

An overview of Maps and Cartography Projections In Present scenario

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ABSTRACT:

In this paper we will study the Maps and Cartography Projection in details. Map makers try to switch the earth—a spherical, round globe—to flat paper. Map projections are the one of a kind strategies utilized by cartographers for offering a spherical globe on a flat surface. Angles, regions, directions, shapes, and distances can end up distorted while converted from a curved floor to a aircraft. Different projections were designed wherein the distortion in one belongings is minimized, while other homes emerge as greater distorted. So map projections are selected based totally on the functions of the map.

Keywords

Azimuthal, conformal, equal ,region, equidistant, oblique, rhumba line, tangent, transverse

1.0 Introduction

Models of Map Projections

There are fashions for growing one-of-a-kind map projections: projections by way of presentation of a metricassets and projections constructed from exceptional surfaces.

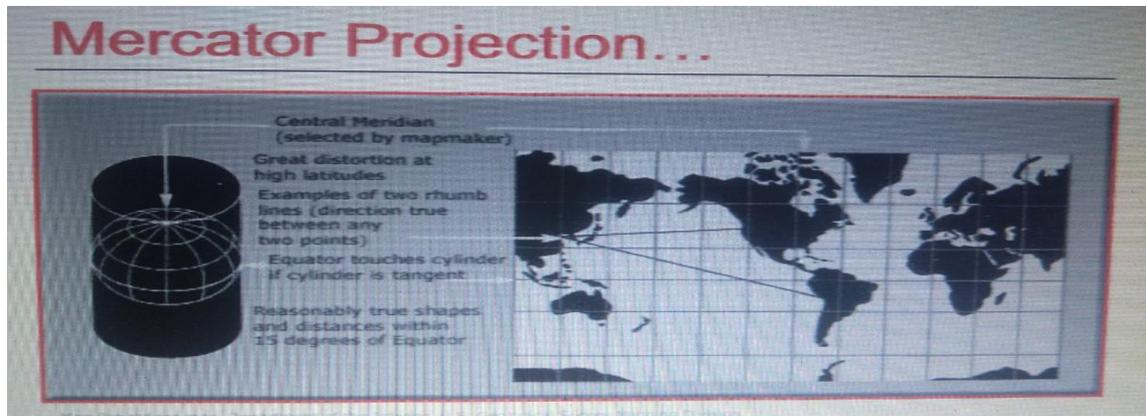
Projections by means of presentation of a metric property might encompass equidistant, conformal, gnomonic, identical region, and compromise projections. These projections account for place, form, path, bearing, distance, and scale. Projections comprised of specific surfaces could include cylindrical, conical, and azimuthal projections.

Types of Map Projections

The range of map projections made feasible is countless, and loads had been published. The attention of this take a look at of map projections, however, will involve twenty varieties of map projections and their characteristics, with examples given the usage of maps from the GIS Research & Map Collection, University Libraries, Ball State University.

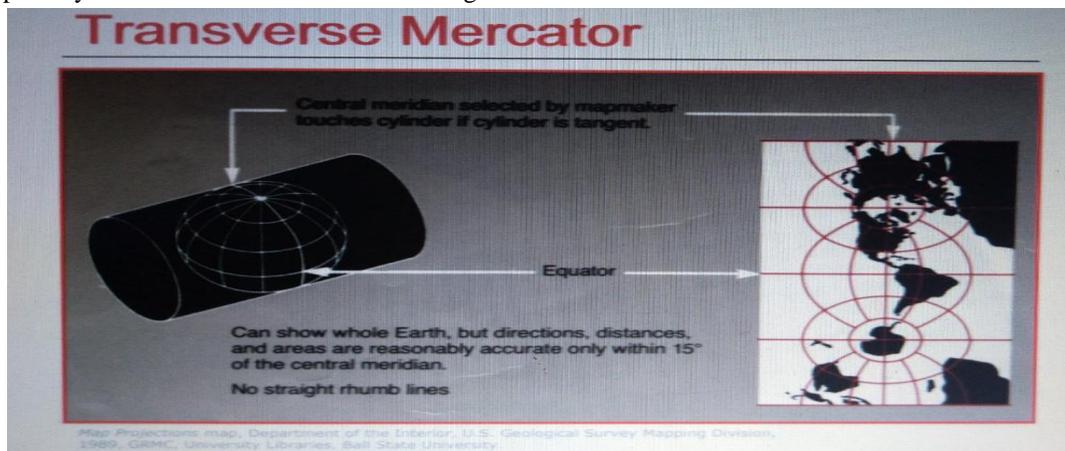
1) Mercator Projection...

- The excellent known map projection is called for its inventor, Gerardus Merator, who advanced it in 1569.
- The Mercator projection is a cylindrical projection that turned into advanced for navigation purposes. The Mercator projection became used for its portrayal of course and shape, so it was useful to the sailors of that point.
- The directly strains crossing at proper angles of this map projection make it useful for navigation, but it distorts the size of areas away from the equator. Polar regions seem to have a larger scale than regions close to the center (Note Greenland). Over small regions the shapes of gadgets will be preserved, however, so this projection is conformal.



2) Transverse Mercator

- The Transverse Mercator projection is a cylindrical projection regularly used to portray regions with large north south than east-west extent.
- Distortion of scale, distance, path and location increase far from the significant meridian.
- The Universal Transverse Mercator (UTM) projection is used to outline horizontal positions international by dividing the earth’s surface into 6-degree zones, every mapped through the Transverse Mercator projection with a primary meridian inside the center of the region.

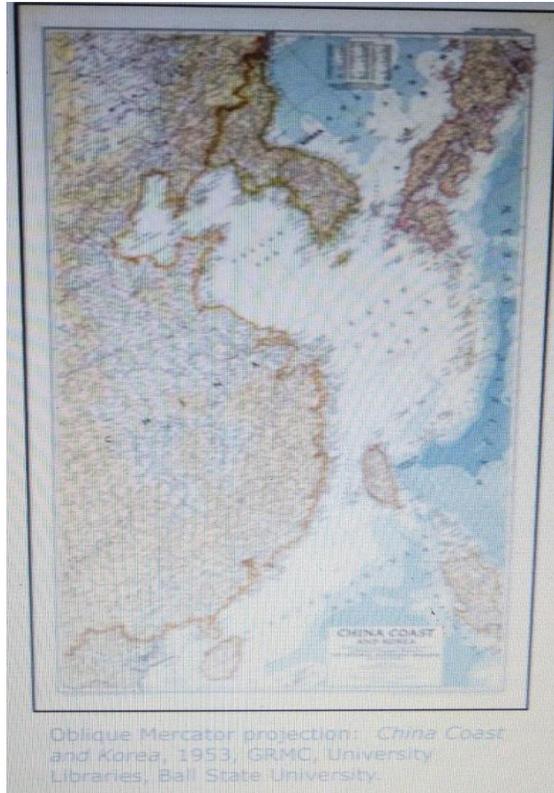




3) Oblique Mercator

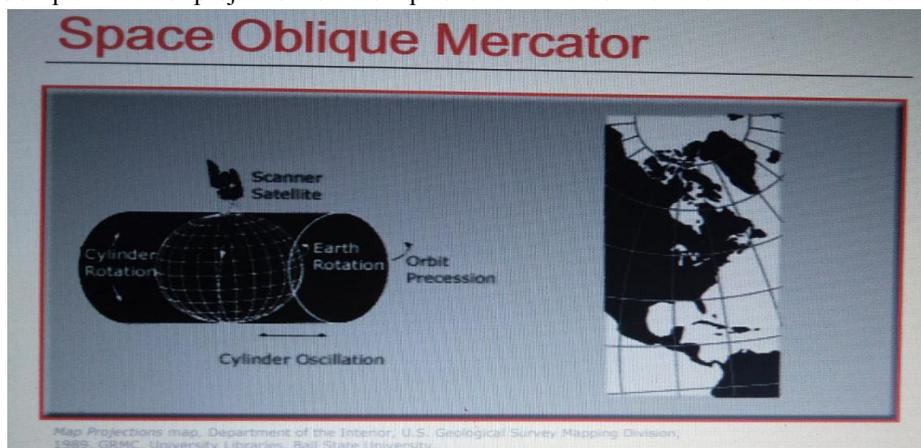
- The Oblique Mercator projection is a cylindrical projection often used to painting regions alongside outstanding circles.
- This map projection is commonly used for areas which are long, thin zones (like coastal areas) at a diagonal with appreciate to the north.
- Distances are real along a amazing circle described by means of the tangent line shaped through the field and the oblique cylinder. In different areas distance, form, and areas are distorted.

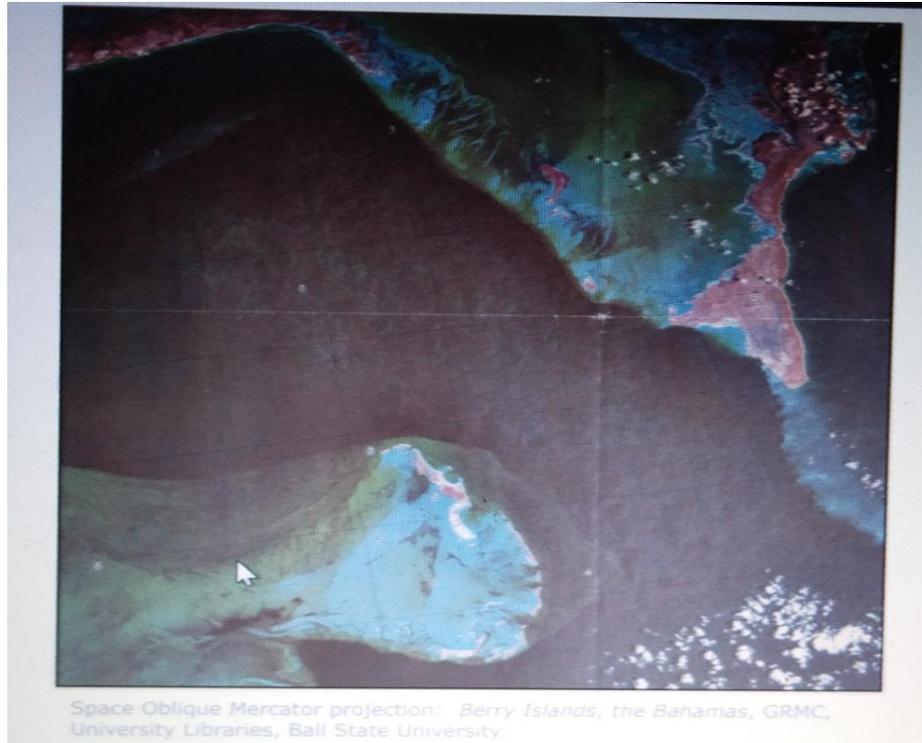




4) Space Oblique Mercator

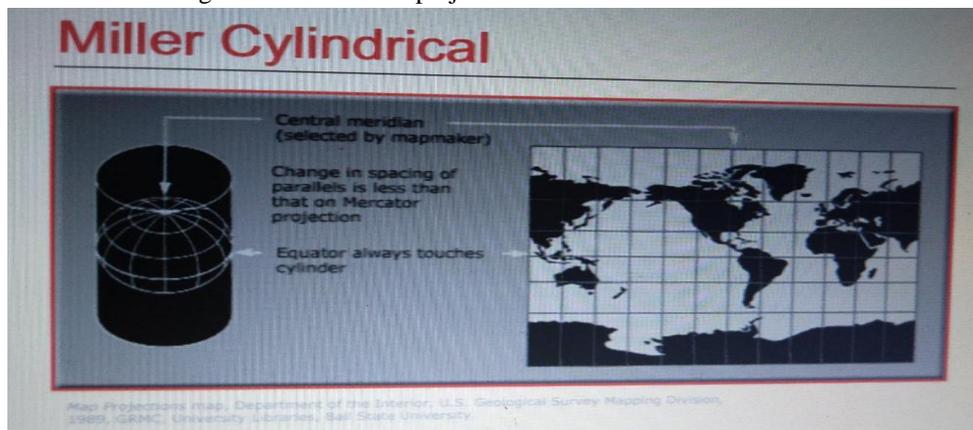
- The Oblique Mercator projection turned into replaced by the Space Oblique Mercator projection for Land-sat map pictures in 1972 with the launching of an earth-mapping satellite tv for pc by means of NASA.
- This map projection allowed mapping of the scanned orbit cycles, with the floor-tune continuously at a accurate scale and the swath on a conformal projection with minimum scale variant.
- The Space Oblique Mercator projection is the simplest one that takes into account the rotation of the earth.





5) Miller Cylindrical

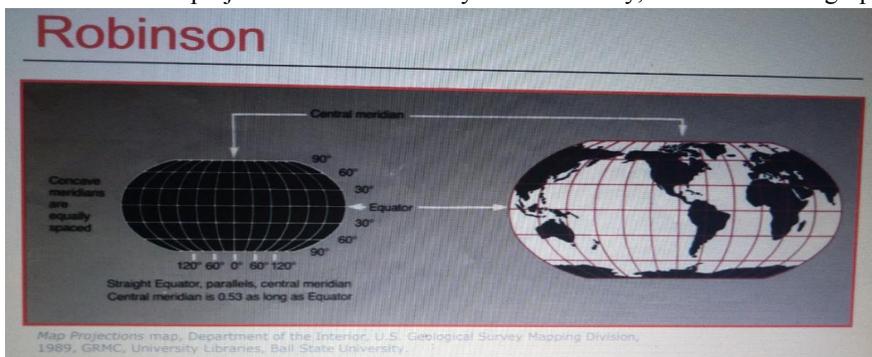
- The Miller Cylindrical projection was a compromise cylindrical projection created by way of Osborn Maitland Miller of the American Geographical Society.
- This projection is on occasion referred to as a “modified Mercator.” The parallels of latitude are scaled with the aid of a factor of 0.8, projected in step with Mercator, and then the end result is split by using 0.8 to hold scale along the equator. Thus, the equator is freed from all distortion.
- The whole earth, consisting of the poles, can be supplied in a rectangle without as much size exaggeration and form distortion inside the excessive latitudes as in the Mercator projection and with less shape distortion within the excessive latitudes as in rectangular same-location projections.

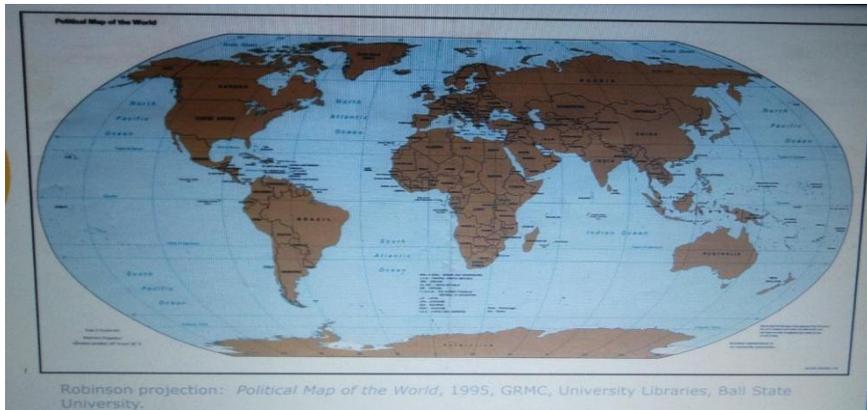




6) Robinson

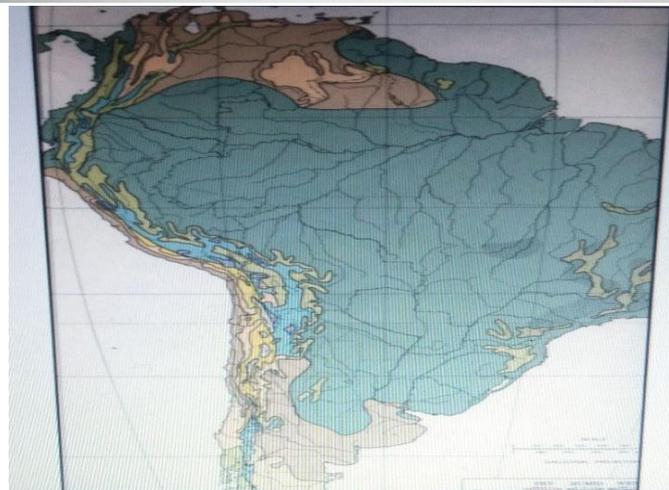
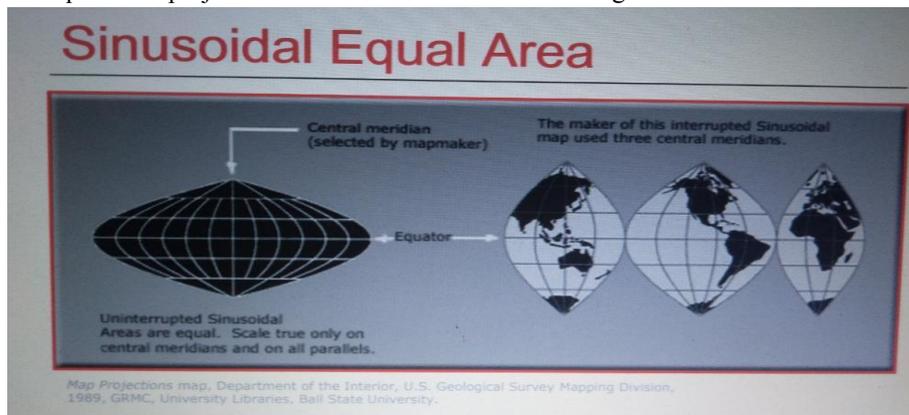
- The Robinson projection was a compromise projection evolved by Arthur Robinson, a leading educator in cartography.
- The Robinson projection is considered a pseudocylindrical projection.
- This projection indicates the entire earth uninterrupted with reasonable shapes. It departs particularly from equal area for you to offer better shapes in the center- and low-range regions.
- The Robinson projection became used by Rand McNally, the National Geographic Society, and others.





7) Sinusoidal Equal Area

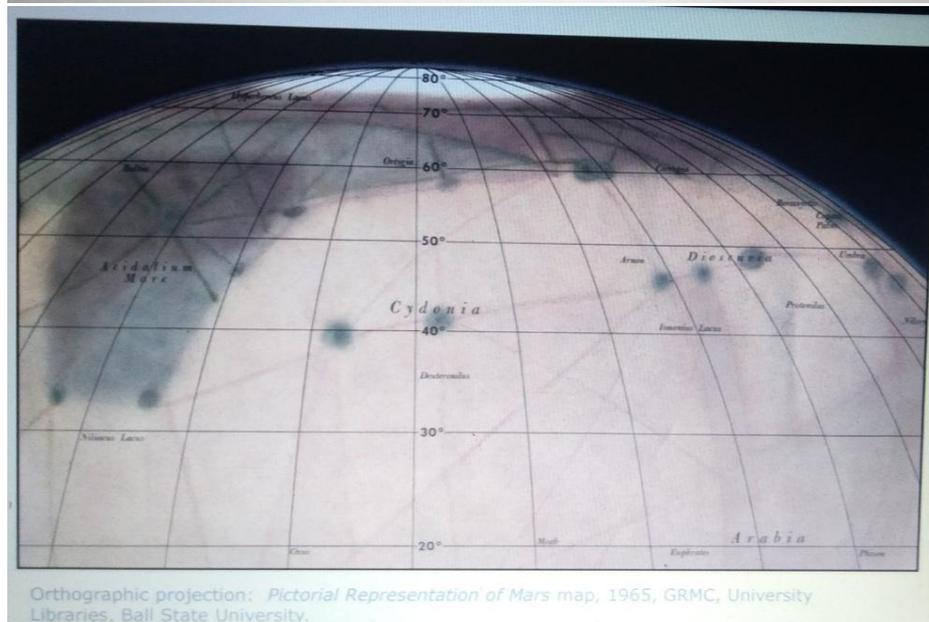
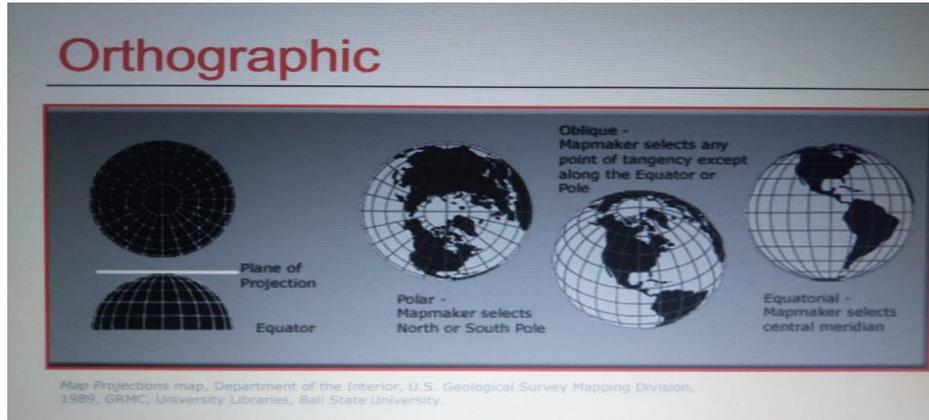
- The Sinusoidal Equal Area map projection is considered a pseudo-cylindrical projection.
- In the Sinusoidal Equal Area projection all parallels and the equator are widespread lines. All meridians are curved lines.
- This projection compresses shapes in better latitudes, but shapes are desirable within the central section. All parallels and the equator are at accurate scale; there may be additionally no distortion of the area scale.
- The Sinusoidal Equal Area projection is often used in areas with a larger north-south than east-west quantity.



8) Orthographic

- The Orthographic map projection is one of the oldest; it turned into use by Egyptians and Greeks lots of years in the past.

- The orthographic projection is used for attitude viewsof planets and areas as a method of providing a threedimensional item in two dimensions.
- This projection is useful for imparting man or womanhemispheres placed in the middle where the shapes arenow not appreciably distorted, however vicinity and shape may bedistorted by means of perspective.
- Directions are proper only from the middle factor of theprojection, and any straight line via the center point is a exceptional circle.
- Distances are authentic alongside the equator and different parallels.



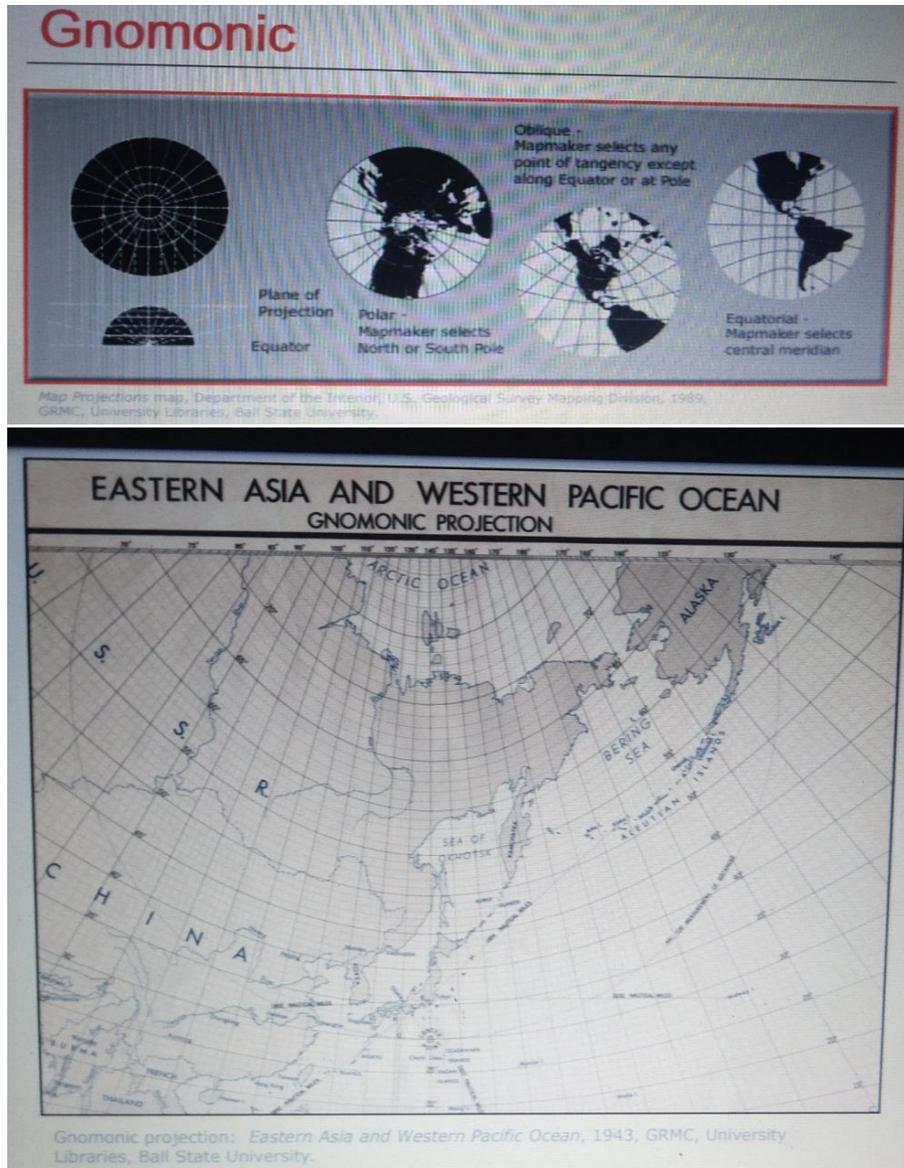
9) Stereographic

- The Stereographic map projection is some other ancientprojection, relationship back to thesecond one century B.C.
- The Stereographic map projection is maximum useful formaps of polar areas (for navigation purposes) or huge continent-sized regions of comparable volume in all directions.
- The Stereographic map projection is conformal however now notequal place or equidistant.
- Directions are authentic from the center point, and scaleincreases away from the center factor, as does distortion in location and form.



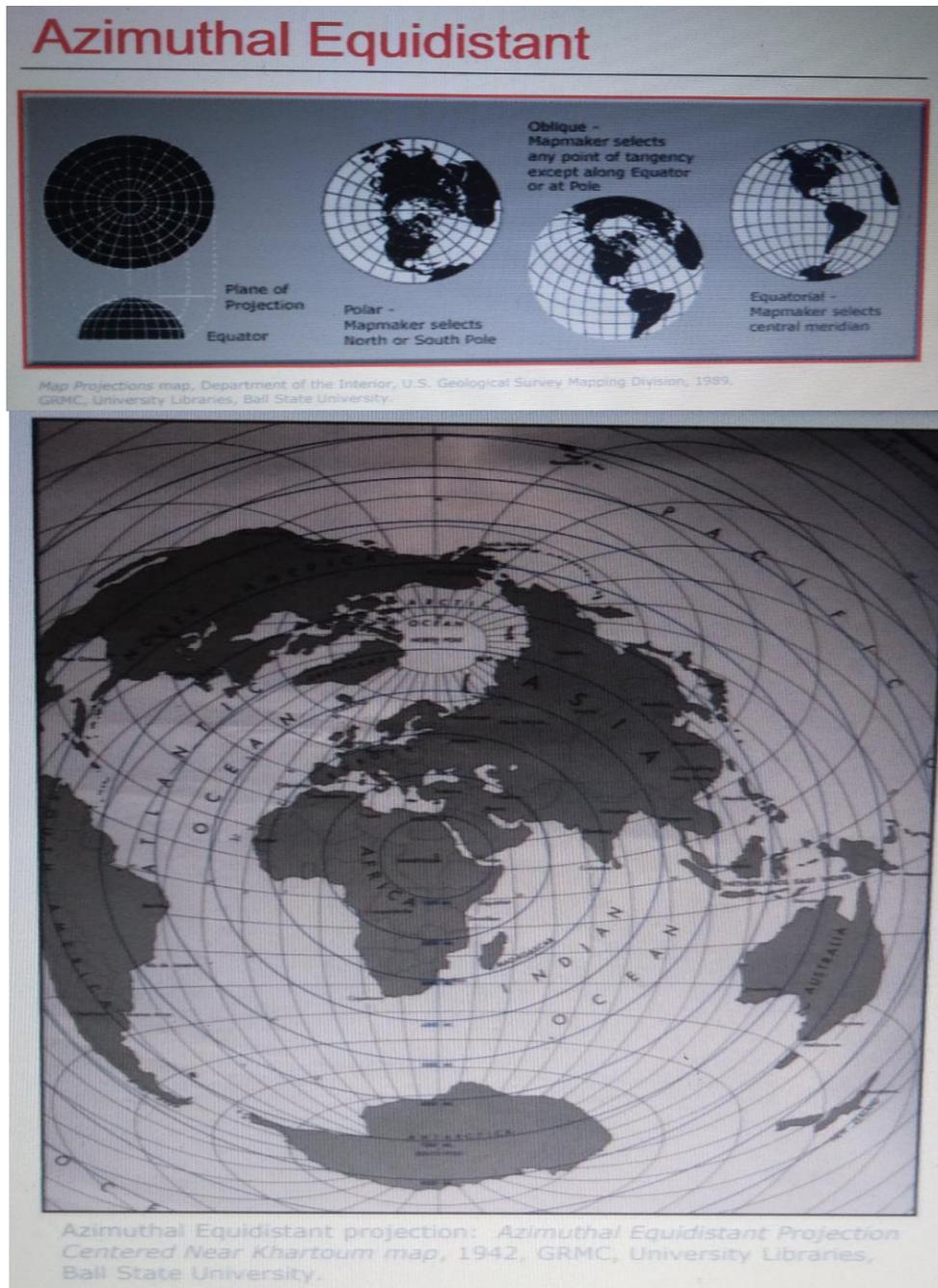
10) Gnomonic

- The Gnomonic or principal projection, another early azimuthal, is projected from the center of the earth onto a tangent plane.
- The Gnomonic map projection shows all splendid circles as immediately traces. Thus the shortest course between points in fact corresponds to that on the map.
- This projection is frequently used by navigators to gauge distance and in seismic work due to the fact seismic waves tend to travel alongside exceptional circles.
- Directions are proper only from the middle factor of projection. Scale and the distortion of form grow far from the center factor.



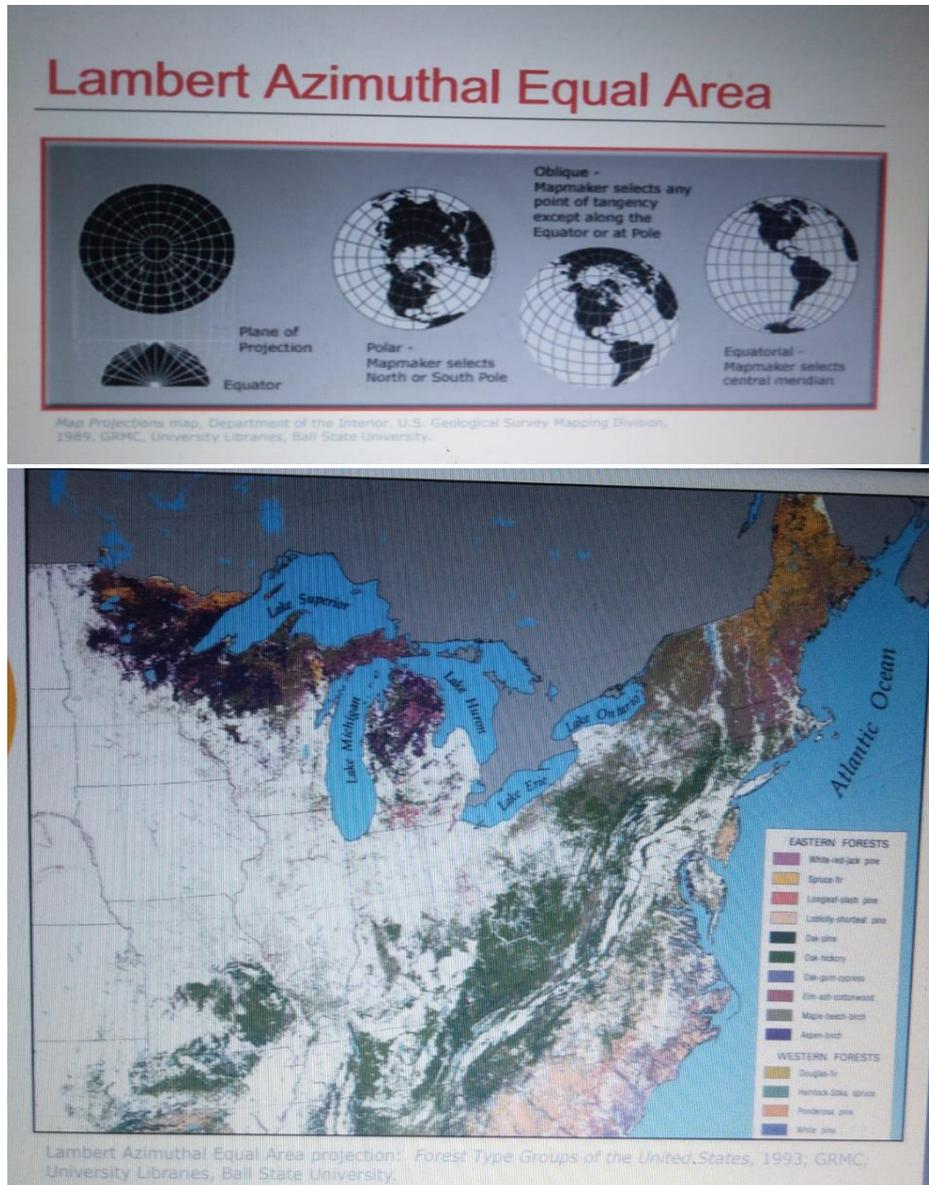
11) Azimuthal Equidistant

- The Azimuthal Equidistant map projection is targeted on one factor of the map. Its motive is to reveal all incredible circle routes thru the center as instantly strains with correct azimuths at the middle and to show the distances along the instantly-line remarkable circles with a uniform scale.
- This projection isn't equallocation, and shapes in the outerhalf are greatly distorted.
- The Azimuthal Equidistant map projection is useful due to the fact it may be centered on one town, as an instance, displaying airline distances from that factor.
- An example of a polar Azimuthal Equidistant map projection may be visible at the United Nations flag.



12) Lambert Azimuthal Equal Area

- The Lambert Azimuthal Equal Area map projection became developed through Johann Lambert in 1772.
- This equal vicinity projection is beneficial while mapping massive ocean areas.
- Directions are real most effective from the middle point. Scaled decreases away from the center point, as distortion of shapes increases.
- Distances are authentic along the equator and other parallels.



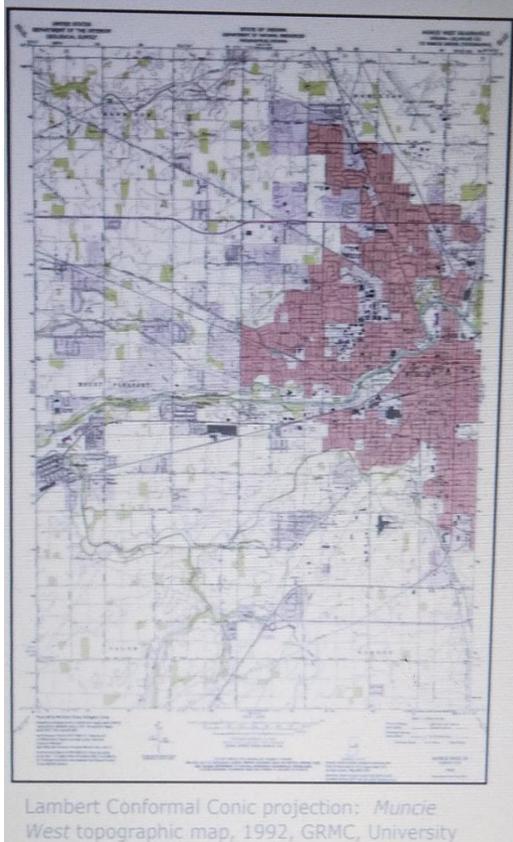
13) Albers Equal Area Conic

- The Albers Equal Area Conic map projection changed into evolved by Heinrich Christian Albers in 1805.
- This projection uses fashionable parallels. Nodistortion takes place alongside the two popular parallels, and parallels steadily decrease in spacing away from the principal parallel.
- Scale and shape aren't preserved, but instructions are moderately accurate in limited areas.
- This projection is beneficial for mapping areas which can be in particular east-west in quantity and that require same-place representation just like the areas of Europe, the United States, Alaska, and Hawaii.



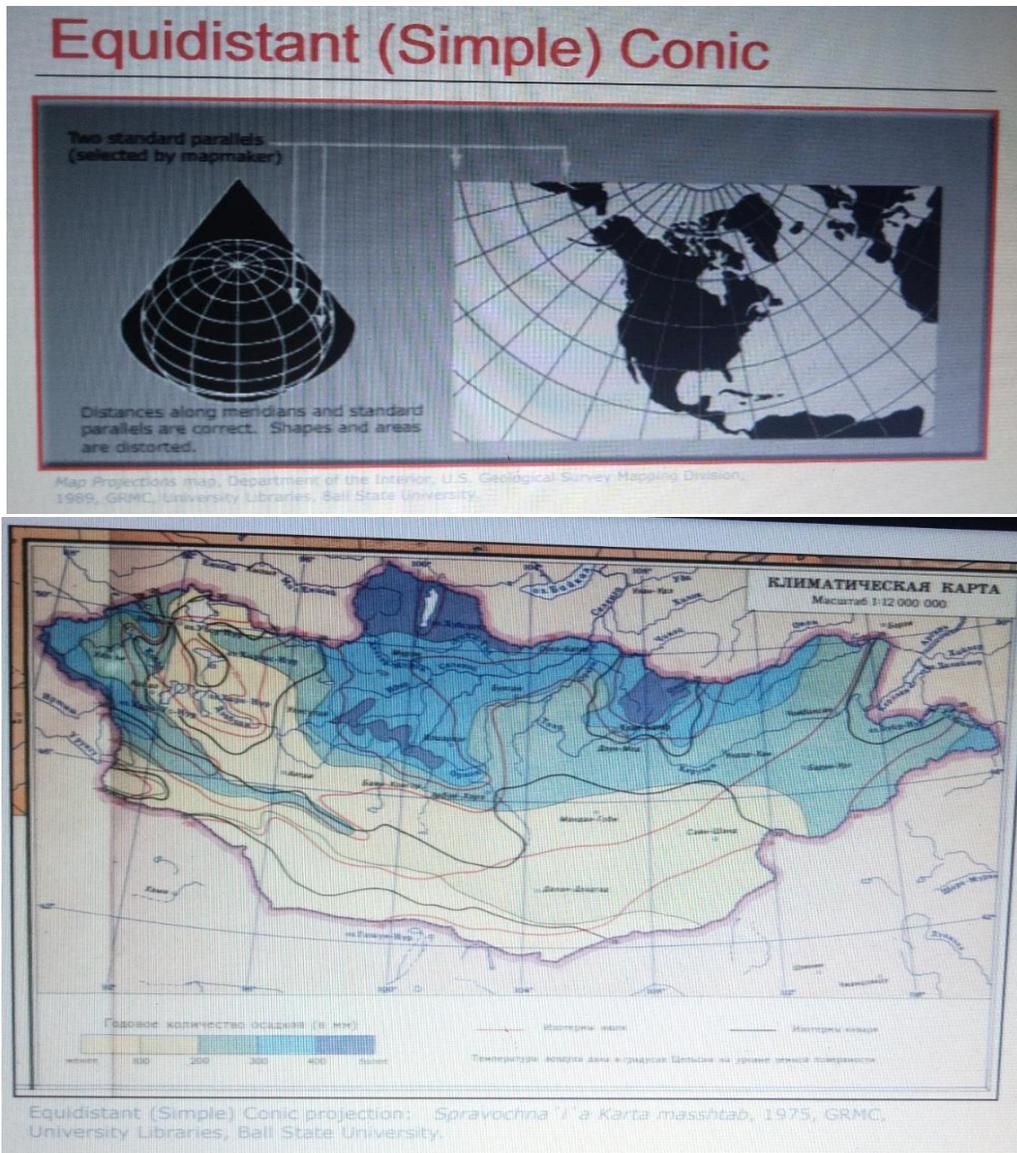
14) Lambert Conformal Conic

- The Lambert Conformal Conic turned into some other map projection advanced through Johann Lambert in 1772.
- This projection superimposes a cone over the sector of the earth, with reference parallels secant to the globe and intersecting it.
- Directions are reasonably accurate, and the distortion of shapes and regions is minimum at, but increases away from, the standard parallels. Shapes on massive-scale maps of small regions are basically genuine.
- The Lambert Conformal Conic map projection is considered one of the most extensively used map projections inside the United States. The USGS uses this projection for lots 7.5- and 15-minute topographic maps. It is likewise typically used for aeronautical charts.



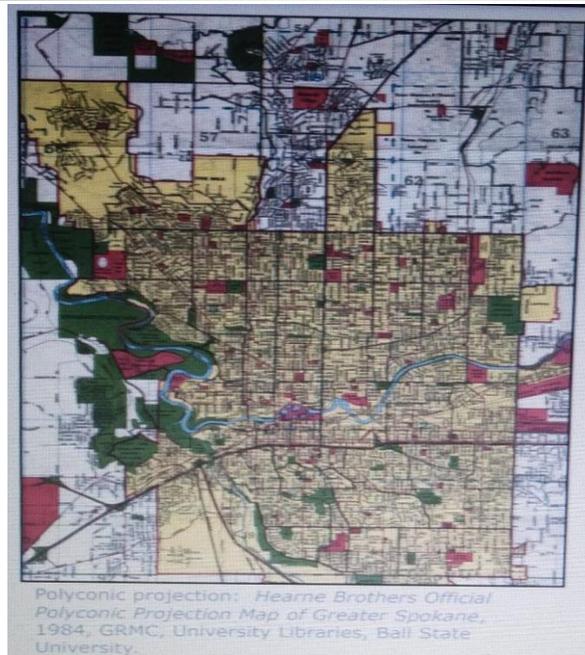
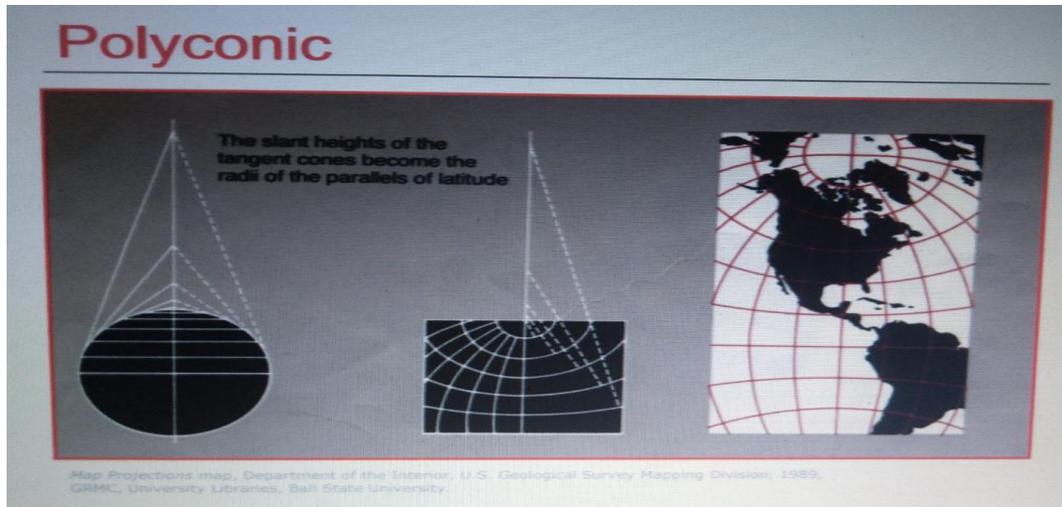
15) Equidistant (Simple) Conic

- A prototype of the EquidistantConic, Simple Conic, map projection became used by Ptolemy in one hundred fifty A.D. It turned into stepped forward in 1745.
- This map projection isn't conformal or identical area.
- The Equidistant Conic projection typically has one or parallels that have the identical scale, suffering from no distortion. Direction, place, and form are pretty correct however distorted faraway from trendy parallels.
- This map projection is usually utilized in atlases to show regions in the center latitudes, commonly on one facet of the equator.



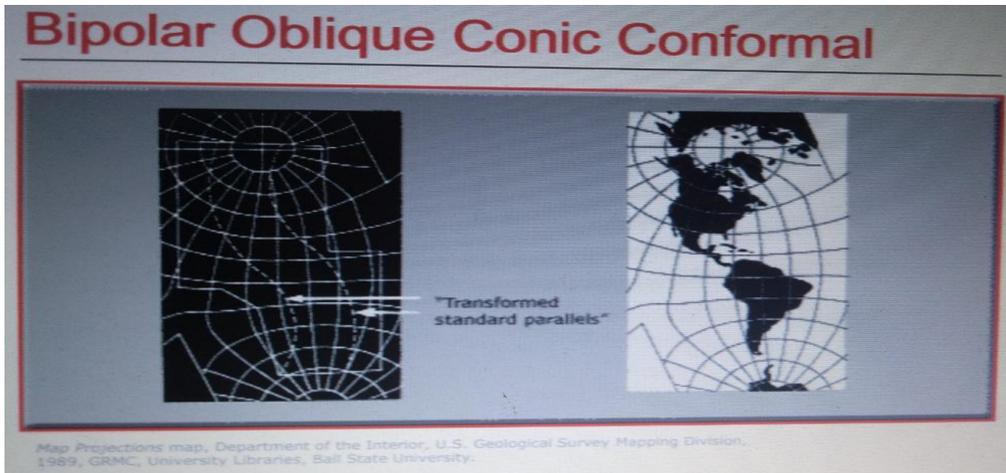
16) Polyconic

- The Polyconic map projection is related to F.R.Hassler round 1820.
- This map projection is primarily based on an infinite number of cones tangent to an countless range of parallels. The valuable meridian is immediately. Other meridians are complicated curves. The parallels are non-centric circles.
- Directions, shapes, and areas are proper simplest alongside the imperative meridian. Distortion increases away from the principal meridian.
- The Polyconic map projection became used almost exclusively for big-scale mapping within the United States till the 1950's, such as most of the USGS early topographic maps. The projection was fine suited for areas with a north-south orientation, but it's miles now nearly obsolete.



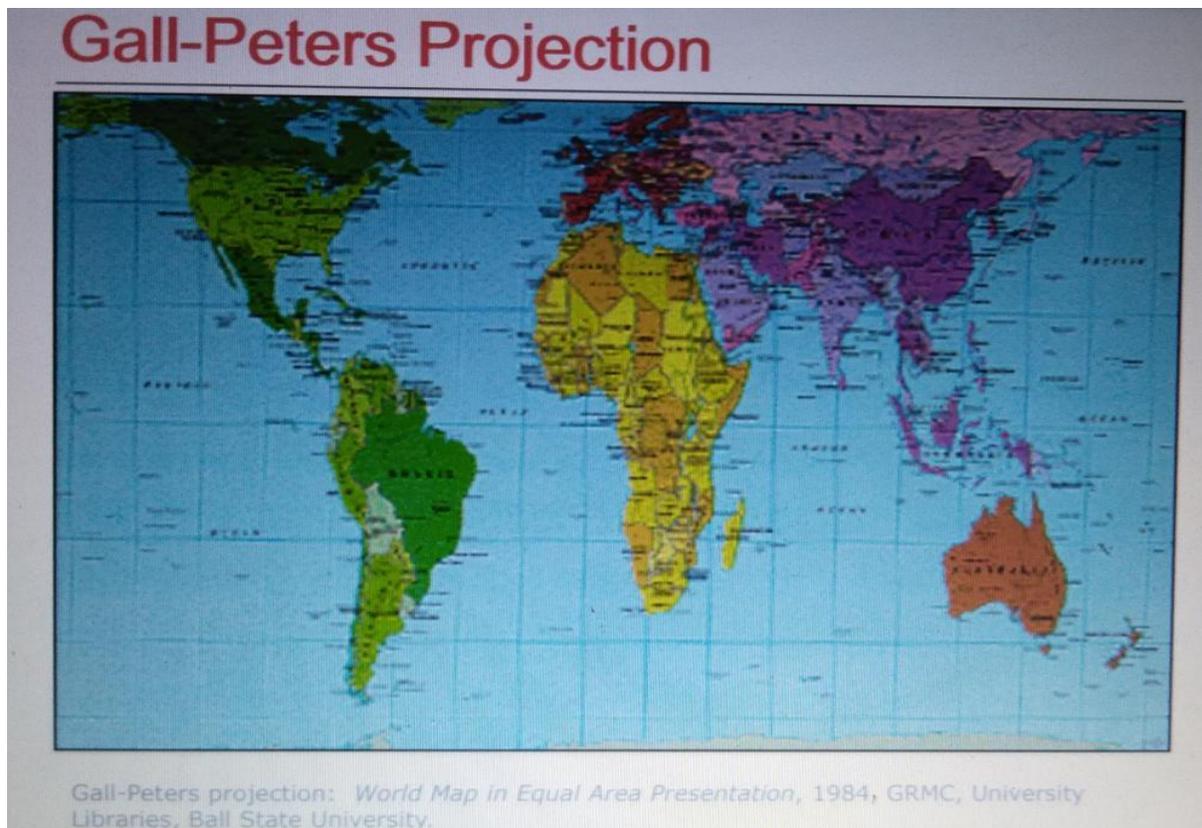
17) Bipolar Oblique Conic Conformal

- The Bipolar Oblique Conic Conformal map projection became developed by way of O.M. Miller and Briesemeister of the American Geographical Society strictly for the cause of creating a map of North and South America.
- This map projection accommodated the tendency of North America to twist towards the east even as South America tends to curl within the opposite direction.
- Scale is usually properly near the middle of the projection.
- The Bipolar Oblique Conic Conformal map projection is not identical place nor equidistant.



18) Gall-Peters

The Peters Projection changed into created in 1974 to deal with a number of the distortions of present maps. The projection turned into similar to one created a century earlier by Gall, so it became called the Gall-Peters projection. Gall-Peters preserves sizes and proportions, however shape distortions are first rate close to the equator and poles. To be equal-location in the rectangle decided by using fashionable parallels of forty five stages causes the equatorial areas to be greatly lengthened vertically and squeezed horizontally. The better latitudes are substantially lengthened horizontally and squeezed vertically.



19) Van der Grinten

Alphons J. Van der Grinten evolved a map projection that changed into neither conformal nor same-area. The Van der Grinten map projection is a compromise projection showing the complete earth within a circle. Shape and size distortions boom far from the significant segment, particularly inside the high latitudes. Most of the substantially enlarged polar regions are overlooked while this projection is used.



20) WinkelTripel

Oswald Winkel advanced the WinkelTripel map projection in 1921 as a modified azimuthal projection. This projection is neither equal-region nor conformal, however shape distortions are mild. Unlike the similar Robinson projection, parallels are directly on the equator and poles and curved some place else. Scales are regular but not identical on the equator and critical meridian.

The WinkelTripel presents a balanced view of the whole global (typically in a round shape), which brought about its choice through the National Geographic Society for its new reference global map in 1998, changing the Robinson projection.



The Globe

- On a globe, instructions, distances, shapes, and regions are all accurate and proper.
- The shortest distance among any factors on the surface of the earth can be observed quickly and easily alongside a fantastic circle the use of a globe.
- However, even the biggest globe has a very small scale and shows relatively little detail. Maps can accommodate a significant range of scales, and can display a larger portion of the earth in one view.
- Globes are high-priced to reproduce and update.
- Globes are cumbersome to shop and tough to move.
- Globes can't be regarded effortlessly on laptop displays.



The “Best” Map Projection Every projection has its own set of benefits and downsides. Even the globe, a proper representation of the earth, has disadvantages. There isn't any "satisfactory" projection. The mapmaker needs to choose the only pleasant perfect to the desires of the unique map, decreasing distortion of the maximum crucial functions.

- For greater statistics approximately any of the maps proven or the tutorial lesson Maps and Cartography: Map Projections, please contact the GIS Research & Map Collection, Ball State University Libraries, at (765) 285-1097.
- Visit the Web page at www.Bsu.Edu/library/collections/gcmc/
- Information supplied by means of Map Projections: A Reference Manual by means of Lev Bugayevskiy and John Snyder, Ball State University Libraries; and Introduction to Map Projections with the aid of Porter McDonnell, Jr., Ball State University Libraries.

Conclusion-

The year 2020, and the COVID-19 virus presented challenges for communities worldwide. Our Cartography and GIScience international ‘family’ was not immune to the impacts of health issues, movement restrictions and the need to operate altogether differently to what we had done in the past. When we look at some maps or atlases we sometimes just ‘like them’, or think they ‘work’. They are something special. They can work, artistically, scientifically, technically – or in all three of these areas. We generally limit our appreciation to some ‘note to self’ or by commenting about the artifact we admire to a close friend or colleague, or by a brief comment on social media. We very rarely express our longer-form thoughts about them to a wider audience. We believe that this Special Issue has provided the vehicle for this to occur, at least for the small proportion of cartographic works on show.

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