PACIFIC
WATERPROOF

FIELD BOOK

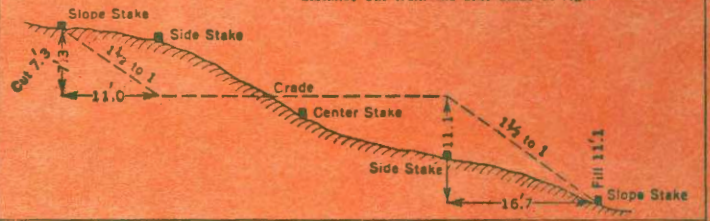
No. 301

MM 76 D-M-Hills

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

Dave's Map Units

(7) Ultramafic Rocks

(8) Magnetiferous, clinoamphibole metabasite

(9) Red-weathering, massive dolomite

(10) Micaceous, variably carbonaceous orthoquartzite

(11) ~~Micaceous~~, graphitic schist.

(12) Massive sulphides

(13) Pyritic, variably baritic quartzite

(14) Q-Ms, Bi-Ms, Ms-Chl. schist

(15) Bi-Clamph, Bi-Ch granulite.

Hole MM-76-01 should penetrate
15 then 13 then 12
or 14 then 15 then 13 then 12

MM-76-01 LITHOLOGIC LOG.

0 - 10 OB

10 - 240 Quartz + muscovite ; quartz + chlorite, quartz + muscovite + chlorite, quartz + chlorite + actinolite. Sulphides throughout - mostly Po, traces of Sph + Ga (sulphides from 0 to 2%) - finely disseminated

10 - 35
35 - 71
71 - 132.5
132.5 - 133.0
133.0 - 197'
197' - 204'
204 - 240

From 35 to 71 - injected vein quartz makes up 20 to 80% of core.

Sample A typical rock from 107' (A)

At 133' - 6" band, also 197' to 204' - lots of apparent brecciation, with pale green mineral injection - sample from 200.5' (B) - contains a couple of % of disseminated sulphides

240 - 527 Imp Quartzite, fairly competent, foliated, with more or less muscovite, chlorite & actinolite.

240-371 Minor sulphides, mostly pyrite disseminated throughout probably 0 to 2% locally. ~~At 241' -~~ ~~band of pyrite about ½" thick, ∥ to S~~

371-373 Contains a few mica schist bands a foot or so thick.

373-426.5 Samples. (C) 272'

426.5-429 (D) 365'

429-527 (E) 464'

(F) 506.5'

Locally, thin bands a few mm thick about 50% sulphides - mostly Pyrite

371-373 - Band of graphitic, Pyritic mica schist.

426.5-429 - Vein quartz, Cont a ¼" sulphide vein - mostly Pyrite with trace of sphalerite, also little blotches of py, sph & ga

527-547 Quartz-rich schist - muscovite, chlorite & graphite present

Sample (G) 544.5

Minor pyrite dissem throughout 1-2%

traces of Sph + Ga

547 - 600 Quartzite very competent (coming out in lengths up to 8 feet), less micas, rather purer quartzite than above, less well foliated; than 240 - 527

587-600 - Contains abundant vein quartz.

587-587 Sulphides throughout, mostly pyrite,

587-600 in little blotches & thin bands - perhaps about 5%

Samples (H) 563.5

(J) 599.0

76-02 SULPHIDE SECTION

405 - 410 (Only 4 feet recovered) Massive, coarse-grained light grey banded, relatively pure, weakly foliated - trace of Py. Minor Qtz

Last 2" - bands of sulphide - almost entirely Pyrite - ½" thick // S_1? (S_2 absent?)

Fol ^ CA ≈ 20° First 1" - Py - Qtz - Ba band with minor Ga + Sph - grns → 2mm

410.0 - 410.5 Massive sulphide band // S_1

Seemrt to be mostly Py - Coarse grnd (2-0.5mm)

410.5 - 412.0 As 405-410 with thin sulphide bands

412 - 430 Massive sulphides, with a few thin interbands of grey ~~barite~~

Sulphides ≈ 75% Mostly Pyrite - grains up to 1mm, minor Sph + Ga in blobs up to ¼" diam. Estimate ≈ 10% comb

Minor calcite, ~~quartz~~ and siderite

430 - 433.3 As 405-410 - Massive ~~Qtz~~ bands

[431.5 - 431.7 2" band of brecciation cont. about 30% sulphide infilling - mostly Po.]

433.3 439.0 Massive sulphides - as 412-430 but mixture of Pyrite + Pyrrhotite

Sulphides ≈ 75%

		Tag #
SPLIT	405.0 - 412.0	1651 ⊛
	412.0 - 415.5	1652
~~Fole 405 - 410~~	415.5 - 420.5	1653
~~405 - 410~~ Lost Seen	420.5 - 425.0	1654
	425.0 - 430.0	1655
	430.0 - 433.3	1656
⊛ Only Split of Core	433.3 - 439.0	1657
	439.0 - 444.0	1658
	444.0 - 449.0	1659
	449.0 - 454.0	1660
	454.0 - 459.0	1661
	459.0 - 464.0	1662
	464.0 - 469.0	1663

Fol. Meas

429.0 - 40	Apparently S_1 - cannot see S_2
439.0 - 50	
449.0 - 45	469.0 - 50
459.0 - 55	479.0 - 40

From 432 to 451 - hole eccentrically // to foliation) which undulates gently

SPLIT	469.0 - 474.0	1664
	474.0 - 479.0	1665
	479.0 - 484.0	1666
	484.0 - 489.0	1667
	489.0 - 494.0	1668

439.0 – 463.0 with pyrrhotite & barite –
bearing quartzite with minor calcite,
Pyrite, Sphalerite, galena, & magnetite
Sulphide about 20%, mostly Po
Po appears cubic and looks like Py but
magnetic. ∴ probably pseudo of Po
after Py, also minor magnetite.

463.0–464.0 Massive Sulphide
Approx 75% Sulphide in quartzite with Feld xcrysts.
Mainly Po with minor Py, Sp & Ga
also minor barite & trace of calcite

464.0 – 484.0
As 439.0–463.0, but with minor Bi & Chl
Sulphides about 10%
Bi flakes along late fracture surfaces
NB In banded sections Ga & Sph are
more visible than in massive sections

~~464.0~~
464.0 – 484.0 Medium grey, fairly pure
fairly massive quartzite, well foliated,
with thin bands cont abundant sulphide,
Mostly Q, minor Chl & Bi (?)
Locally cont feldspar xno's

Fol 489.0 – 25°
499.0 – 20°
509.0 – 65°
519.0 – flatter
breac-fol irreg
529.0 – 55° S_2 000
539.0 – 65° S_2 / 205 S_1
549.0 – Folded & wavy
557.0 – roughly vertical (*)
569.0 – roughly vertical (*)
(*) vertical in core

SPLIT 494.0 – 498.0
498.0 – 503.0
503.0 – 513.0
513.0 – 518.0
518.0 – 523.5
523.5 – 529.0
529.0 – 534.0
534.0 – 539.0
539.0 – 544.0
544.0 – 548.0
548.0 – 553.5
553.0 – 557.0

Sulphide mainly Po with minor Ga & Sph
perhaps 10% total sulphide
Bi flake along late fracture surfaces
well foliated

484.0 – 495.0 Light grey, banded quartzite
with minor ? Barite, calcite, & chlorite
Approx 10% sulphides – mostly Po,
minor Py, Sph & Ga. – As 437–463

495.0 – 510.0 – As 464.0–484.0
Sulphides mainly Po + Py with minor
Ga & Sph – Perhaps 10% total
Large blobs of purple fluorite

518.0 – 529.0 As above but more sulphides – perhaps 25-30% overall Approx 10% Sph, 2-3% Ga, rest Po (probably pseudo after Py), traces of Cp. Minor fluorite present, also a few blobs of magnetite

529.0 – 548.0 As 495.0 – 518.0 without the fluorite

548.0 – 557.0 As above but more sulphides perhaps 15-20% overall. Mostly mixture of Py + Po with minor Sph & ga.

557.0 – 595.0 Greenish grey chlorite & muscovite-rich quartzite, also (?) minor biotite. Biotite & chlorite along late fracture surfaces. Bands of sulphide throughout – Approx 10% total – mostly Po, minor Py, Sph & ga. At 587 – 2" band of 50% sulphides

seems to be 20% Po, 10% Sph, 5% Ga, minor Py

Light grey marble with interbands of light grey quartzite

510 – 518 " Approx 10% sulphides – mainly Po + Py with minor Sph & Ga. Large blobs of fluorite

518–529 As above but more sulphides – perhaps 25-30% overall Approx 10% Sph, 2-3% Ga, rest Po (probably pseudo after Py) + traces of Cp. Minor fluorite also a few blobs of magnetite

529.0–548.0 As 510–518 minus fluorite

548.0 – 557.0 As Above but 15-20% Sz – mostly mixture of Py + Po minor Sph & ga

557–583 Greenish grey Ch & Ms-rich quartzite with minor biotite. Bi & Ch along late fractures. Locally thin interbands of light grey marble

Banded S_2 throughout - approx
5-10% of total mostly Po, minor Py,
Sph & Ga.

Thinks

543 - 585 Interbanded light grey marble, light grey quartzite and sulphides
10% Sulphides mostly Po, minor Py, Sph & Ga

585 - 587.3 greenish grey MSC - chlor quartzite with bands of S_2 - 5-10%
Mostly Po with minor Sph & Ga

587.3 - 595 As 583 - 585

595 - 620.5 As 558 - 583 dark-type rock
Minor dissem Py locally

620.5 - 623.5 Banded sulphides ± cls
I/band light grey quartzose marble or calcareous quartzite with micaceous partings and sulphides -
S_2 chiefly Po with blobs of Sph & Ga
$S_2 \simeq 20\%$

Split

~~558 - 563~~	557 - 562
~~563 - 568~~	562 - 567
~~568 - 573~~	567 - 572
~~573 - 578~~	572 - 577
~~578 - 583~~	577 - 583
~~583 - 588~~	583 - 589
~~588 - 595~~	589 - 595

595
573
572
13

623.5 - 626 Banded sulphides
I/band light grey-green chlor-Q schist & grey quartzite, & sulphide
$S_2 \simeq 60\%$
Chiefly Po; ± 10% Sph, 1-2% Ga, large blobs of Py, traces of Cp

626 - 633.5 I/b light greenish grey chlor-quartzite & dark green Q-chlor-actin rock (? c/s) with ~~very minor~~ trace disseminated sulphides

633.5 - 638.0 Banded Sulphides
same as above with sulphide bands S_2 between 20 & 75% - increasing grad downwards
Mostly Po, Minor Sph, large blobs of Ga and Py, traces Cp

CONT

MM76-02

0-12 OB

12-25 Light greenish grey quartz-musc-chlorite schist (minor chlor)

25-34 Interbanded light greenish grey Q-Ms-Ch schist & dark grey Bi/St musc schist Minor disseminated Po - <1%

34-69 Light grey-green Q-Chlor-Actin (minor Ms) schist - rather homog in appearance - well foliated but not banded. Minor disseminated Po - <1%, also a few thin bands Py // fol - c 1-2%

69-71.5 As above with abund vein quartz, also pyrite bands c 5%

71.5-78 As 34-69.

78-82 Interbanded med. grey-grn Q-Ms-Chlor - ?Actin schist & black ?Bi/St - Chlor schist

82-102 I/B light grey-grn Q-Ms-chlor schist & med green Q-chlor-act schist. Abund light grey quartzite. Abund pyrite in some bands - <1% overall

Mud vein quartz 90-92 & 95-99

102-111 Interbanded black biotite schist and light grey qtz-Ms schist and light greenish grey Q-Ms-Chl schist, with small brownish red garnets scattered locally - Porph. blasts

111-124 Interbanded light grey-green Q-Ms-Chl schist & medium green actin-Q-chlor schist - possibly c-s? - c/s bands contain minor pyrite - & light grey qtz. Also vein quartz bands having a sort of "marbled" appearance - probably injected pre-S1

strange looking

124 - 127.5 Breccia or agglomerate of some sort = sort of quartzite matrix containing lumps of chlorite schist and marble bands also banded pyrite, large lumps of sphalerite and galena and small crystals of magnetite, to name but a few.

NB ~~Sulphide between 124.0 127.5~~

127.5 - 138 Interbanded Q-Ms, Q-Ms-Chl schists and yellowish (? limonitic) feldspar-quartz(?) rock.

138 - 140 Mostly yellowish vein quartz with minor grey Ms-quartzite bands & trace of Py.

140 - 144 50% grey Ms-quartzite cont. minor pyrite, 50% white vein quartz - sort of marbled appearance.

CSM 157

144.0 - 144.7 Light greenish grey Ms-chlor schist with minor pyrite

144.7 - 145.5 Grey massive barite with minor pyrite in bands and blobs of soft black mineral, & minor calcite

145.5 - 183.5 As 111 - 124 locally contains blobs + lense of Po - total <1%

183.5 - 192.5 Mainly light grey-green Chl-Ms schist with variable (low) proportion of Qtz

192.5 - 215.0 Interbanded/ill dark green qtz + act-chlor-qnt schist light grey-green Q-Ms-Ch schist minor light grey Q-Ms schist and black bio schist ~~Locally~~ a few thin light grey marble bands in last few feet

215.0 - 228.0 Interbanded ~~dk grey &~~ black biotite schist, light green act-chlor schist ④ light grey-green Ms-chlor schist & light grey marble. Garnets locally.

④ ? c/s

228 - 239 Interbanded dk grey Q-Ms-Bio schist, grey-green Q-Ms-chlor schist, locally a few thin marble bands

239 - 242.7 Light grey quartzite with minor micaceous partings & some yellowish white vein quartz injection

242.7 - 244 Massive barite-cont sulphide bands = mixture of Py, Ga, minor Sph, calcite & magnetite - tarnished brown & yellowish

244 - 248 AS 239 - 242.7

248 - 256 I/banded light grey Q-Ms schist, light grey-green Q-Ms-chl schist & act-chlor schist (? c/s).

256 - 259 I/banded light greenish grey quartzite (? chert) and white vein quartz

259 - 269 I/banded light greenish grey quartzite (? chert), locally light grey marble, and light green actin - c/s. Minor pyrite scattered in blobs locally.

269 - 272.5 ~~I/banded~~ Light green Q-chlor-actin schist (c/s?) with ~~mar~~ local interbands of light grey qtzt & light grey-green Q-Ms-chlor schist

272.5 - 277.5 I/banded dk gn Q-chlor-act schist (c/s?), light grey-green Q-Ms-chlor schist, locally with abund thin light grey marble bands & black Bi-cont-Ms sch bands (Does not really resemble 257-269)

2775 - 2833 I/band dk gn Q - chlor actin schist (? calc-silicate) & light grey - green Q-Ms-chlor schist, with white vein quartz bands
Minor pyrite in a few bands
Also 5 bands of light greenish grey chert lower 2 feet.

2833 - 2855 I/band light grey-green Q-Ms-Ch schist & black Q-bi ms ~~-bi~~ schist - Traces of pyrite

2855 - 294 I/band light to med. green Q-chlor Ms schist & dk gn Q-chlor-actin schist, At 287 - 6" sulphide band 50% S_2 - Approx 30% Py, 10% Ga, 10% sph(?)

294 - 298 Sulphide band - hosted by greenish grey quartzitic calc-silicate marble Sulphide ~ 30% - mostly Py with minor Ga, also [Siderite (?) possibly sphalerite] - light orange possibly some barite
Ga in lumps

298 - 303 I/band light grey Q-Ms schist & dark greenish grey Q-Ms-Chlor schist.

303 - 315 - Only 6 feet recovered. Looks as though it has been put in box wrong way round.
Assortment of greenish Q-Chlor-Ms schists Q-Ms schists, Bi-Ms schists & grey quartzites.
Minor pyrite disseminated locally, also in bands up to 1" wide

315 - 315.5 Grey Ms-quartzite with band of ~ 50% pyrite

315.5 - 320.5 Grey & greenish grey foliated quartzite with I/bands of white vein Qtz & greenish grey Q-Ms-Chlor schist. Minor pyrite

320.5 - 321.5 Band of Baritic, pyritic quartzite. Pyritic bands contain minor Ga & Po

MM-7602 STRUCTURE — LM 342. FM 429

FROM	TO	S1 Dip Direct	S2 Dip Direct	Description
	321.0			Looks like Fi fold hinge in pyritic baritic graphite.
	352.0	30-		NST devel well enough to mea
	363.5	30-		NST devel " " " "
	375.0	Variable - undulating		NST devel well enough " "
	395.0	28-		NST seen " "
	409	17-		" "
	419	10-		" "
	569	Horiz		Not seen
	579	30		"
587 -	590	Zone of refolded Fi folds		
		S2 not devel, S1 irregular & contorted		
592 -	595	Ditto		
	596	80		
	606	10/090	30/000	
	616	28/225	52/000	
	626	00/135	40/000	S2 V. poor
	636	35/135	65/000	S2 V. poor
	646	Not meas	Not meas	devel
	657	Irreg	NST devel	
	667	"	"	

321.5 - 404 — As 315.5 - 320.5.

Vein quartz bands contain purple fluorite at Approx 340 and between 371/9 375

Minor dissem Py locally

Band of Py + Bo along fracture at 397-7

353 - 363 - only 1 foot recovered.

373 - 394 - only about 9 feet recovered

633.5 - 638.0 CONT Large blobs of purple dark to pale green fluorite, apparently assoc with galena blobs

638.0 - 643.0 As 626 - 633.5 + Ms-Ch schist plus biotite in some bands

643.0 - 650 Light grey-green Ms-Chlor-Quartzite → + Biotite blo schist

S_2 bands up to 1" thick, approx 1ft apart - Po + Sph + Ga in roughly equal proportions, minor Py / trace Cp

650 - 652.5 Banded Sulphide - S_2 ↗ 75% in quartzite

Mostly Po; Sph ≈ 20%, Trace Ga & Cp

Blob of Py at Bottom.

652.5 - 661.5 Banded grey quartzite
cont ~ 10% sulphide - Po
with minor sph & ga

661.5 - 663 As above, sulphide ~ 30%

663 - 793 BANDED SULPHIDE
1/6 grey quartzite & grey
marble (*) Sulphide 0 to 20%
Mainly Po with minor Sph & Ga
(*) Will interbands of grey-green
mica schist

793 - 801 BAND SULPH
As above - sulphide ~ 50%
Also bands of Magnetite

801 - 846 As 663 - 793

846 - 870 Light to dark grey chert
with white vein quartz along
fractures

180
45
135

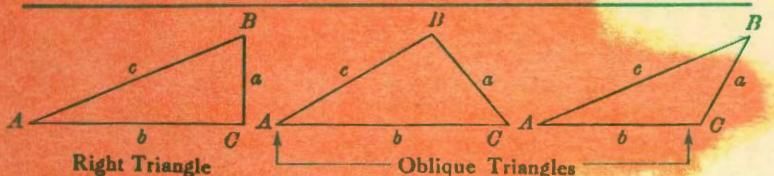
FROM	TO	S1	S2	
	677	50	X	
	687	45	X	
	697	42	X	
	707	X	X	
	717	66	X	
	729	32	X	
	739		X	F, folded & wing
	751	40	X	
	761	40		
	771	33/135	68/000	
	782.5	44	X	
	792.5	40	X	
	803	35	X	
	813	34	X	
	827	34/225	52/000	
	838	35	X	
	848	30/000	55/000	
	858	52	~~50~~	
	868	40		

Brian Fairbanks } Navarro
Jessie Hetkenburg }

George Leary } Amax
Tony Hatchins }

PYRRHOTITE

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

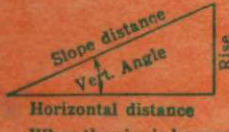
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A, b = a \cot A, c = \frac{a}{\sin A}$.
A, b	B, a, c	$B = 90° - A, a = b \tan A, c = \frac{b}{\cos A}$.
A, c	B, a, b	$B = 90° - A, a = c \sin A, b = c \cos A$.

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C, \tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b}, c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}, \sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}}, C = 180° - (A + B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10'. From Table, Page IX. cos 5° 10' = .9959. Horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 − cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10' = .9959. 1 − .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 − 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.