Notes of GEOG 10100 – People &Their Environment

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Fall 2022

What is Geography?

- This is a very difficult question to be answered, because geography's nature is changing.
- Geography is referred to as a spatial science. It is concerned with the use of earth space.
- Geography is also defined as the study of spatial variations of how and why thing differ from one place to another on the surface of the earth.
- The literal meaning of geography means **the description of earth's surface**.
- Later Geography developed and included people and their activities on earth.
- In a wider scope, people and their activities on the environment represent the major theme of geography.
- In other words, geography is concerned with **people/environment relationship**.
- Such interaction between people and the environment can go both ways.
- That means, people can cause damage to the environment and the environment can create damage or problems to people.

Division of Geography:

- 1- **Physical Geography:**
- Climatology, Geomorphology, Hydrology, Biogeography, Cartography.
- **2- Human Geography:**
- Population, Agriculture, Culture, Historical Geography, Economic Geography, Transportation, Political Geography, Medical Geography, Urban Geography and Natural Resources.

Basic Geographic Concepts:

- Geographers investigate or study physical or cultural phenomena through asking questions such as:
- What is it? Where is it? Where is it in relation to other physical or cultural phenomenon?
- Does its location affect human lives? In addition to many other questions.
- In order to answer these questions geographers use certain concepts and terms. That means geography has terms, concepts and themes.
- In order to understand how people live on and shape the earth's surface, we should find out first how things are organized on the earth's surface.
- In other words, we should start with the **Spatial Pattern** of the distribution phenomena on earth.
- For example, if we consider a spatial distribution of towns and cities in some parts of the world:

- Geography is about places and spaces. We make comparisons to find out that whether places look similar or different.
- This comes basically as a result of **Observation.** Geographers observe the pattern of the distribution of places on earth in order to make comparison between these places.
- A place may be large or small (Scale).
- Places have location, direction and distance in relation to other places.
- A place has both physical and cultural characteristics.
- The characteristics of places develop and change overtime.
- Places interact with other places.
- Places may be generalized into regions.

Location

- A location of a place may be described in 2 ways:
- 1- Absolute location and
- 2- Relative location.

1-**Absolute location** (Mathematical):

- It shows the precise position of a place on the surface of the globe using the coordinates which are the latitudes and the longitudes.

2-Relative location:

- It shows a location of a place in relation to other location(s).
- Relative location expresses spatial interconnection and interdependence. It tells us that people, things and places exist in a world of physical and cultural characteristics that differ from place to place.
- Places have physical and cultural attributes that distinguishing them from other places and giving them character, potential and meaning.
- Geographers are concerned with identifying and analyzing the details of those attributes within the context of people/environment relationship.
- The result of human activity on the environment is called **cultural landscape.**
- Attributes of places are always changing.
- Places similarity and Regions (large places):
- Large places that show significant elements of **internal uniformity** and **external differences** from surrounding territories are called **regions**.
- Two generalized types of regions are recognized:

1- **A Formal region**:

- An area that shows uniformity in one or a limited number of related physical or cultural features. For example, New York is a **formal political region** (uniformity of laws and administration). The African Sahara Desert is a **formal natural region.**

2- **A Functional region**:

- A functional region may be visualized as a **spatial system**. Its parts are interdependent and operate as a dynamic, organizational unit. It has a unity not in the sense of static content but in a manner of its operational connectivity. It has a **core area** surrounded by the total region which defined by the type of operation.

Geographical Tools

- Maps: Maps are one of the main tools of Geographers. Geographers depend on maps to help them record, present and analyze the location of points, lines and objects.

Locating Points on a sphere:

- Using the **Grid System** "**Coordinates**". In order to locate points on the surface of the earth, we use the **Grid system**. It is a set of imaginary lines drawn across the face of the earth.

Latitudes:

- The horizontal grids are the **latitudes**. They encircle the globe. The circles are getting smaller and smaller as we go from the Equator towards the poles.
- The Equator is the prime latitude. There are **90 latitudes** (degrees) **north** of the Equator, and **90 latitudes south** of the Equator. The distance between each latitude and another is **111km** or **69 miles**. Latitudes are parallel to each other. **Each latitude** (degree) could be divided into **60 minutes (')** and **each minute** into **60 seconds (").** This shows the exact place on earth.

- For example, the location of down town Chicago is 41° 51' 50" North.

Three important points

- **Three points** should be considered when locating points (places) on the globe:
- **1-**Relate the location of the point (a village or a city or a well) to the smaller latitude and the smaller longitude.
- **2-** Start dividing your minutes of distance from the smaller latitude and smaller longitude.
- **3-** Write the latitude first and show whether it is **N** or **S** of the equator. Then write the longitude and show whether it is **E** or **W** of Greenwich.

Longitudes (meridians):

- They are imaginary north-south lines connecting the poles of the earth. **Greenwich** is the prime meridian. The distance between longitudes decreases towards the pole. Unlike the latitudes, all longitudes have the same length. There are **180 long. East** of Greenwich and there are **180 longitudes west of Greenwich.** Longitudes can also be divided into **minutes** and **seconds**.

- For example: Chicago is located at 41° 52' N , 87° 40' W

Time:

- Time is always calculated in relation to **longitudes.** There are 24 hours a day.
- Accordingly, earth is divided into **24 Time Zones.**
- They are found along longitudes.
- Each **Time Zone** represents **one hour** and each of these time zones covers **15 longitudes**.
- **Time** starts at **Greenwich**, and each **New Day** begins at the **International Date Line,** which is located in the Pacific Ocean and follows the **180th meridian.**
- The difference between each longitude and another is **4 minutes.** This is called a **Solar Time.**

How can we find the time of a place?

- In finding the time of a place located **east** of another place, we **add** (+) the difference in terms of time zones between the two places to the time of that particular place (**A**). This will give us the time of the place located to the **east** (**B**).
  If a place (**C**) is located **west** of a particular place i.e. (**A**), we **subtract** (**-**).

The Scale

- The scale of a map is the ratio between measurement of something on the map and the corresponding measurement on the earth. The scale is represented in 3 ways:
  1-**Verbal scale** (written): "One inch equals one mile"
  2- **Graphic scale** (Line scale)
  3- **Representative fraction** (Numerical): The scale is given in 2 numbers. The first scale represents the map distance. The second is the ground distance. The unit in each part is the same. **1: 63360.**
- **Large-scale map** shows many details.
  i.e. **1:400**
- **Small-scale map** shows fewer details**.**
  i.e. **1: 100,000 or 1: 250,000**

Remote sensing:

- Making maps with the help of Satellite Imagery and Landsat Satellites.

Geographic Information System (GIS):

Making maps with the help of computers.

Landforms

- The earth was formed **4.7 billion** years ago.
- And it is formed of different layers:
  1.The **Crust** at the top, (8-60 km).
  2. Lithosphere (60- 400 km).
  3. Asthenosphere (400-700 Km).
- The **crust** consists of the rocks that form the continents and the rocks that found below the ocean. It is made of solid materials (Rocks).
- The **Lithosphere** is made of solid materials. The Lithosphere is broken into large **12 plates** (land masses). Each one of them may contain both oceanic and continental crust.
- The **Asthenosphere** is made of **semi-molten** materials. Each of the Lithospheric plates **slides** or **drifts** or **floating** over the Asthenosphere.

Movements of the Continents

- A scientist called **Wegener** came up with a **theory** which he called **Continental Drift**.
- He said that all of the continents used to be connected in **one supercontinent** called **Pangaea** (All earth).
- At about **200 million** years ago, Pangaea was broken into parts **(continents)** as the seafloor began to spread. The main force came from what is now the Atlantic Ocean.
- Materials from the Asthenosphere have been rising along Atlantic Ocean fracture that causes the spread of the seafloor and also forms the **Atlantic Ocean Ridge**. The Ridge runs parallel to continents.
- Drifting of continents continues. The Atlantic Ocean is widening at a rate of about **2.5 cm** or **one inch** a year.
- The theory of **Continental Drift** was appreciated and not accepted by scientists.
- The idea of the moving continents has led to the theory of **Plate Tectonics.**
- Continental crust is made of lighter materials (rocks), and the ocean floor is made of denser and heavier materials (rocks).
- When continental plate collides with oceanic plate, the denser oceanic plate will move downwards and creates **deep-sea trenches**.
- The continental plate will be forced to rise forming **continental mountain ranges** (i.e. Rocky Mountains).
- This type of collision is called **Subduction**. The collision may cause **earthquake**, **fault** and **volcano** at the intersection of plates.
- These tectonic activities helped in **changing** the **shape** and **features** of **landforms**.
- Most Pacific Ocean is underlain by a plate which is constantly pushing or being pushed. This makes the rim of the Pacific Ocean an **active** zone of **earthquakes** and **volcanoes**. For this reason it is called the "**Ring of Fire**".

Earth Materials (Types of rocks)

- The earth's crust is composed of different types of rocks.
- According to the type of minerals these rocks may be hard or soft, dense or open, one color or another. They may be chemically stable or not.
- There are 3 main groups of rocks.
  1. **Igneous rocks**.
  2. **Sedimentary rocks**.
  3. **Metamorphic rocks**.

Igneous Rocks

- They are formed by the **cooling** and **hardening** of the earth's materials (molten materials) that rise from the Asthenosphere.
- When the material cools and hardens below the earth's surface is called **magma**, and the rock it forms is called **intrusive igneous rock**.
- When it appears above the ground, the material is called **lava** and the rock it forms is called **extrusive igneous rock**.

Sedimentary Rocks:

- They are composed of particles of gravel, sand, silt and clay that eroded from already existing rocks.
- **Sedimentary rocks** are formed when surface water carried sediments to oceans, marshes or lakes. Compression of sediments by an additional weight of the same materials, together with the cementing process brought by the chemical action of water and certain minerals forms **Sedimentary rocks**.
- **Sedimentary rocks** are formed under the water in horizontal beds called **strata.**
- **Sedimentary rocks** are also formed of **organic materials** such as **coral**, **shells** and **marine skeletons**. Such materials form **limestone**.
- **Petroleum** (gas) is associated with vegetation and biological products that are found in the **Sedimentary rocks**.

Tectonic Forces

- The earth's crust is changed by forces resulting from plate movements.
- Tectonic processes are divided into two: These are **Diastrophic** and **Volcanic**.
- **Diastrophism** is the great pressure acting on the plates that **deforms** the earth's surface by **folding, twisting**, **breaking** (**faults**) or **compressing** rocks.
- **Volcanism** is the force that transports molten material to or towards the earth's surface.

Diastrophism:

- **Folding**: When the pressure caused by the moving plates is great it will result in bending of the crust. Therefore, a **ridge** or a series of **ridges** or **folds** (mountains) will be formed.

- **Faulting**: A **fault** is a **break** or a fracture in the rock. The broken land mass may be uplifted by tectonic forces and forms a **plateau**. Or it may go down (downthrust) and forms a **rift valley.**
- **Earthquakes:** Whenever tectonic movement occurs it may result in an earthquake. The greater the tectonic movement, the greater the magnitude of the earthquake.

- If an earthquake occurs below an ocean, the movement can cause a **tsunami**, which is a **large destructive sea wave.**

Volcanism:

- Volcanism is the movement of the molten materials to the earth's surface at the intersections of plates.
- If the material arrives at the surface as a great explosion it will form a **steep-sided cone** which is called **strato** or **composite volcano**. The volcanic eruption may occur without explosion. In this case it will form a **gentle slope volcano** called **shield volcano.**

Gradational Processes

- **Gradational processes** are responsible for the reduction of land surface.
- Through these processes a mountain will diminish and be replaced by a plain and its material may be carried away and deposited in another place.
- There are 3 kinds of Gradational Processes: weathering, mass wasting (gravity transfer) and erosion.

1-Mechanical Weathering:

It is the physical disintegration of earth materials (rocks) at or near the surface. It occurs in 3 ways:

A- Frost action
B- Salt crystals
C- Root action

2-Chemical Weathering:

It causes rock to decompose rather than to disintegrate by:

A- Oxidation occurs when oxygen combines with minerals of rock (iron) and causes decomposition of some part of the rock. The product will be softer than the original rock (rusting).

B- Hydrolysis occurs when water interacts with some minerals in the rock.

C- Carbonation occurs when carbon dioxide dissolves in rain drops it forms weak carbonic acid. When the acid reacts with limestone, limestone dissolves in it and be carried and deposited in other areas.