

## COMMON RAFTER LENGTHS PER METRE OF RUN.(SEE PAGE 6.)

°PITCH	LENGTH(m)	°PITCH	LENGTH(m)	°PITCH	LENGTH(m)	°PITCH	LENGTH(m)
1	1.0002	23.5	1.0904	46	1.4396	68.5	2.7285
1.5	1.0003	24	1.0946	46.5	1.4527	69	2.7904
2	1.0006	24.5	1.0989	47	1.4663	69.5	2.8555
2.5	1.0010	25 *	1.1034	47.5 *	1.4802	70 *	2.9238
3	1.0014	25.5	1.1079	48	1.4945	70.5	2.9957
3.5	1.0019	26	1.1126	48.5	1.5092	71	3.0716
4	1.0024	26.5	1.1174	49	1.5243	71.5	3.1515
4.5	1.0031	27	1.1223	49.5	1.5398	72 *	3.2361
5	1.0038	27.5 *	1.1274	50 *	1.5557	72.5 *	3.3255
5.5	1.0046	28	1.1326	50.5	1.5721	73	3.4203
6	1.0055	28.5	1.1379	51	1.5890	73.5	3.5209
6.5	1.0065	29	1.1434	51.5	1.6064	74	3.6280
7	1.0075	29.5	1.1490	52	1.6243	74.5	3.7420
7.5	1.0086	30 *	1.1547	52.5 *	1.6427	75 *	3.8637
8	1.0098	30.5	1.1606	53	1.6616	75.5 *	3.9939
8.5	1.0111	31	1.1666	53.5	1.6812	76 *	4.1336
9	1.0125	31.5	1.1728	54	1.7013	76.5 *	4.2837
9.5	1.0139	32	1.1792	54.5	1.7221	77 *	4.4454
10 *	1.0154	32.5 *	1.1857	55 *	1.7434	77.5 *	4.6202
10.5	1.0170	33	1.1924	55.5	1.7655	78 *	4.8097
11	1.0187	33.5	1.1992	56	1.7883	78.5 *	5.0159
11.5	1.0205	34	1.2062	56.5	1.8118	79 *	5.2408
12	1.0223	34.5	1.2134	57	1.8361	79.5 *	5.4874
12.5 *	1.0243	35 *	1.2208	57.5 *	1.8612	80 *	5.7588
13	1.0263	35.5	1.2283	58	1.8871	80.5 *	6.0589
13.5	1.0284	36	1.2361	58.5	1.9139	81 *	6.3925
14	1.0306	36.5	1.2440	59	1.9416	81.5 *	6.7655
14.5	1.0329	37	1.2521	59.5	1.9703	82 *	7.1853
15 *	1.0353	37.5 *	1.2605	60 *	2.0000	82.5 *	7.6613
15.5	1.0377	38	1.2690	60.5	2.0308	83 *	8.2055
16	1.0403	38.5	1.2778	61	2.0627	83.5 *	8.8337
16.5	1.0429	39	1.2868	61.5	2.0957	84 *	9.5668
17	1.0457	39.5	1.2960	62	2.1301	84.5 *	10.4334
17.5 *	1.0485	40 *	1.3054	62.5 *	2.1657	85 *	11.4737
18	1.0515	40.5	1.3151	63 *	2.2027	85.5	12.7455
18.5	1.0545	41	1.3250	63.5	2.2412	86	14.3356
19	1.0576	41.5	1.3352	64	2.2812	86.5	16.3804
19.5	1.0608	42	1.3456	64.5	2.3228	87	19.1073
20 *	1.0642	42.5 *	1.3563	65 *	2.3662	87.5	22.9256
20.5	1.0676	43	1.3673	65.5 *	2.4114	88	28.6537
21	1.0711	43.5	1.3786	66	2.4586	88.5	38.2015
21.5	1.0748	44	1.3902	66.5	2.5078	89	57.2987
22	1.0785	44.5	1.4020	67	2.5593	89.5	114.5930
22.5 *	1.0824	45 *	1.4142	67.5 *	2.6131		
23	1.0864	45.5	1.4267	68	2.6695		

\* Lengths given on the blade. Multiply by Common Rafter run.

To find RISE per metre of C.R.run :- Take C.R.length per metre of run from table above; square it; subtract 1; find the square root.

## HIP OR VALLEY RAFTER LENGTHS PER METRE OF COMMON RAFTER RUN. (See PAGE 13.)

°PITCH	LENGTH(m)	°PITCH	LENGTH(m)	°PITCH	LENGTH(m)	°PITCH	LENGTH(m)
1	1.4143	23.5	1.4795	46	1.7528	68.5	2.9060
1.5	1.4145	24	1.4826	46.5	1.7636	69	2.9642
2	1.4146	24.5	1.4858	47	1.7748	69.5	3.0255
2.5	1.4149	25 *	1.4891	47.5 *	1.7863	70 *	3.0901
3	1.4152	25.5	1.4925	48	1.7982	70.5	3.1582
3.5	1.4155	26	1.4960	48.5	1.8104	71	3.2302
4	1.4159	26.5	1.4995	49	1.8230	71.5	3.3064
4.5	1.4164	27	1.5032	49.5	1.8360	72 *	3.3871
5	1.4169	27.5 *	1.5070	50 *	1.8494	72.5 *	3.4726
5.5	1.4175	28	1.5109	50.5	1.8632	73	3.5635
6	1.4181	28.5	1.5149	51	1.8775	73.5	3.6602
6.5	1.4188	29	1.5190	51.5	1.8922	74	3.7632
7	1.4195	29.5	1.5232	52	1.9074	74.5	3.8733
7.5	1.4203	30 *	1.5275	52.5 *	1.9231	75 *	3.9910
8	1.4212	30.5	1.5320	53	1.9393	75.5 *	4.1172
8.5	1.4221	31	1.5366	53.5	1.9561	76 *	4.2528
9	1.4231	31.5	1.5413	54	1.9734	76.5 *	4.3988
9.5	1.4241	32	1.5461	54.5	1.9913	77 *	4.5565
10 *	1.4252	32.5 *	1.5511	55 *	2.0099	77.5 *	4.7272
10.5	1.4263	33	1.5562	55.5	2.0291	78 *	4.9126
11	1.4275	33.5	1.5614	56	2.0489	78.5 *	5.1146
11.5	1.4288	34	1.5668	56.5	2.0694	79 *	5.3354
12	1.4301	34.5	1.5724	57	2.0907	79.5 *	5.5778
12.5 *	1.4315	35 *	1.5781	57.5 *	2.1128	80 *	5.8449
13	1.4329	35.5	1.5839	58	2.1357	80.5 *	6.1408
13.5	1.4344	36	1.5899	58.5	2.1594	81 *	6.4702
14	1.4360	36.5	1.5961	59	2.1840	81.5 *	6.8390
14.5	1.4377	37	1.6024	59.5	2.2095	82 *	7.2545
15 *	1.4394	37.5 *	1.6090	60 *	2.2361	82.5 *	7.7263
15.5	1.4411	38	1.6157	60.5	2.2636	83 *	8.2662
16	1.4430	38.5	1.6226	61	2.2923	83.5 *	8.8901
16.5	1.4449	39	1.6296	61.5	2.3221	84 *	9.6189
17	1.4469	39.5	1.6369	62	2.3531	84.5 *	10.4812
17.5 *	1.4489	40 *	1.6444	62.5 *	2.3854	85 *	11.5172
18	1.4511	40.5	1.6521	63 *	2.4191	85.5	12.7846
18.5	1.4533	41	1.6600	63.5	2.4541	86	14.3704
19	1.4555	41.5	1.6682	64	2.4907	86.5	16.4109
19.5	1.4579	42	1.6765	64.5	2.5289	87	19.1335
20 *	1.4603	42.5 *	1.6851	65 *	2.5688	87.5	22.9474
20.5	1.4628	43	1.6940	65.5 *	2.6105	88	28.6712
21	1.4654	43.5	1.7031	66	2.6542	88.5	38.2146
21.5	1.4680	44	1.7125	66.5	2.6999	89	57.3074
22	1.4708	44.5	1.7221	67	2.7477	89.5	114.5974
22.5 *	1.4736	45 *	1.7321	67.5 *	2.7979		
23	1.4765	45.5	1.7423	68	2.8506		

\* Lengths given on the blade. Lengths at each end of these tables are included for interest.

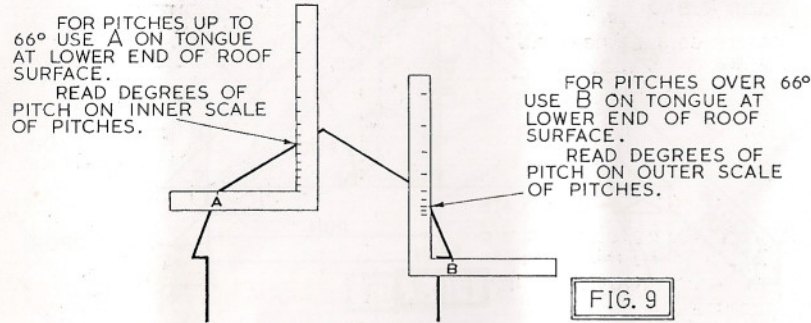
Note :- Reduce the length to three decimal places after multiplying by the number of metres in Common Rafter run.



## FINDING THE PITCH.

If pitch of roof is not given, it may be measured directly from drawings using either side of the square. (FIG.9)

Lines may be extended on drawings if they are too short.



Note:— If rafter lengths shown in tables on the blade are to be used, work to the nearest pitch shown there. Otherwise use tables of rafter lengths provided at the back of this book.

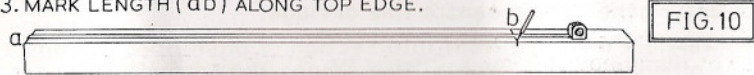
## MARKING OUT A PATTERN COMMON RAFTER.

EXAMPLE WORKED THROUGHOUT:—RUN=3.675m, PITCH=35°

1. Calculate length:—On the blade, on the line which reads 'Common rafter length per metre of run; find 1.2208 at 35° pitch.  
Rafter length=1.2208 X Run = 1.2208 X 3.675m = 4.486m.

2. Pick out a good straight piece as a pattern.

3. MARK LENGTH (ab) ALONG TOP EDGE.



It is worth noting that the tables on the square and on PAGES 20 & 21 may be used equally well with inches as the basic units; providing fractions of an inch are given as decimals.

Using the same run as above:—  
Run in Imperial measure = 12'-0 1/8"

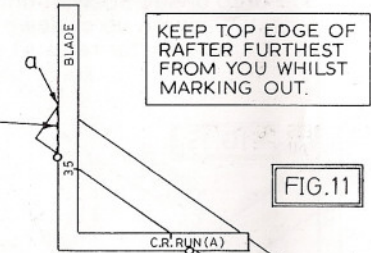
∴ Common rafter length = 1.2208 X 144.6875 inches  
= 176.6345 inches  
= 14 ft. 8.6345 ins.  
= 14 ft. 8 5/8 ins. (4.486m)

Avoid approximating too early. Finish the calculation before reducing the number of decimal places.

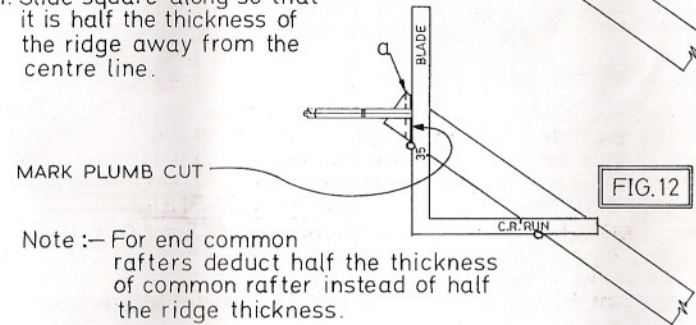
## MARKING OUT A PATTERN COMMON RAFTER. (Cont.)

### 4. TO MARK THE PLUMB CUT.

i. Using 'C.R. RUN' on tongue and 35° on the blade, mark centre line of ridge from a.



ii. Slide square along so that it is half the thickness of the ridge away from the centre line.

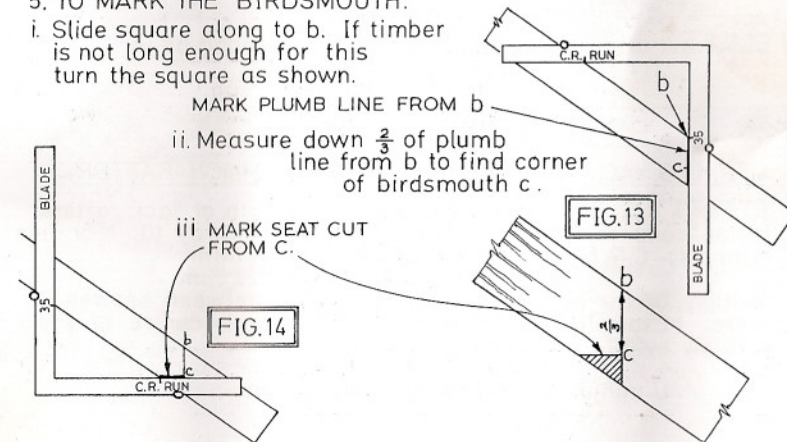


### 5. TO MARK THE BIRDSMOUTH.

i. Slide square along to b. If timber is not long enough for this turn the square as shown.

MARK PLUMB LINE FROM b

ii. Measure down 2/3 of plumb line from b to find corner of birdsmouth c.



iii. MARK SEAT CUT FROM C.

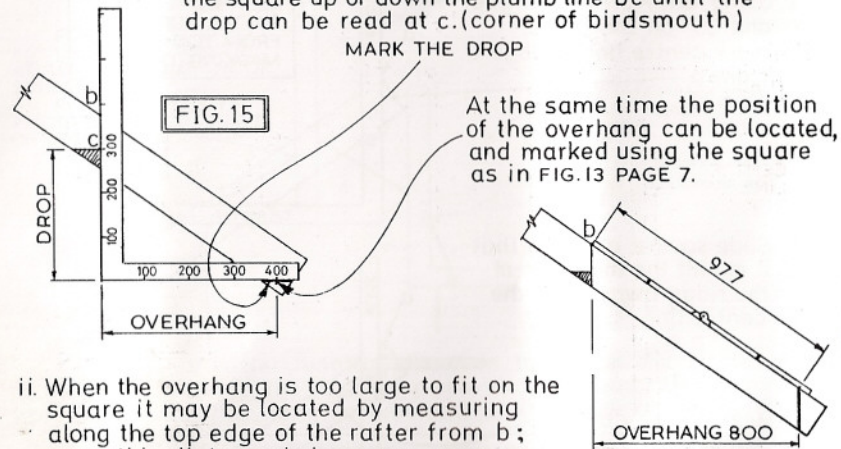
FIG. 14



## MARKING OUT A PATTERN COMMON RAFTER. (Cont.)

### 6. TO MARK DROP AND OVERHANG.

- i. For a small drop of say 300mm and an overhang of 400mm, slide the square up or down the plumb line bc until the drop can be read at c. (corner of birdsmouth)



- ii. When the overhang is too large to fit on the square it may be located by measuring along the top edge of the rafter from b; once this distance is known.

Example :— To find the distance to measure along from b to give an overhang of 800mm.

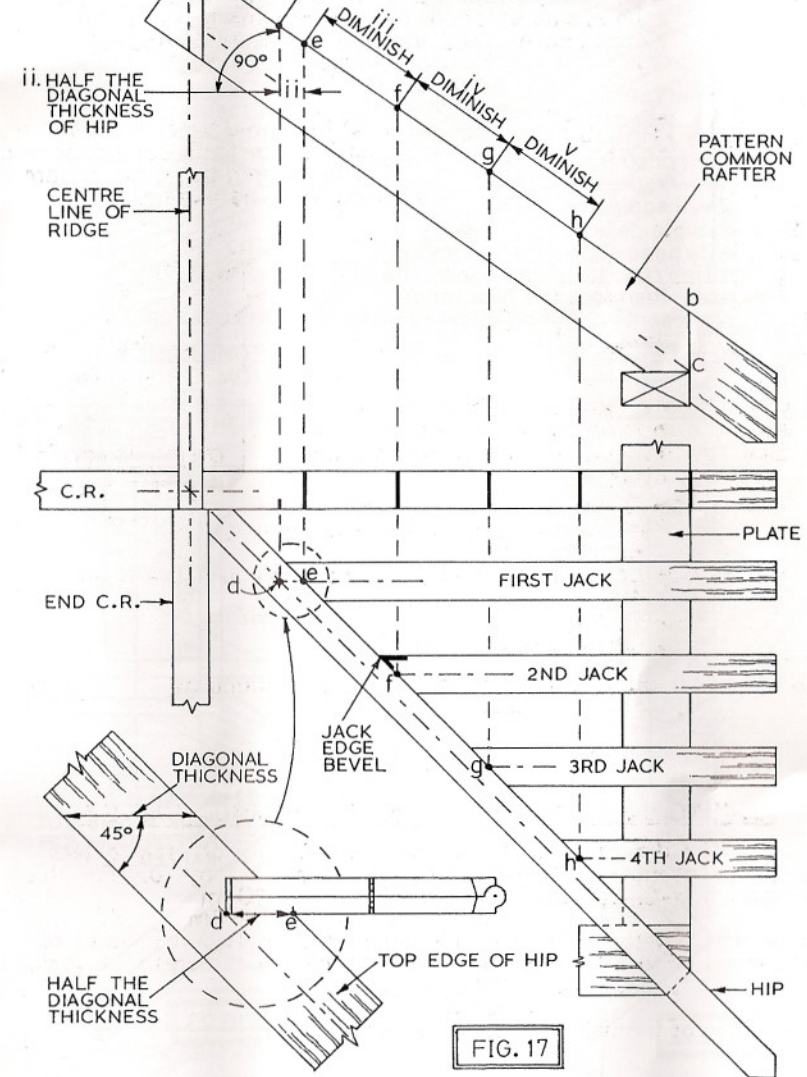
$$\begin{aligned} \text{Distance} &= \text{'Common rafter length per metre run' } \times \text{ overhang} \\ &= 1.2208 \times 0.8\text{m} \\ &= 0.97664\text{m} \\ &= 977\text{mm to nearest mm.} \end{aligned}$$

- iii. A further alternative is to step off the overhang as in FIG. 37, PAGE 15.

## MARKING JACK RAFTERS ON PATTERN COMMON RAFTER.

1. TO FIND THE DIMINISH.— Difference in length of jack rafters.
  - i. Divide "common rafter length per metre of run" by 10. For this example:— C.R. length per metre of run = 1.2208m  
Divided by 10 = 0.12208m
  - ii. Multiply by the number of 100mm spaces between centres of jacks. Example:— for 600mm from centre to centre of jacks multiply by 6. i.e.  $0.12208\text{m} \times 6 = 0.73248\text{m}$   
∴ Diminish = 732mm to nearest mm.

- i. MARK DIMINISH FROM a
  2. TO MARK CENTRES OF JACK EDGE BEVELS ON PATTERN COMMON RAFTER.
- See PAGE 8.





## MARKING JACK RAFTERS.

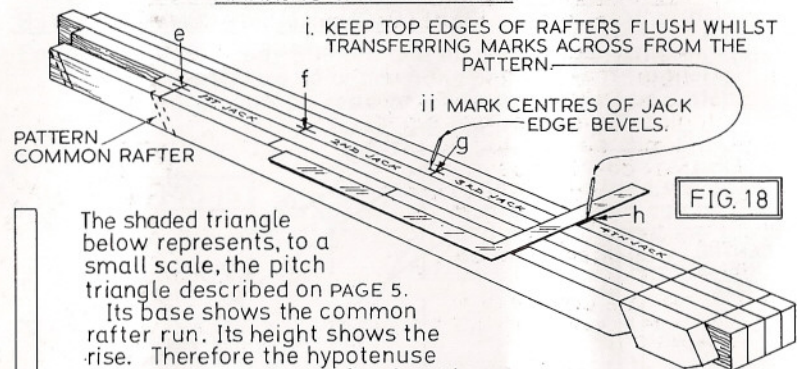


FIG. 18

The shaded triangle below represents, to a small scale, the pitch triangle described on PAGE 5. Its base shows the common rafter run. Its height shows the rise. Therefore the hypotenuse represents common rafter length.

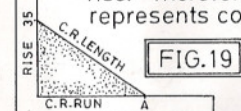


FIG. 19

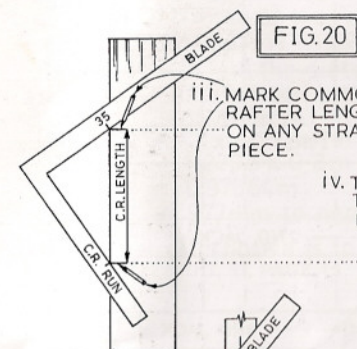


FIG. 20

IV. TRANSFER C.R. LENGTH TO INSIDE EDGE OF BLADE.

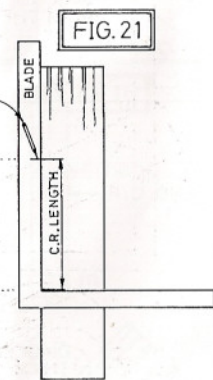


FIG. 21

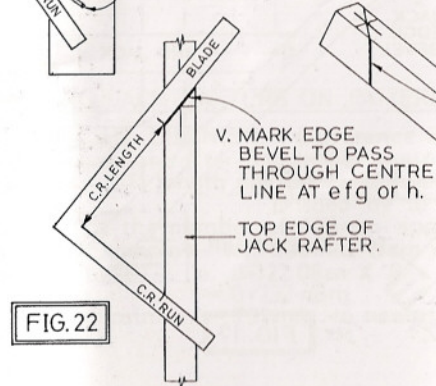


FIG. 22

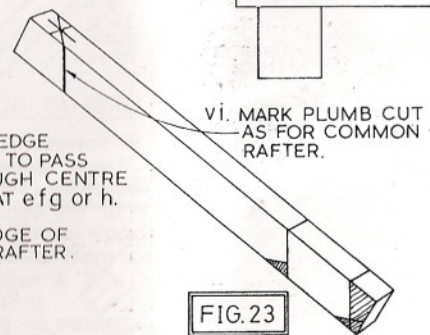


FIG. 23

## MARKING OUT A HIP WITHOUT BACKING BEVELS.

See PAGE 13 if backing bevels are required.

### 1. TO FIND THE LENGTH.

i. Hip lengths may be calculated (PAGE 13) or 'stepped off' (PAGE 16) but unless wall plates are fixed square and level it may be best to find the length by direct measurement along the hip pitch line. (FIG 24)

ii. USING AN OFFCUT FROM THE HIP, MARK A VERTICAL LINE ON THE END COMMON RAFTER TO INTERSECT THE PITCH LINE AT Q.

iii. CUT OFF THE CORNER OF WALL PLATE AS SHOWN BELOW. THIS SIMPLIFIES THE MARKING OUT.

iv. MEASURE HIP LENGTH (ab) ALONG HIP PITCH LINE.

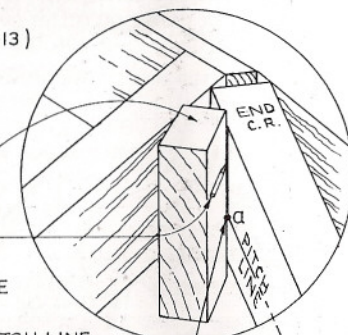


FIG. 24

### 2. MARKING LENGTH, PLUMB CUT AND BIRDSMOUTH.

i. MARK HIP PLUMB CUT ABOUT 50mm FROM THE END.

ii. MARK HIP LENGTH ab ON TOP EDGE OF HIP.

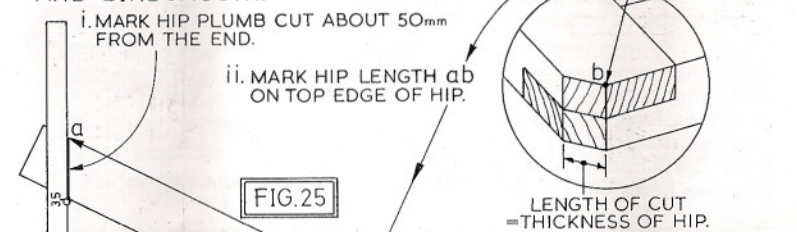


FIG. 25

iii. MARK PLUMB LINE FROM b.

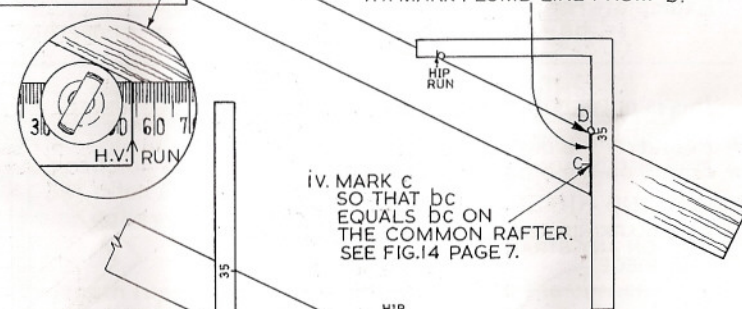


FIG. 26

iv. MARK C SO THAT bc EQUALS dc ON THE COMMON RAFTER. SEE FIG. 14 PAGE 7.

v. MARK SEAT CUT

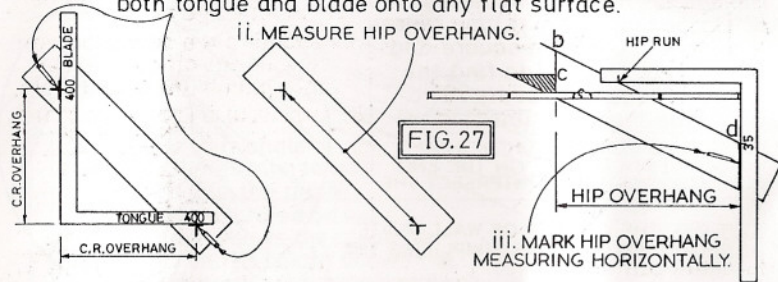


## MARKING OUT A HIP WITHOUT BACKING BEVELS. (Cont.)

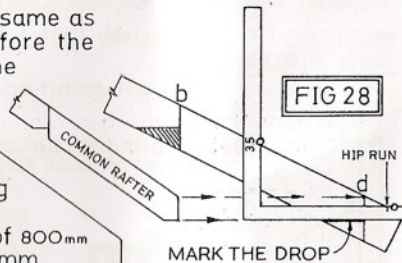
### 2. FINDING & MARKING HIP OVERHANG AND DROP.

i. For common rafter overhang of say 400mm, mark off 400mm on both tongue and blade onto any flat surface.

ii. MEASURE HIP OVERHANG.



iv. The drop on the hip will be the same as on the common rafters. Therefore the height of the plumb cuts at the overhang will correspond.



v. When the common rafter overhang is too large to fit on the square, the hip overhang can be calculated.

Example:—For a c.r. overhang of 800mm  
Hip overhang =  $1.4142 \times 800\text{mm}$   
= 1131mm.

This must be measured horizontally (FIG. 27) or 'stepped off' (PAGE 15)

vi. Alternatively the distance bd may be calculated.

Example:—For common rafter overhang of 800mm  
 $bd = \text{'Hip length per metre of c.r. run'} \times \text{c.r. overhang}$   
=  $1.5781 \times 800\text{mm}$   
= 1262mm.

This is not a horizontal measurement.

\* Found on the blade at 45° pitch.

\* Found on the blade at 35° pitch

### 3. MARKING HIP EDGE BEVELS.

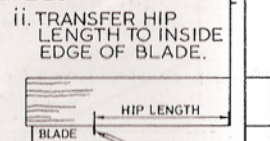
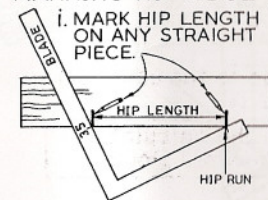
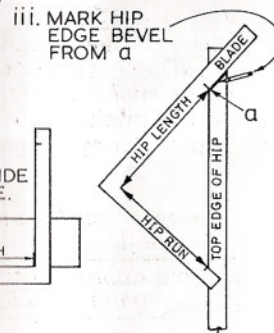
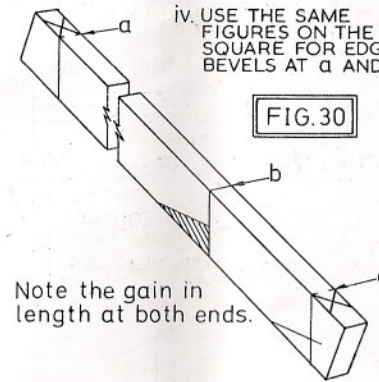


FIG. 29



## MARKING HIP EDGE BEVELS. (Cont.)

iv. USE THE SAME FIGURES ON THE SQUARE FOR EDGE BEVELS AT a AND d.



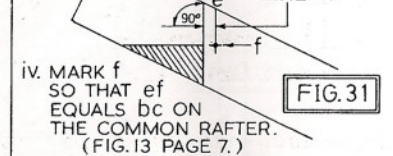
Note the gain in length at both ends.

## HIP WITH BACKING BEVELS.

1. MARKING THE BIRDSMOUTH.  
i. Measure and mark the length as in FIGS. 24 & 25 PAGE 11.

ii. Assuming the corner of wall plate is cut off as in FIG. 24, mark plumb line b as before.

iii. MARK PLUMB LINE e HALF THE THICKNESS OF HIP AWAY FROM LINE b.

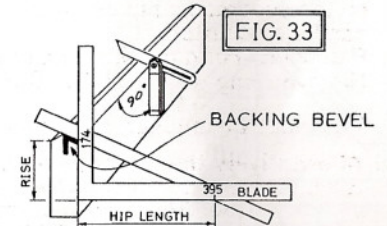
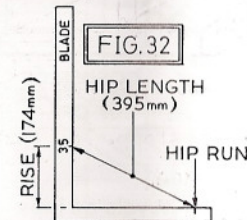


iv. MARK f SO THAT ef EQUALS bc ON THE COMMON RAFTER. (FIG. 13 PAGE 7.)

v. SEAT CUT IS APPLIED LEVEL WITH f.

## BACKING BEVEL FOR HIP

Use 'rise' on the tongue and 'hip length' on the blade.  
Backing bevel is found at the tongue.



## CALCULATING HIP AND VALLEY LENGTHS.

Hip and valley lengths are related directly to common rafter run.  
TO FIND THE LENGTH:— Look on the blade, on the line which reads 'Hip or Valley length per metre of common rafter run'.  
At 35° pitch find 1.5781.

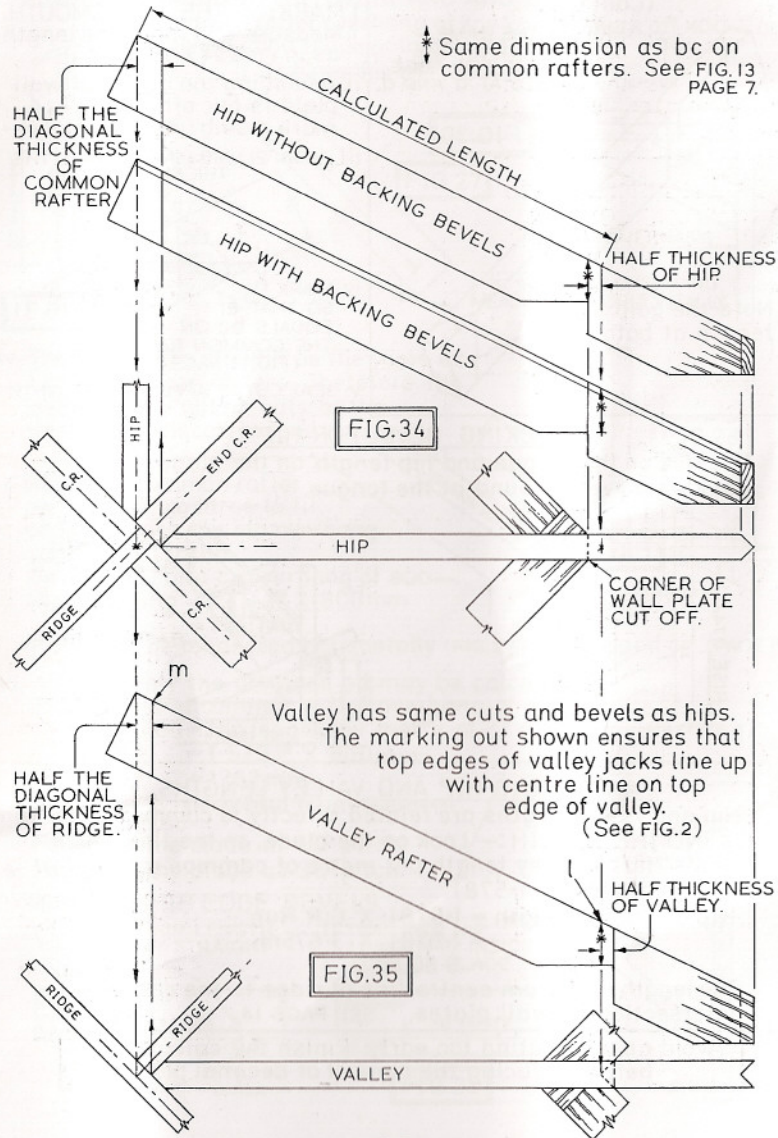
Hip or Valley length =  $1.5781 \times \text{C.R. Run}$   
=  $1.5781 \times 3.675\text{m}$   
= 5.800m.

The length runs from centre line of ridge to the corner, or intersection, of wall plates. SEE PAGE 14.

Avoid approximating too early. Finish the calculation before reducing the number of decimal places.

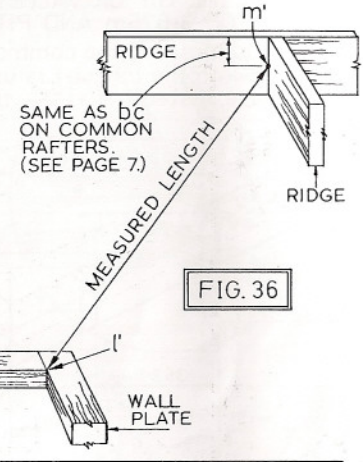


## MARKING HIPS AND VALLEYS USING CALCULATED LENGTHS.



## VALLEY LENGTH BY DIRECT MEASUREMENT.

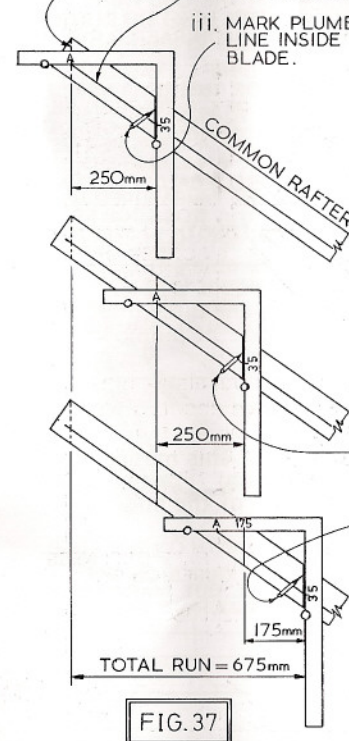
The measured length  $m'l'$  (FIG. 36) is equal to distance  $ml$  in FIG. 35. Marking out the birdsmouth is the same as with the calculated length but there is no need to deduct for the ridge.



### STEPPING-OFF METHOD.

TO MARK THE COMMON RAFTER LENGTH WITH RUN OF 3.675m, PITCH 35°

- MARK CENTRE LINE OF RIDGE.
- GAUGE PITCH LINE.
- MARK PLUMB LINE INSIDE BLADE.



Notes:— The stepped-off length is equal to the calculated length so the same adjustment will need to be made at plumb cut. SEE PAGES 6 & 7.

C.R.Run (A) is at 250mm on the tongue. Therefore 4 steps will cover one metre of the common rafter run.

- SLIDE SQUARE ALONG SO THAT C.R.RUN (A) RESTS ON THE PLUMB LINE JUST MARKED. MARK INSIDE BLADE AGAIN.

- SLIDE SQUARE UNTIL 175mm IS ON THE LAST PLUMB LINE. MARK INSIDE THE BLADE.

675mm of the run has now been covered and the remaining 3 metres can be, (a) Stepped-off using 4 steps per metre,

or (b) Calculated and measured along the pitch line.

i.e. Length for remaining 3m of run =  $1.2208 \times 3m = 3.6624m$ .

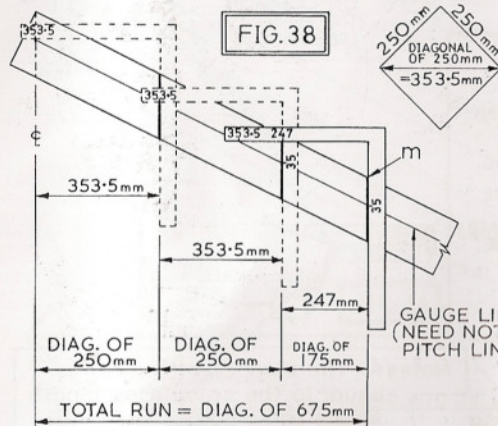


### STEPPING-OFF METHOD. (Cont.)

TO MARK THE HIP OR VALLEY LENGTH WITH COMMON RAFTER RUN OF 3.675m AND PITCH OF 35°

Similar to marking the common rafter length but 'Hip or Valley Run' (at 353.5mm on the tongue) is used instead of 'C.R.Run' (at 250mm.)

Likewise, instead of 175mm, the diagonal of 175mm is used. (i.e. 247mm)



i. STARTING FROM CENTRE LINE OF RIDGE, STEP OFF THE HIP OR VALLEY LENGTH FOR THE ODD PARTS OF A METRE (0.675m) IN THE COMMON RAFTER RUN.

ii. THE HIP OR VALLEY LENGTH FOR THE REMAINING 3m OF C.R. RUN CAN BE :-  
(a) STEPPED-OFF USING 4 STEPS PER METRE. i.e. 12 STEPS.

OR (b) CALCULATED AND MEASURED ALONG TOP EDGE FROM m.  
REMAINING LENGTH =  $1.5781 \times 3m$   
= 4.734m.

Note:- The stepped-off Hip or Valley length is equal to the calculated length; i.e. the full length of the pitch line. Therefore adjustments need to be made at plumb cut and birdsmouth as on PAGE 14.

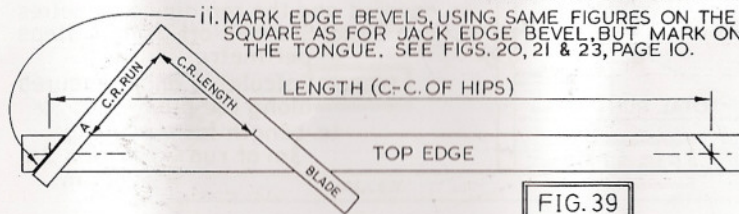
### PURLIN LENGTHS AND BEVELS.

The end purlin length is taken as half the span. This means that the purlin will fit approximately halfway up the roof. For two sets of purlins, the end purlin lengths will be  $\frac{2}{3}$  and  $\frac{1}{3}$  of the span.

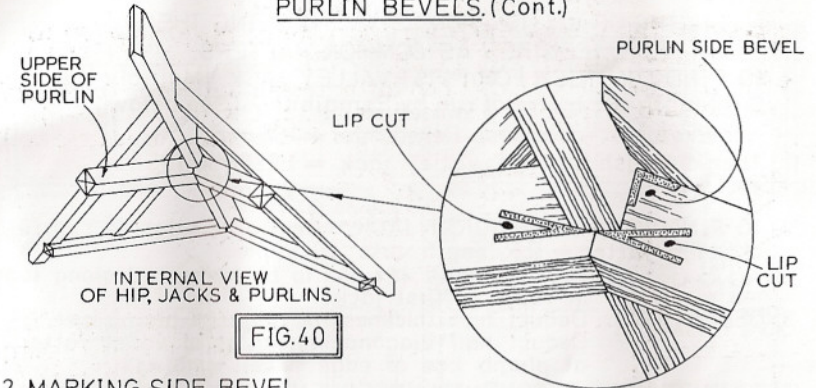
#### 1. MARKING LENGTH & EDGE BEVELS.

i. MARK LENGTH ON TOP EDGE.

ii. MARK EDGE BEVELS, USING SAME FIGURES ON THE SQUARE AS FOR JACK EDGE BEVEL, BUT MARK ON THE TONGUE. SEE FIGS. 20, 21 & 23, PAGE 10.



### PURLIN BEVELS. (Cont.)



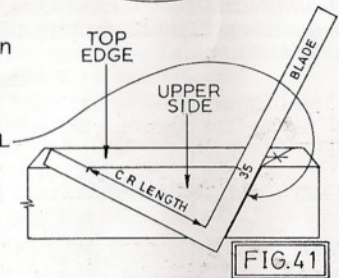
#### 2. MARKING SIDE BEVEL.

i. Use degrees of pitch (35° for this example) on the blade, and 'common rafter length' on the tongue.

See FIG. 20, PAGE 10 for reminder about 'common rafter length'.

MARK PURLIN SIDE BEVEL

ii. Cut off to these bevels. This gives centre line of hip if lip cut is to be used; otherwise the purlin butts against the side of the hip.



#### 3. PURLIN LIP CUT.

i. Hold purlin in position.

iii. TRANSFER LINE ONTO SIDE

ii. MARK UNDER HIP

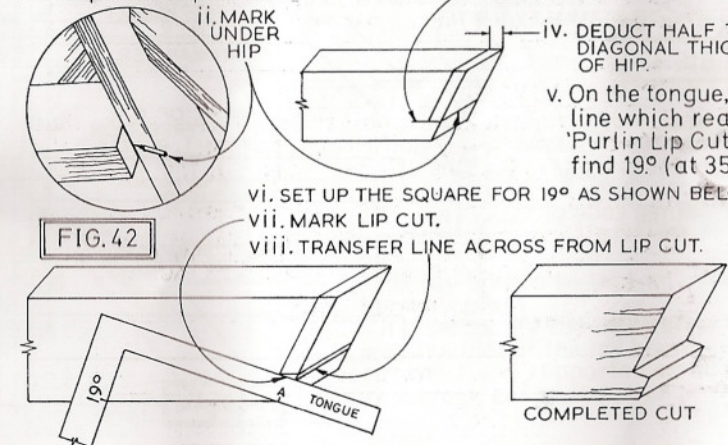
iv. DEDUCT HALF THE DIAGONAL THICKNESS OF HIP.

v. On the tongue, on the line which reads 'Purlin Lip Cut', find 19° (at 35° pitch).

vi. SET UP THE SQUARE FOR 19° AS SHOWN BELOW.

vii. MARK LIP CUT.

viii. TRANSFER LINE ACROSS FROM LIP CUT.



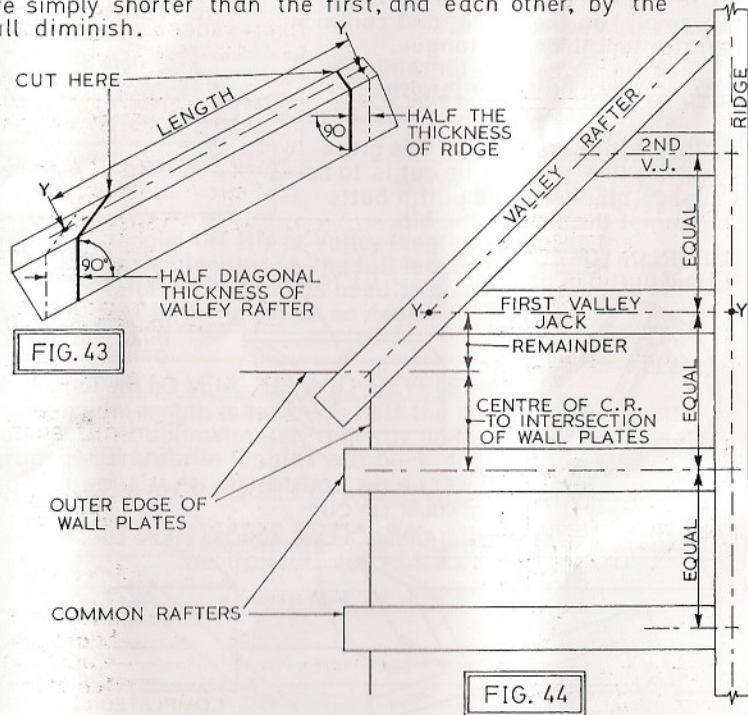


**LENGTHS OF VALLEY JACKS:—MAINTAINING THE SAME CENTRES AS COMMON RAFTERS.**

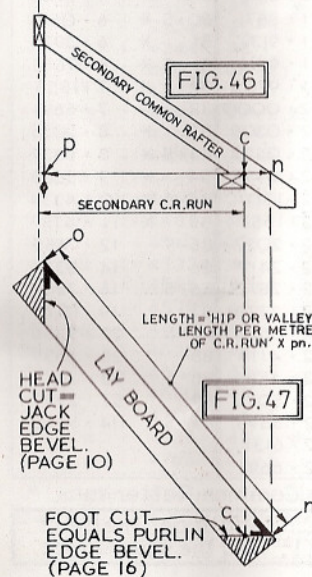
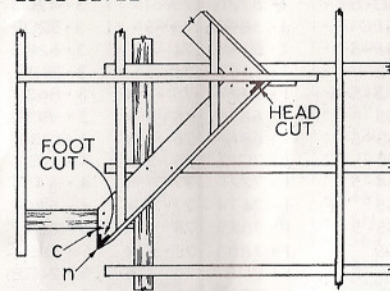
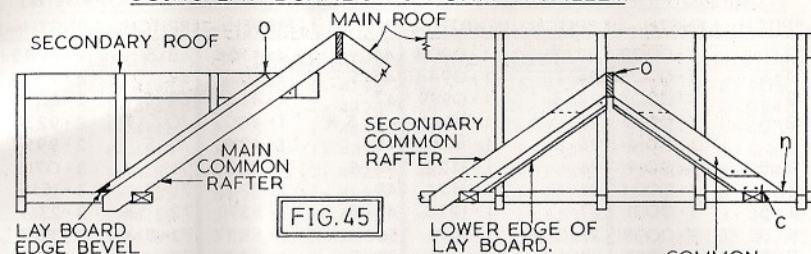
1. TO FIND DIMINISH FOR FIRST VALLEY JACK. Multiply the C.R.length per metre of run by 'Remainder'. (See below.)

Example:— Suppose Remainder = 165mm,  
Then diminish for first valley jack =  $1.2208 \times 165\text{mm}$   
= 201mm

2. TO FIND LENGTH OF FIRST JACK. Centre of ridge to centre of valley rafter = C.R.length less 201mm  
= Y-Y (FIGS. 43 & 44) to be measured along top edge of first jack.
3. DEDUCTIONS. Deduct half thickness of ridge at plumb cut. Deduct half diagonal thickness of valley rafter at plumb line of edge bevel. (FIG. 43)
4. DIMINISH FOR SECOND & SUBSEQUENT JACKS. These jacks are simply shorter than the first, and each other, by the full diminish.



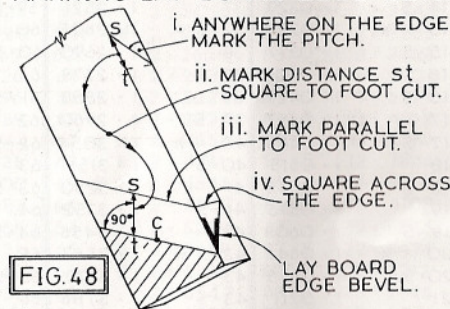
**USING LAY BOARDS TO FORM A VALLEY.**



LOWER EDGE OF LAY BOARD.  
UPPER EDGE IS IN LINE WITH TOP EDGES OF SECONDARY C.R.S. AND VALLEY JACKS.  
COMMON RAFTER REMOVED TO SHOW LAY BOARD AND VALLEY JACK.

- FINDING LAY BOARD LENGTH.**
- i. Find distance pn. (Secondary c.r. run, minus half ridge thickness, plus cn.) SEE FIG. 46.
  - ii. Take 'Hip or Valley length per metre of common rafter run' for 35° pitch; ie 1.5781, and multiply by pn.
  - iii. Mark length (o-n), head cut & foot cut. SEE FIG. 47.

**MARKING LAY BOARD EDGE BEVEL.**



Fix lay boards so that cn overhangs the wall plate.

If a secondary common rafter is in the way the foot of the lay board can be cut short and supported on noggings or a block cut to the pitch of the roof.

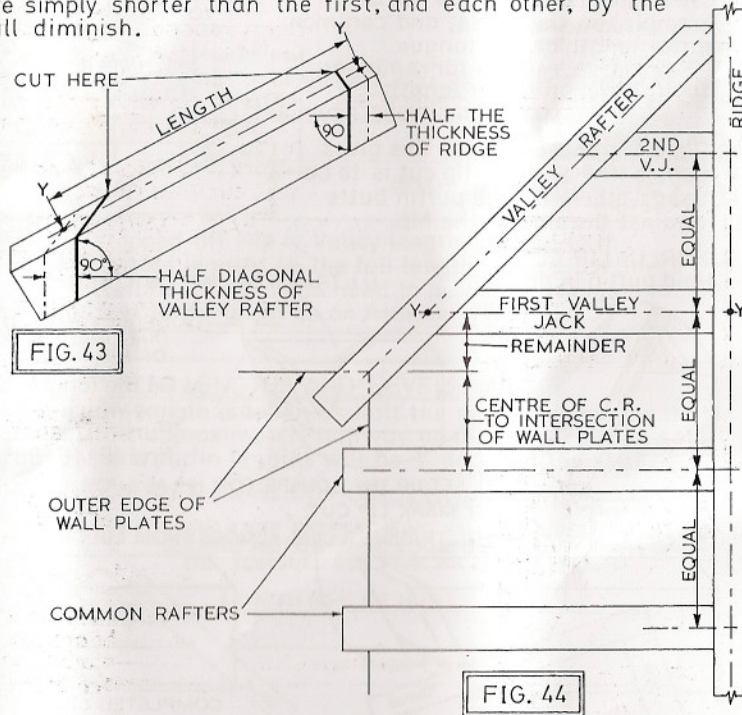


**LENGTHS OF VALLEY JACKS :—MAINTAINING THE SAME CENTRES AS COMMON RAFTERS.**

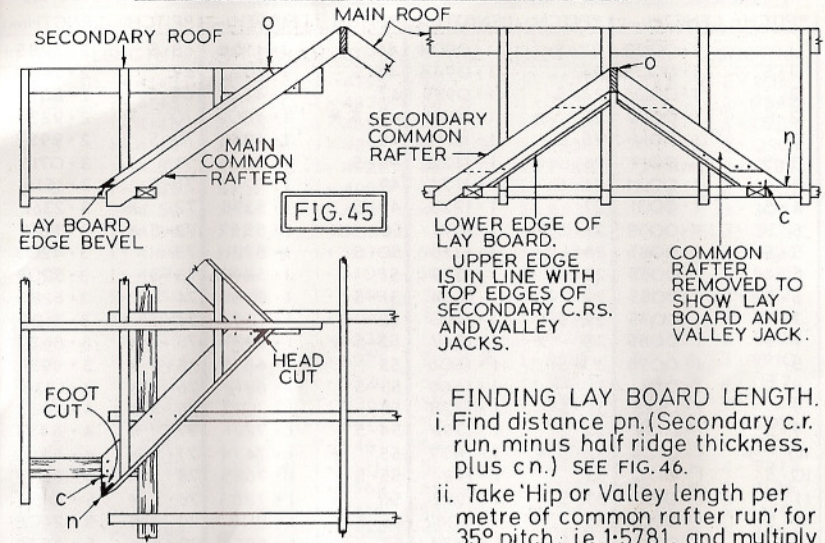
1. TO FIND DIMINISH FOR FIRST VALLEY JACK. Multiply the C.R.length per metre of run by 'Remainder.' (See below.)

Example:— Suppose Remainder = 165mm,  
Then diminish for first valley jack =  $1.2208 \times 165\text{mm}$   
= 201mm

2. TO FIND LENGTH OF FIRST JACK. Centre of ridge to centre of valley rafter = C.R.length less 201mm  
= Y-Y (FIGS. 43 & 44) to be measured along top edge of first jack.
3. DEDUCTIONS. Deduct half thickness of ridge at plumb cut. Deduct half diagonal thickness of valley rafter at plumb line of edge bevel. (FIG. 43)
4. DIMINISH FOR SECOND & SUBSEQUENT JACKS. These jacks are simply shorter than the first, and each other, by the full diminish.



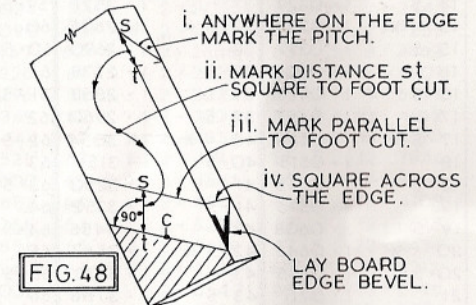
**USING LAY BOARDS TO FORM A VALLEY.**



**FINDING LAY BOARD LENGTH.**

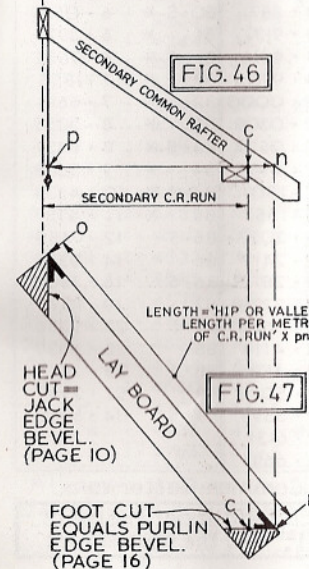
- i. Find distance pn. (Secondary c.r. run, minus half ridge thickness, plus cn.) SEE FIG. 46.
- ii. Take 'Hip or Valley length per metre of common rafter run' for 35° pitch, ie 1.5781, and multiply by pn.
- iii. Mark length (o-n), head cut & foot cut. SEE FIG. 47.

**MARKING LAY BOARD EDGE BEVEL.**



Fix lay boards so that cn overhangs the wall plate.

If a secondary common rafter is in the way the foot of the lay board can be cut short and supported on noggings or a block cut to the pitch of the roof.





## POSITIONS OF MOST OF THE BEVELS.

See FIG. 40, PAGE 17 for purlin side bevel and lip cut; PAGE 19 for lay board cuts.

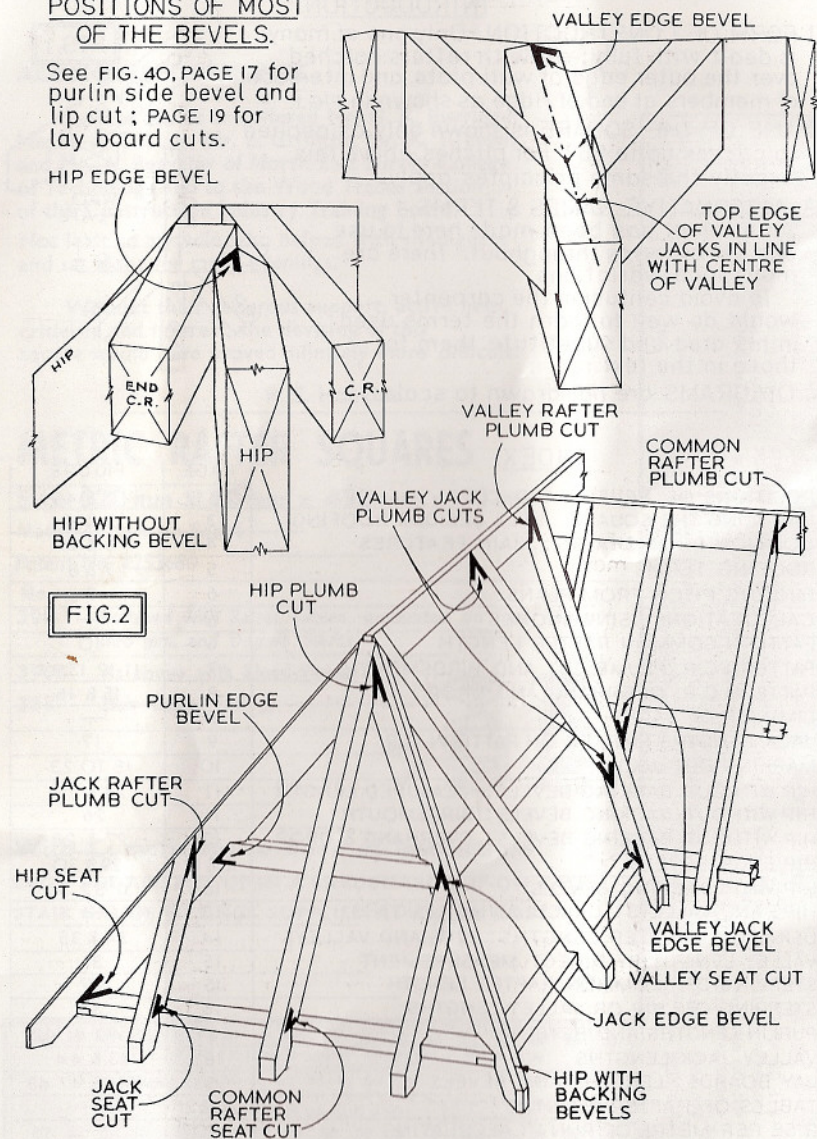


FIG. 2

## HANDLING THE SQUARE.

1. SETTING OUT ANGLES. Either side of the square may be used. Centres for all angles are found on the inner edge of tongue at A and B.

2. FOR ANGLES UP TO 66°. Place A on the edge of timber. Hold the figure for the required angle (found on the inner scale of pitches on inner edge of blade) also on the edge of timber.

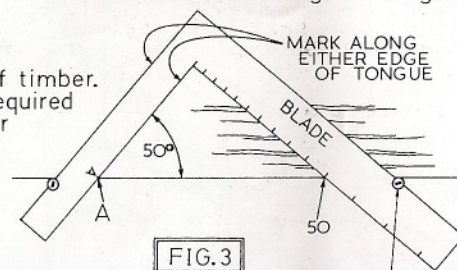


FIG. 3

3. FOR ANGLES 66-85°. Use B on the tongue together with the outer scale of pitches.

MARK ALONG EITHER EDGE OF TONGUE

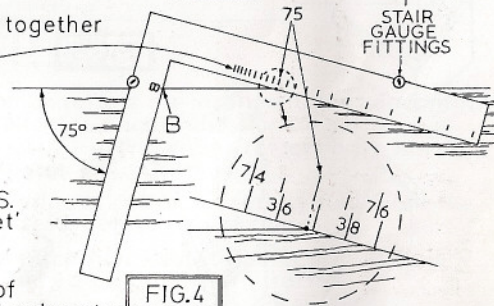


FIG. 4

4. REPETITION OF ANGLES. The square may be 'set' by clipping on a pair of stair gauge fittings to butt against the edge of timber. Repetition of plumb cuts seat cuts and bevels, 'stepping off' odd parts of a metre in the run, and the marking out of treads and risers may be speedily and accurately carried out with the use of such fittings or a home-made fence.
5. USES BESIDES ROOFING. Many other uses will suggest themselves such as marking out and taking off cuts for shores, braces, struts, squint corners, bay windows and hopper bevels; almost anywhere a protractor might serve.
6. DIMENSIONS TOO LONG TO FIT ON THE SQUARE. These may be halved (or divided by any convenient number) providing the measurement on each leg of the square is treated in exactly the same way: thus reducing them proportionately. Beware of halving 'degrees of pitch'. Here it is important to halve, not the number of degrees, but the distance (measured in mm) from Zero up the scale of pitches.
7. MEMOS. As aids to remembering the various roof bevels and jack rafter diminish, memos are printed on the tongue. To help in working out the rafter lengths, memos are given at the end of tables on the blade.



## COMMON ROOF SHAPES & MAIN FEATURES

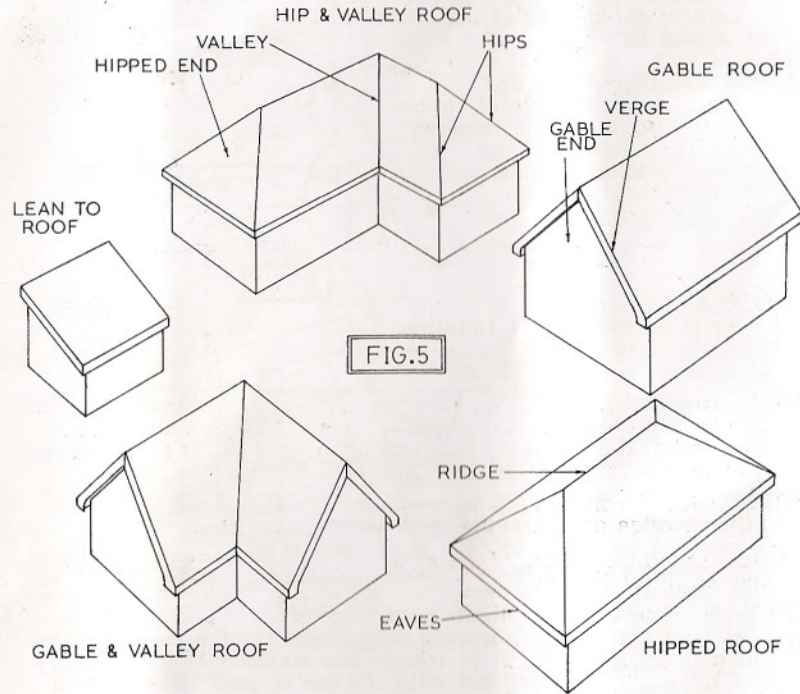


FIG. 5

## POSITIONS OF ROOF MEMBERS & ABBREVIATIONS

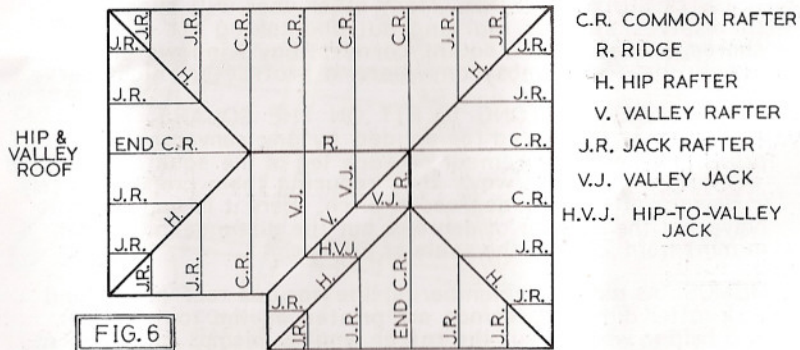


FIG. 6

## ROOFING TERMS

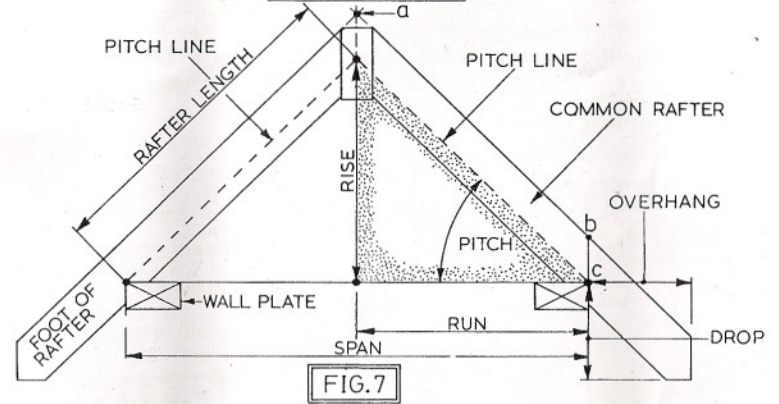


FIG. 7

**PITCH.** Angle at which common rafters are inclined to the horizontal. Most roofs are of 'equal pitch', i.e. each of the sloping surfaces is inclined at the same angle. Hip and valley rafters have lower pitches than common rafters on the same roof.

**PITCH LINE.** Parallel to top edge of rafter. Generally runs from the outside edge of wall plate to centre line of ridge.

**RAFTER LENGTH.** Length of pitch line. Note: this is not usually the length of timber required to cut the full rafter.

**SPAN.** Measured from outside to outside of wall plates.

**RUN.** Horizontal distance from outside of wall plate to a point directly beneath the centre line of ridge.

**RISE.** Vertical distance from intersection of pitch lines on centre line of ridge, to a horizontal line across the tops of wall plates.

**PITCH TRIANGLE.** (shaded) The basic right-angled triangle:—  
Base=common rafter run. Height=rise.  
Hypotenuse=pitch line=rafter length=ab.

## VARIATIONS OF PITCH LINE POSITION

FIG. 8

