

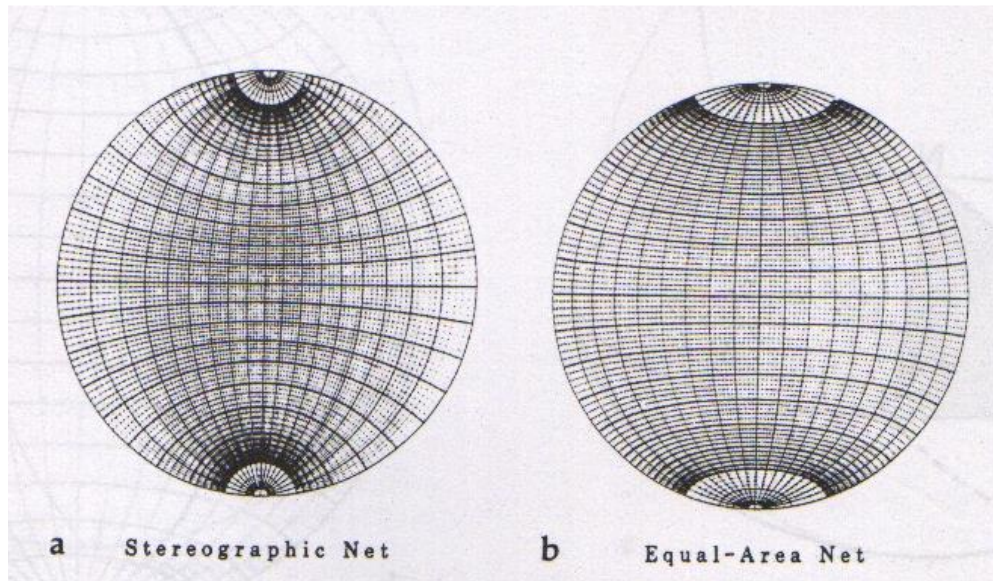
## STEREOGRAPHIC PROJECTIONS

Representation of structural data by the geometric methods in the previous labs and its application becomes difficult if we have to analyze a large number of measurements. In these labs we introduce the concept of the stereographic projection, which has become widely used by structural geologists during the last 50 years, which provides a simple and quick alternative way to represent three-dimensional data in two dimensions. Although data plotting using a stereographic projection may seem abstract at first, once you are used to it you will find that the methods are powerful and allow you to solve many types of structural problems easily. Computers are increasingly being used to plot structural data on stereographic projections, but you will not be able to interpret computer output if you are not adept at plotting data by hand. In fact, you will find that the cardboard stereonet itself is versatile and quick and can easily be carried with you to the field, even if you are backpacking into a remote area.

► Two types of nets are in common use:

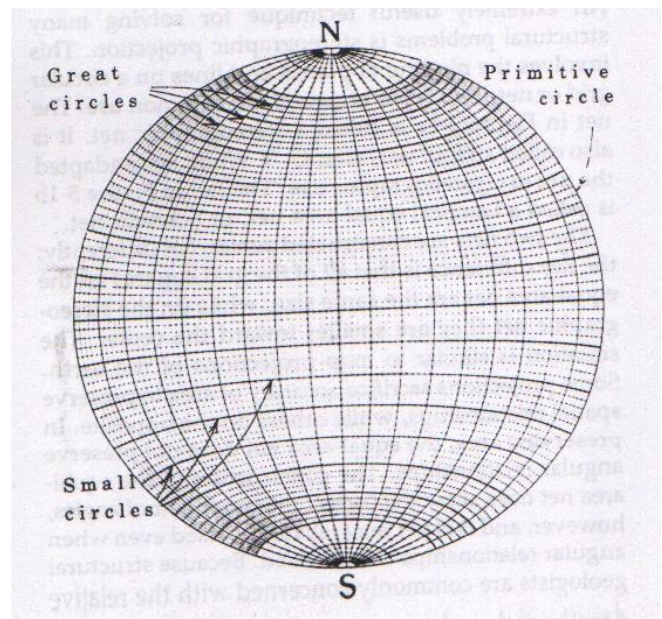
**Wulff net:** this net uses in crystallographic use, not equal in areas.

**Equal area Schmidt net :** this net used in structural geology analysis data.



► **The equal – area Schmidt net** is arranged like a globe of the earth (North-South lines that are analogous to meridians of longitude, and East-West lines analogous to latitude).

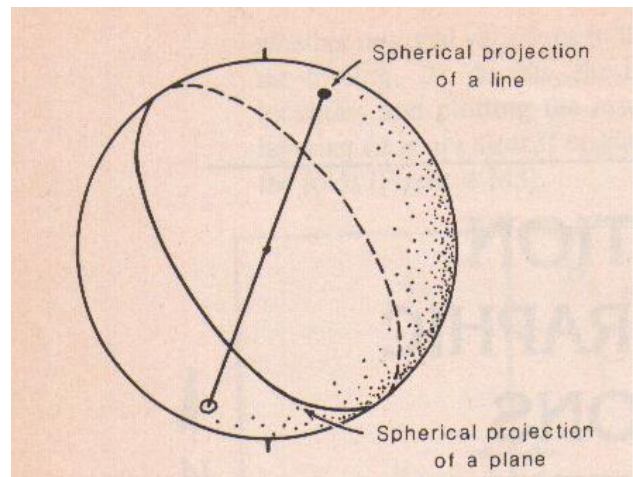
The North-South lines called **great circle**; East-west lines called **small circle**; Perimeter of net is called **primitive circle**.



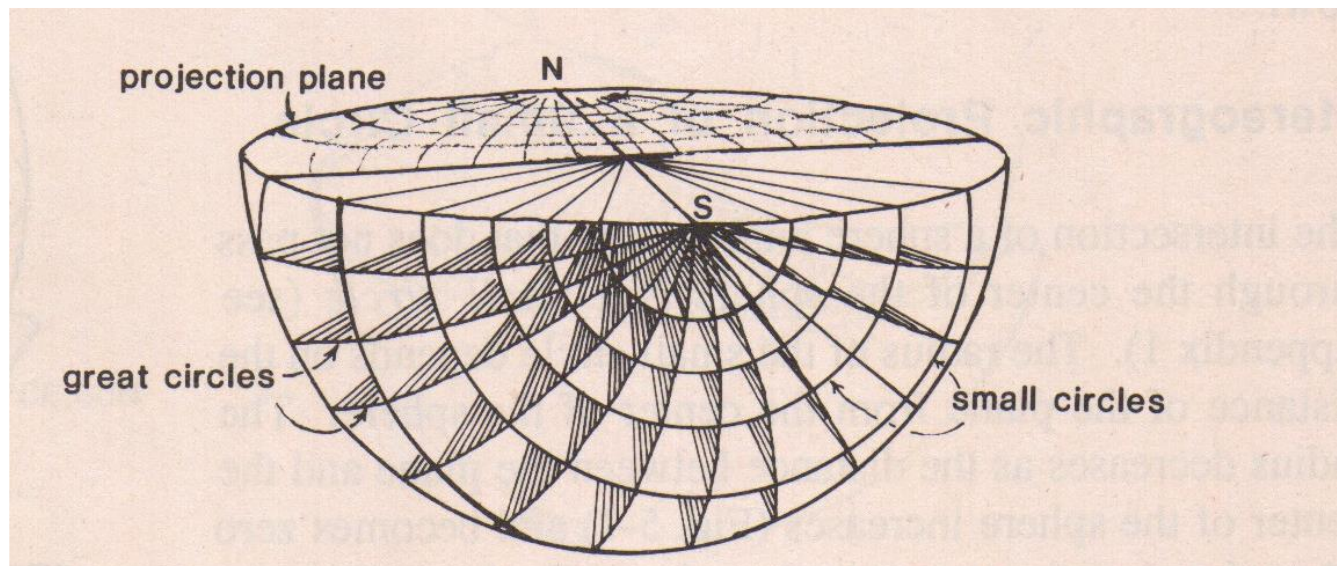
## Spherical projections of lines and planes

Any line through the center of the sphere cut the sphere at two points.

Any plane through the center of the sphere intersects the sphere along a circle.



In structural geology the Lower hemisphere is taken in to consideration

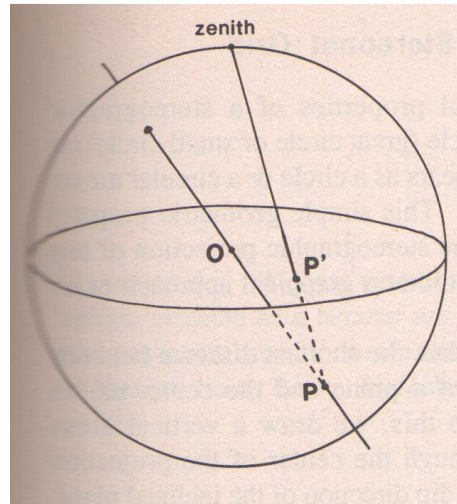


► Great circles in the stereographic net (stereonet) represent dipping planes that all intersect along the north-south axis.

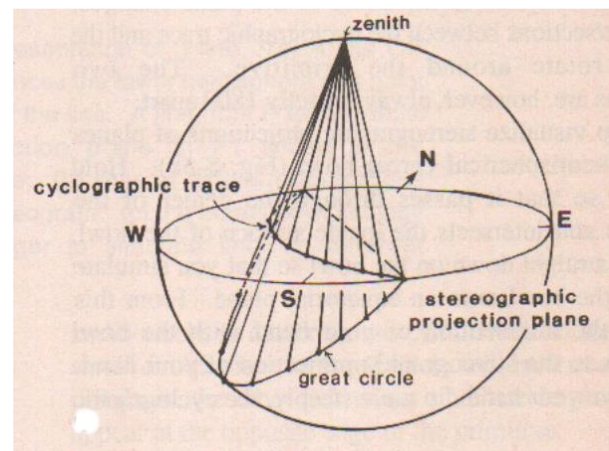
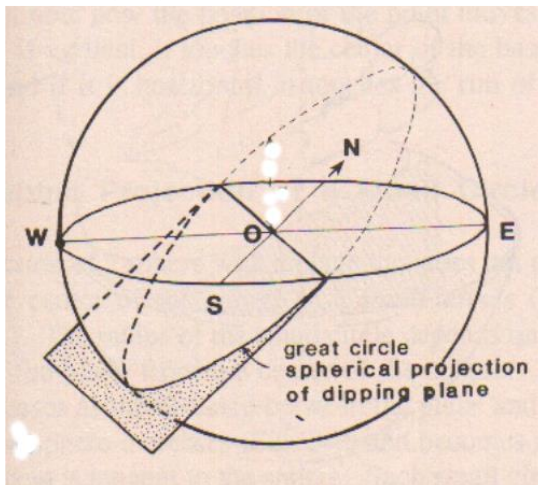
► The small circles represent coaxial circular cones.



## Line representation on stereonet (Stereographic projection of the lines).



## Stereographic representation of the planes (Stereographic projection of the planes)



### A) Plotting a Line:

Ex.1) Plot these lines by the stereographic net:

1) 200/ 30; 2) N44E/ 58; 3)065/ 62; 4) 305/87; 5) 150/ 90; 6) S42W/ 26; 7) S90E/04; 8) N43W / 34B).

### The plotting procedure

1-Place the overlay on the stereonet. Start, as always, by sketching the stereogram.

2-Mark the north and trend (i.e. the plunge direction =200) on the primitive circle.

3- Rotate the overlay so that one of the straight great circles (on the net) acquires the trend of 200° (i.e. the plunge direction) on the tracing.

4- Starting at the edge of the net (i.e. primitive circle), count in through the angle of plunge (30° in this case) towards the centre of the net. The line 200/30 has now been plotted Like *all lines it plots stereographically as a single point.*

## **B) Plotting a Plane:**

1- Strike / dip ;2- Dip direction/ dip

Ex.2) Draw these planes by the stereographic net:

1) N60E /30 SE; 2) 034/ 38; 3) 351/ 79 SW; 4) S83E / 18 NE; 5)270/ 40; 6) 186/ 15; 7) 074/ 68 NW  
8) 262/ 87SE.

### **The plotting procedure**

1-Mark north on the overlay (trace paper), together with the primitive circle. Mark the strike N60E on the primitive circle.

2- Keeping the overlay fixed in position, rotate the overlay until previously marked strike lies along North-South diameter.

3- Measure dip angle 30 from East depending on given dip direction.

► Note that the great circle representing the bedding plane bows out towards the direction of dip. The great circle and dip direction of a plane always have this bow-and-arrow relationship.