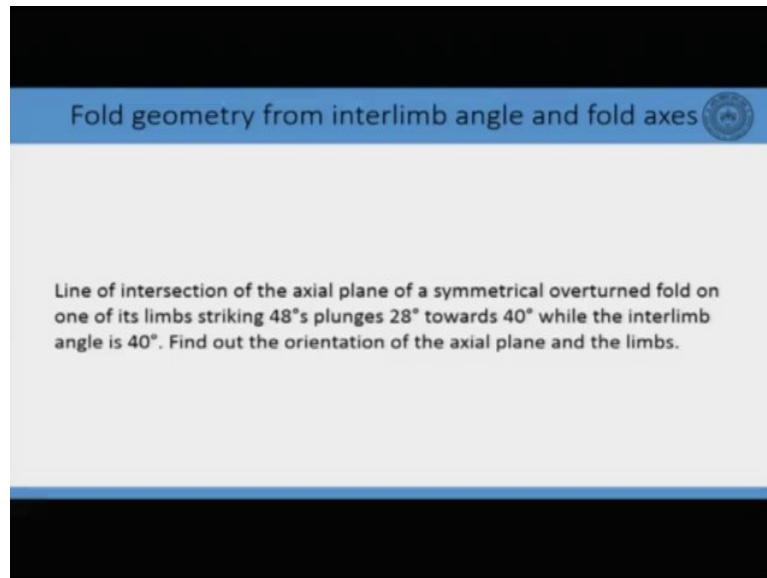


Structural Geology
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Lecture Lab Session Stereonet 6
Fold geometry from interlimb angle and fold axes

Now, we have come with another problem.

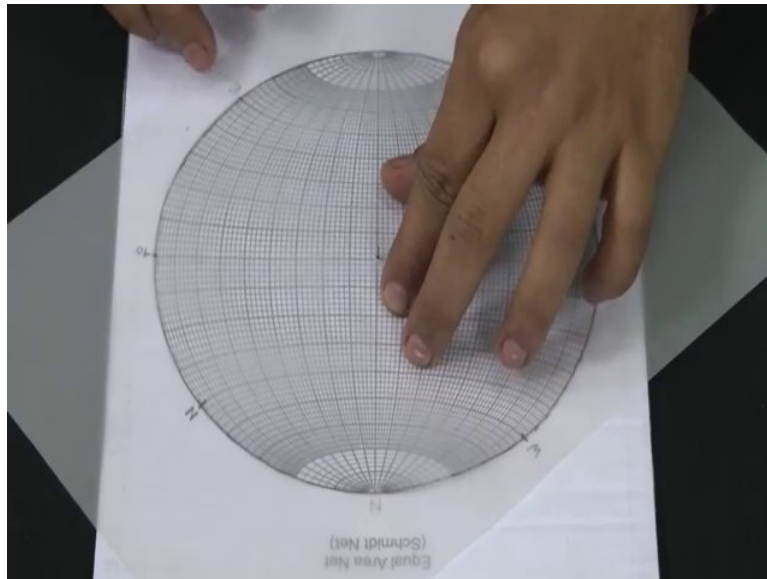
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In this problem we will determine the fold geometry from interlimb angle and fold axes. When we know the interlimb angle of a fold and know the orientation of the fold axes, how can we reconstruct the fold geometry? The question states that the line of intersection of the axial plane of a symmetrical overturned fold on one of its limbs striking 48° plunges 28° towards 40° while the interlimb angle is 40° . Find out the orientation of the axial plane and the limbs.

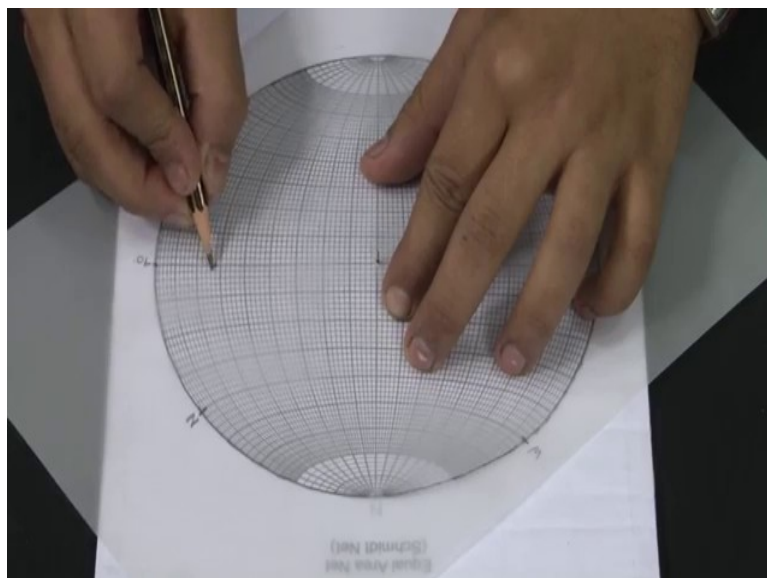
So, clearly the line of intersection of the axial plane on one of its limbs gives us the fold axes. So, we have given the information that the fold axes plunges, 28° towards 40° and one of the limbs strike 48° while the interlimb angle is 40° and the fold is in symmetrical overturned fold. So, with this information in mind, we will try to determine the orientation of the axial plane and the limbs of the fold. So, we again will use the tool stereonet to determine the orientation of the axial plane and the limbs of the fold.

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So, now we will mark the fold axes; so, as I have already mentioned, the line of intersection on the axial plane and one of the limbs gives us the fold axes. The fold axes orientation is 28 degree the plunge amount and the direction is 40 degree. So, first we will mark the 40 degree which is this point, in the stereonet. So, this 40 degree we as we have done in the previous problems where we will take it in the East West section and then mark the 28 degree which is the plunge amount.

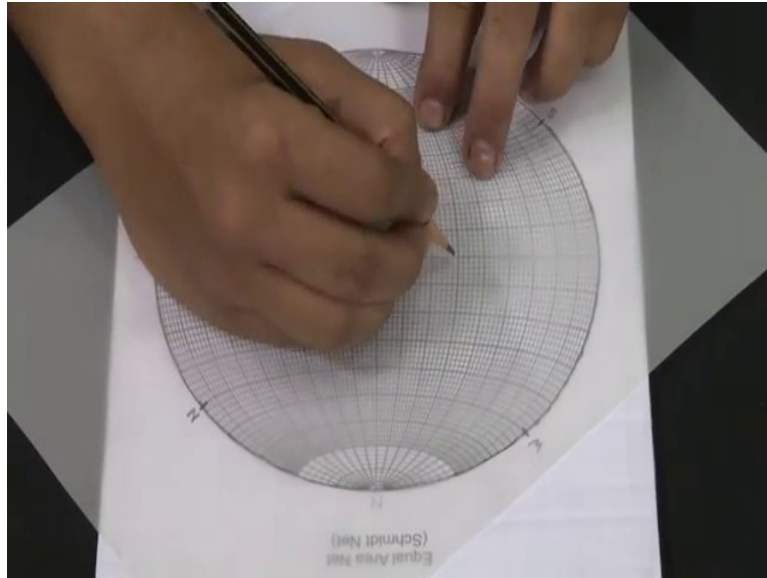
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So, this is the 28 degrees point. So, clearly this point as I have marked is the fold axes. Now, from the fold axes we know if we 90 degrees from fold axes, we will get the profile plane. So, 90 degrees from this point the great circle corresponding 90 degrees from this point will

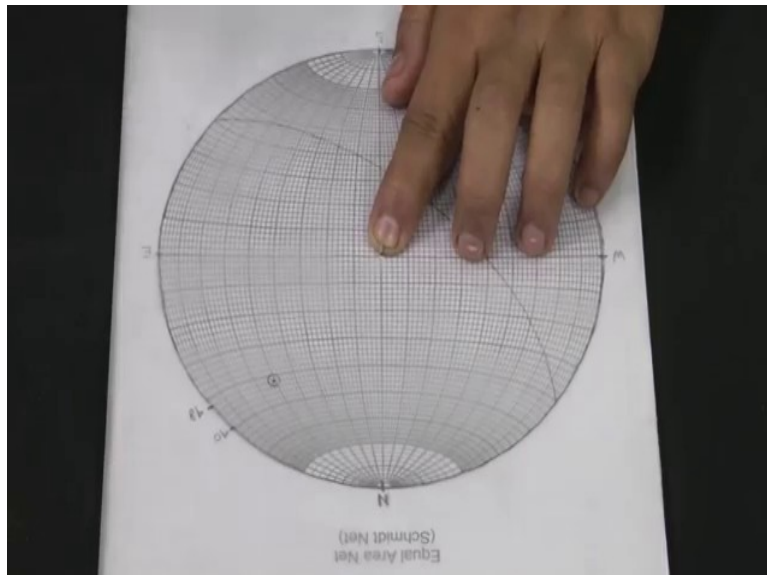
give us the profile plane of the fold. So, clearly this is 2 degrees and this would be 62 degrees because we have count 28 degrees from this side. So, this is 62 degrees; so, we will count 28 degrees from the centre.

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So, this is 10, this is 20, this is 28 and this great circle will be the profile plane of the fold. So, I mark the profile plane of the fold.

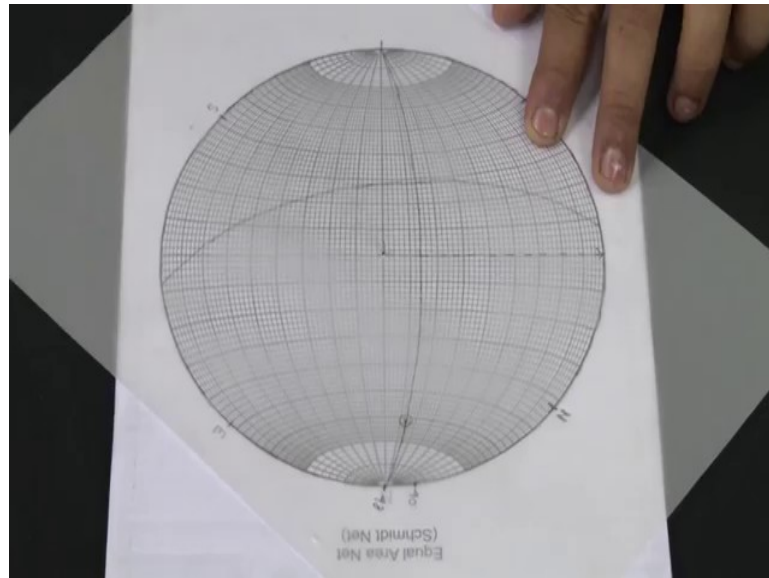
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Now, I again rotate back the tracing paper to its original position. Now, we have another information; that one of the limbs strike 48 degree, so we mark the 48 degree which is here. Clearly, the limb will pass through the fold axes because the intersection of two limbs gives

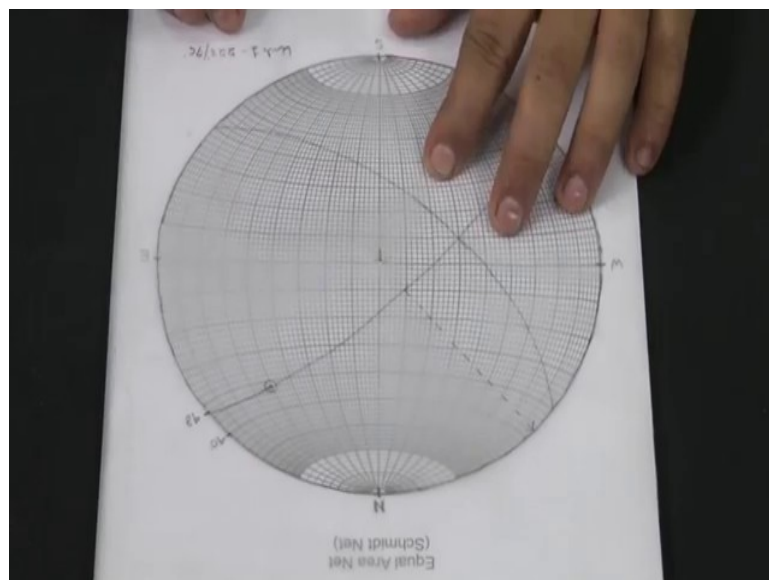
us fold axes. So, the limb should pass through the fold axes so one of the strikes of the limb is 48 degree and we have the fold axes. So, the great circle that has the strike of 48 degree and passes through the fold axes will correspond to one of the limbs of the fold.

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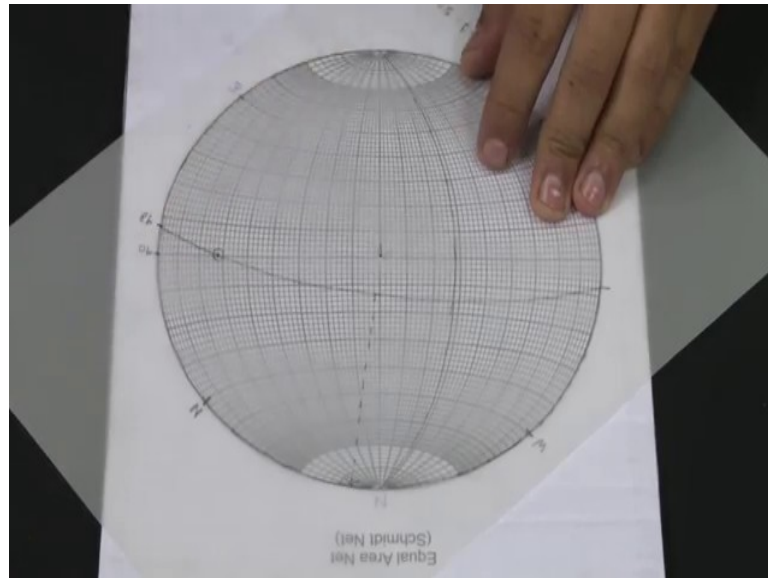
So, now we construct that great circle. Clearly, this is the (othe) other end of the strike and this is the dip angle; so, the dip angle is 6, 16, 26, 26, 36, 46, 56, 66, 76. So, the dip angle is 76 degrees and the strike is 200, 210, 220, 228.

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So, the orientation of the limb one is 228 degrees and the dip angle is 76 degrees. Now, what we will do is that we will bring the fold axes on the East West plane and the profile plane we will calculate the interlimb angle which is mentioned as 40 degrees.

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So, we have brought the fold axes on the East West plane and now we have to calculate the interlimb angle. The interlimb angle is 40 degrees; so, now it is a dilemma, so, we will calculate the interlimb angle in this side or get in this side. So, again we have to think about the geometry of the fold which is given in the problem and we have to visualise it so it is mentioned that the fold is in symmetrical overturned fold.

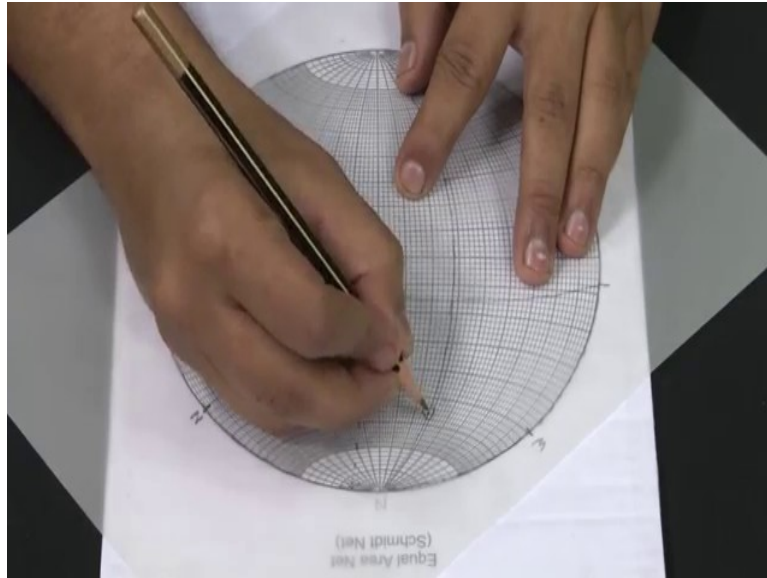
So, now from the properties of symmetrical overturned fold; we know that in an overturned fold, the axial plane of the fold and the two limbs dip in the same direction. So, now, if we calculate the 40 degree from here, clearly, we will find a point and the point that one of the points of the great circle that corresponds to another limb and this fold axes would be the other point.

So, if we join this we will get the limb but if we count 40 degrees from here the point, we will get the two limbs will dip into opposite directions. So, what we will do is that we will do not count the interlimb angle 40 degrees from here but if we count the interlimb angle 40 degrees from here we will get a point (an) and if we join that point and this fold axes through a great circle, we will get an orientation of the other limb.

And the other limb will dip in the same direction as limb one. So, the fold will correspond to a symmetrical overturned fold. So, as in the question; it is mentioned, the fold is in

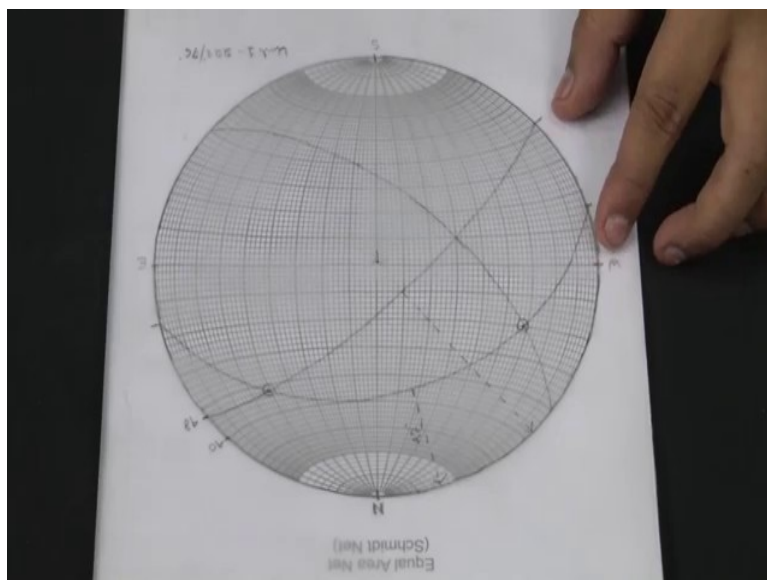
symmetrical overturned fold, so we will count the interlimb angle in this side. So, by this way we do and visualise the problems, the geometry of the fold and try to solve it via this stereonet.

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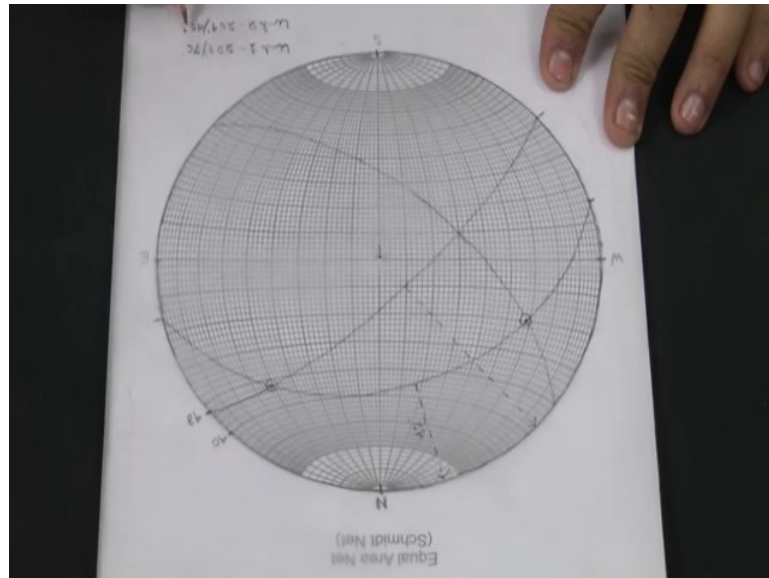
Now, I count the 40 degrees in this plane so, this is 4 degrees, so this is 14 degrees, this is 24 degrees, this is 34 degrees and this is 36, 38, 40; so, this is the point. So, If I join this point and the fold axes; clearly, I would get the other limb.

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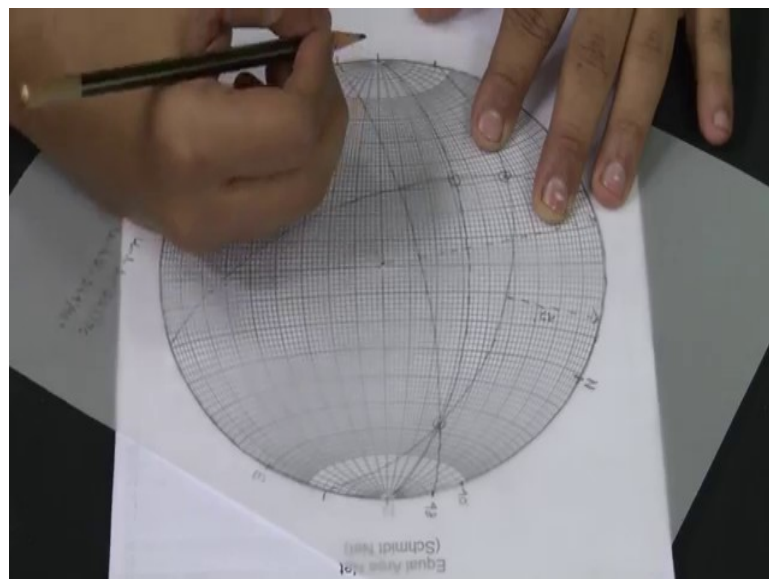


Now, I try to bring these two points on a great circle so that I can have the orientation of the other limb. We have come to the great circle that connects the fold axes and the other limb.

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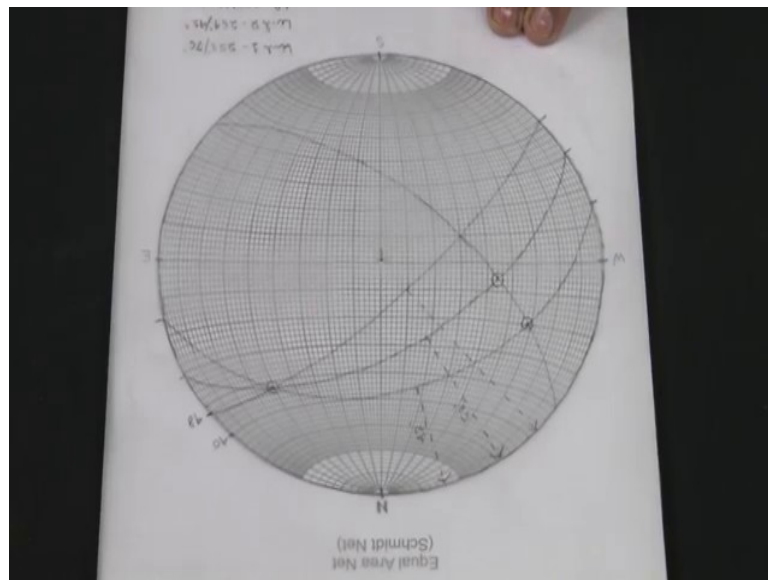
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Now, in order to bisect the interlimb angle we bring the profile plane to the North South and we calculate the interlimb angle we know the interlimb angle as mentioned in the problem that is 40 degrees. So, the bisection would be 20 degree so we calculate the point so we started from this or this end each will be the same. This is 2, this is 14, this is 16, 18, 20. So, this is probably the bisection point and again if we join this point and the fold axes, we would get the orientation of the axial plane.

So, we do it similarly we find the great circle that joins the fold axes and bisection of the interlimb angle. Probably, not probably; certainly, this is the plane. So, we draw the great circle that corresponds to the axial plane of the fold. So, this is one of the strikes of the axial plane. This again would be one of the strikes and now in the East West section we calculate the dip of the axial plane.

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Now, the dip of the axial plane is; this is 8, 18, 28, 38, 48, 58. So, the dip of the axial plane is 58 degrees, so now I rotate the tracing paper to its original position and now I find the strike of our axial plane. So, if this is 180, 200, 210, 220, 230 so the axial plane strike is 239 degree and the dip amount is 58 degrees. So, when we have a fold geometry and the data of interlimb angle and the fold axes we can reconstruct the fold geometry so we have the found out the orientation of the two limbs as well as the axial plane.