

## Temperature

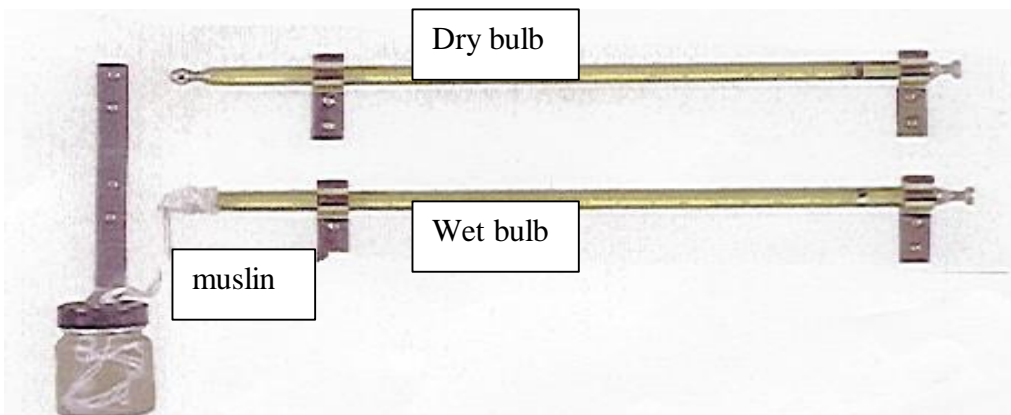
### Stevenson Screen

This screen is used to shield the thermometers and thermo-hygrograph from direct sunlight, rainfall and other elements. It allows for the free circulation of air around the thermometer thus creating a uniform temperature in the screen. The base of the screen is position at about 1.25 –2metres above the ground on a metal stand.



Thermometers which indicate the actual temperature are known as **ordinary** thermometers.

### Ordinary Thermometers



These are used to obtain the dry (air) and wet (saturation) temperature in the screen. The muslin covering the wet bulb should be fitted snugly around the bulb of the thermometer. The wick and water container is used to keep the muslin covering the wet bulb moist.

The thermometers indicating extreme temperatures over a period of time are called **Maximum** or **Minimum** thermometers.



The Maximum and Minimum thermometers are mounted horizontally inside the Stevenson Screen with the minimum thermometer slightly tilted.

### **Maximum Thermometer**

This is mercury in glass thermometer with a constriction in the bore between the **bulb** and the beginning of the scale. This **constriction** prevents the mercury column from receding with falling temperature. The thermometer can be reset by forcing the mercury back through the constriction. This is done with a quick rotation of the wrist.

### **Minimum Thermometer**

This is an alcohol in glass thermometer with a glass **index** immersed in the alcohol. When temperature falls, the surface tension of the meniscus of the alcohol pushes the index down through the bore of the thermometer. When the temperature raises again the index remains at the lowest position. The end of the index furthest from the bulb indicates the lowest temperature. Raising the bulb end so that the index slides down the bore of the thermometer resets the thermometer.

## Precipitation (Rainfall)

Precipitation is measured on the basis of the depth to which a flat horizontal impermeable surface would have been covered if no water were lost by runoff or evaporation. Rain gauges are of two types; recording and non-recording.

### Standard Rain gauge

This rain gauge consists of a funnel leading into a glass bottle inside a brass can. The base is embedded about 6-8 inches in the ground for stability. An extra bucket is added to prevent loss of rainfall due to overflow of bottle. Rainfall is collected in the bottle and is measured using a graduated measuring cylinder.



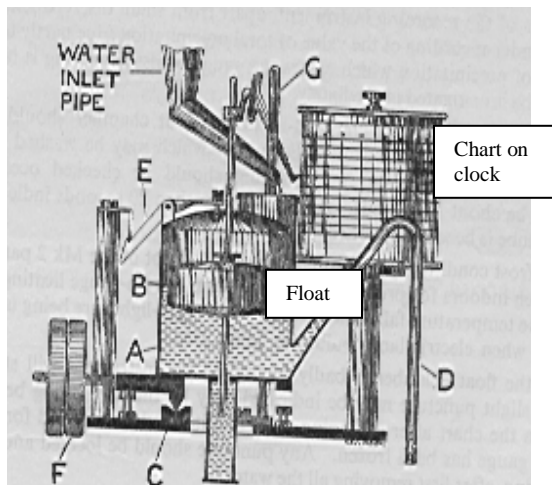
Measuring Cylinder

## Recording Rain gauge

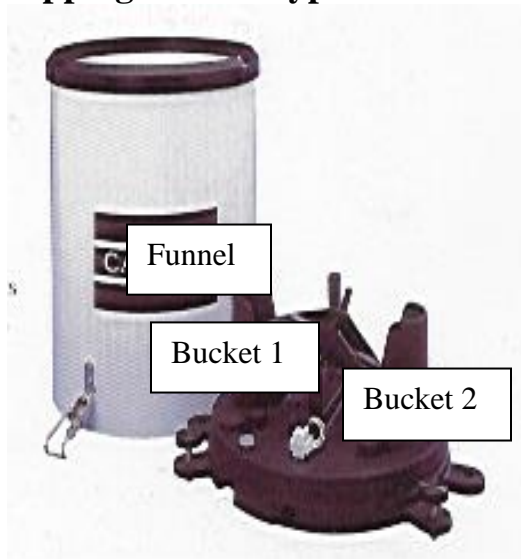
These are of two types: **float type** and **tipping bucket type**

### Float type

It is called the tilting siphon recorder and has a float inside a drum. When it rains water is collected inside the drum. The float which is connected to a pen then rises and records the amount of rainfall on a chart.



### Tipping Bucket Type



Rainfall from the funnel falls into the first bucket. When this is filled it tips and empties its water. The second bucket now begins to collect water, when this is filled it empties its water. With each tip it sends a signal to a recorder where the amount of rainfall is recorded. This recorder can either be an electrical one or a chart on a drum, which is connected to a clock, and rotates once a week.

## Soil Temperature

These are mercury in glass thermometer mounted in a glass or plastic tubes with their bulb embedded in wax. The wax enables the thermometer to be removed from the tubes and read before the temperature has time to change appreciably. The thermometer is placed in a steel tube, which is sunk into the earth to a depth of either 1ft or 4 ft. The thermometer is held by a chain that is connected to a metal cap which covers the steel tube.



## Grass Minimum thermometer



The **Grass Minimum Temperature** is the temperature recorded in open air ground on short turf, with the bulb of the thermometer just in contact with the tips of the blades of grass. The alcohol column overnight causes a small indicator within the stem of the thermometer to descend and record the lowest temperature.

## Evaporation

Evaporation of water is measured using a **Class-A Evaporation Pan**



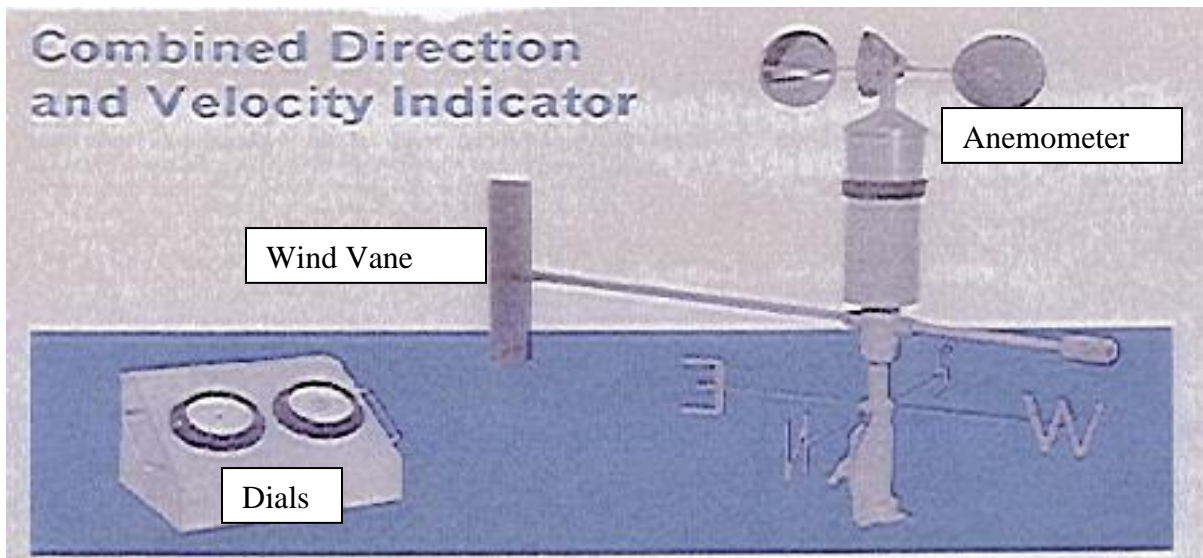
During the day the sun heats the water in the pan and causes it to evaporate. Since the water is evaporated the level of water in the pan falls. The water level in the pan is measured using a hook-gauge which consists of a movable scale fitted to a hook. When properly set the point of the hook just touches the water surface. A still well with a small hole in the bottom breaks the ripples that may be present in the pan and also acts as a support for the hook gauge. The pan is reset whenever more than 25mm of water is evaporated or when it is overflowed.

## WIND

### Cup-counter Anemometer



This instrument measures the average wind speed for the day. A counter is fitted to an anemometer, which turns according to the wind speed. By observing the reading at the beginning and end of a period, the average wind speed for that period can be calculated.



The Anemometer measures the **Wind Speed** and the Wind Vane Measures the **Wind Direction**.

The **Anemometer** consists of three cups position  $120^\circ$  apart. The cups are connected to an electrical generator. When the wind blows, the cups turn and thus the generator motor turns. Current is then produced in the generator and is displayed on a dial. The current produced is proportional to the wind speed.

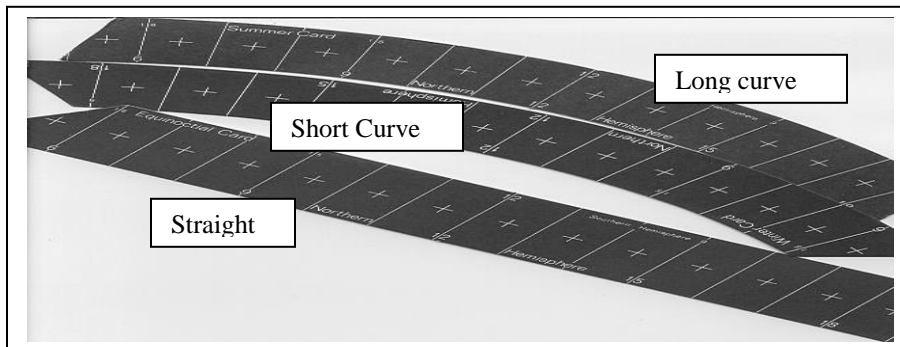
The **Wind-vane** consists of a fin type tail and a round knob position in the direction the wind is blowing from. When the direction of the wind changes from a specific direction, this same action is repeated and displayed on a dial where it is read.

## Sunshine

Glass sphere



The Campbell- Stokes sunshine recorder is used to measure Sunshine hours. It consists of a glass sphere which focus the sun's rays on heat sensitive cards causing it to burn a trace. There are three types of cards which correspond to the position of the sun at different times of the year. Long curve cards are used between 12<sup>th</sup> April and 2<sup>nd</sup> September, Straight cards are used from 3<sup>rd</sup> September to 14<sup>th</sup> October and short curve cards are used from October 15<sup>th</sup> to February 28 or 29. The Straight cards are used again from 1<sup>st</sup> March to 11<sup>th</sup> April.



## Solarimeter

Solarimeter



Integrator



This instrument measures both sunshine hours and radiation. The Solarimeter consists of two sets of heat sensitive diodes inside a glass dome. When there is a temperature change between the two sets of diodes caused by the heat of the sun the voltage changes and this change is transmitted to the integrator. This change in voltage is proportional to the energy input in watts per square meters.



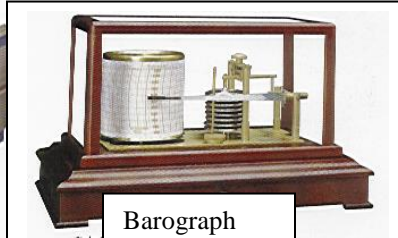
# Pressure

Pressure is measured using an instrument called a barometer.

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not



Standard Accuracy Barometer



Barograph



Aneroid barometer

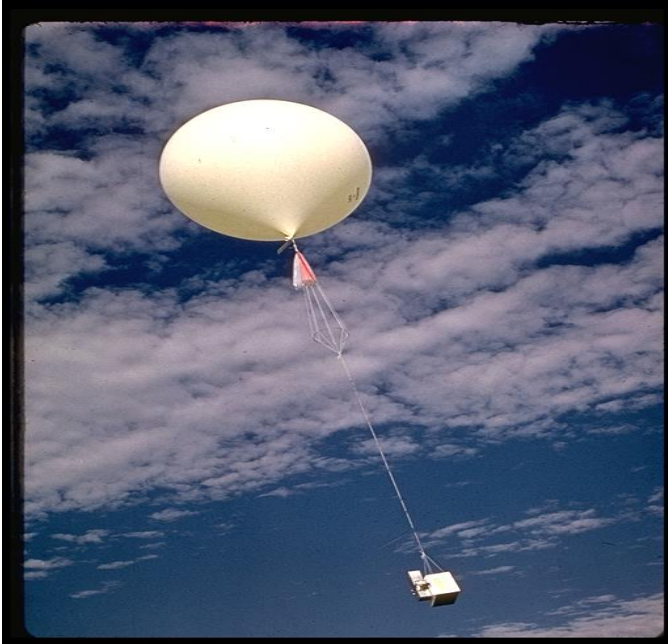


Kew Pattern

Fortin Barometer

Pressure is the weight of the air which lies vertically above an area. It is measured using an instrument called a barometer. Barometers are of different types, Kew Pattern, aneroid and standard accuracy barometer. Most weather offices use the aneroid barometer and the Standard accuracy barometer while the Kew Pattern is used to check other barometers for accuracy. The barograph gives a graphical display of the pressure changes over time.

## Radiosonde



**The Radiosonde** is a balloon borne, battery powered instrument used together with a ground receiving equipment to create a vertical profile of the atmosphere. It sends a signal of all measured variables back to the ground receiving station where a computer calculates the measured variables and displays them on a screen. This instrument measures pressure, temperature, relative humidity, wind direction and speed. It uses these measurements to determine the stability of the atmosphere.