CATERPILLAR	112	AMMONAL	85	THREE CIRCUITS - EACH 5 DETS WITH EACH DET IN 1 G.C. SLAB, 5 G.C. PRIMERS AND 4 NO 8 DETS. EACH PRIMER IN 10 LB AMM TIN	POWER ALL CIRCUITS		4 GALLON PETROL TINS DETS WELL SPACED	90 SOLID 100 AIR 180 SOLID 200 AIR 60 SOLID TOTAL 630 P	260	60	51	17	360	10	DETONATORS PLACED ALONG CENTRAL PASSAGE OBTAINED GOOD RESULTS IN SPITE OF MANY SEPARATE CHAMBERS
11 ^B	TRENCH 122 NO 6 RIGHT	116 1/2	AMMONAL	58	THREE CIRCUITS EACH 6 DETS. EACH DET IN 1 G.C. PRIMER WITH 10 NO 8 DETS IN 50 LB AMM TIN	EXPLODER ON ONE CIRCUIT ONLY		AMM TINS DETS WELL SPACED	420 SOLID	228	64	28	4	356	12	SEE REMARKS 10A
8 ^B	KRUISSTRAAT NO 2	120 1/2	AMMONAL	55	THREE CIRCUITS - EACH 6 DETS, 9 IN 1 G.C. PRIMER WITH 10 NO 8 DETS IN 50 LB AMM TIN. 3 IN 7 1/2 STICKS CEL. DYN EACH PRIMER IN 50 LB AMM TIN	POWER ALL CIRCUITS		AMM TINS DETS WELL SPACED	180 SOLID RIGHT ANGLE BEND	217	75	40	10	367	11	GOOD ARRANGEMENTS SECURED GOOD RESULTS

Mines in Combat

- Offensive Mining
 - Example

