

Stylish & Useful

Weather Vane

A Breeze to Assemble

Information and Assembly Instructions By Norman Wood

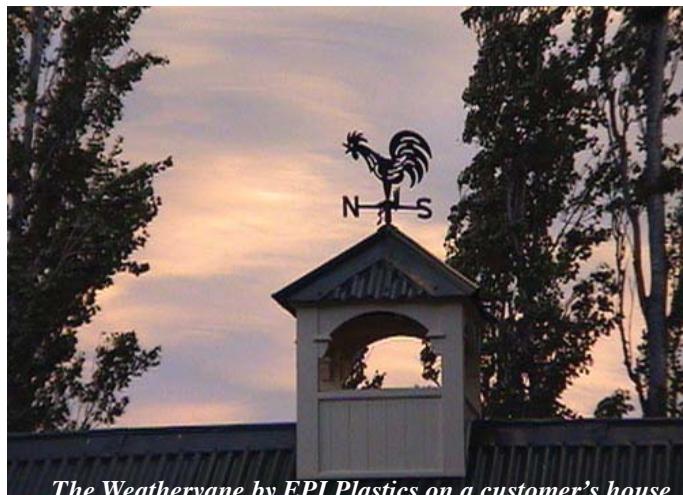


Manufactured
by EPI Plastics in
Dunedin New Zealand



Introduction and History of the Weathervane

This book contains information, diagrams and photographs about our weathervane and weather prediction. There is also information on where to view instructional videos. Our weathervane can be purchased from any good garden or DIY centre. If you are a retailer such as a garden centre, DIY store and would like to purchase this product to sell to your customers please email us. EPI Plastics does not sell direct to the public.



The Weathervane by EPI Plastics on a customer's house

A weather vane is a device for showing you which direction the wind is coming from (wind direction is described on this basis, a North West wind, comes **from** the North West). Weathervanes are also typically used as an architectural ornament placed on the highest point of a building.

Hence, they are not only functional, weather vanes can also be very decorative, often featuring the traditional cockerel (rooster or male chicken) such as the weathervane manufactured by EPI Plastics in Dunedin New Zealand, they usually feature letters indicating the points of the compass with the letters N, W, S and E. The word 'vane'

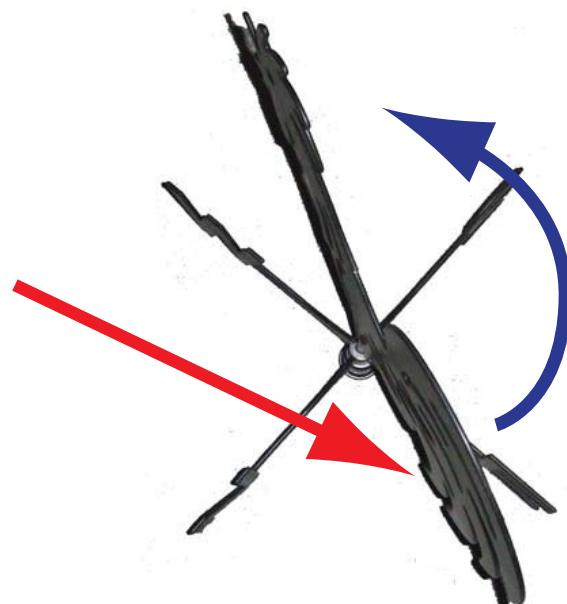
comes from the Anglo-Saxon word 'fane' meaning 'flag' but the history of the weathervane stretches even further back to Classical Greek and Roman times.

How it Works

The Weathervane will always point towards where the wind is coming from.



This is because the wind pushes on the body and especially the tail of the bird (see above), if it pushes too hard the bird will swing too far and the wind will push it back the other way (see below).



Hence, given these two pushing forces, the bird's beak will always point into the wind (see below).



The beak always points into the wind (rather than the tail) because the weight is evenly distributed but the surface area is unequally divided, in other words a small head, but big tail. When the wind hits the tail it pushes it backwards, when the wind hits the head it tries to do the same, but it can get more push on the tail, hence it is the large tail end that swings to the back. To achieve this the pointer (in our case the rooster) must move freely on its axis, it does this with the help of being sat on top of an steel axle on which it pivots.

To obtain an accurate reading, the weather vane must be located well above the ground and away from buildings, trees, and other objects that interfere with the true wind direction. Changing wind direction can be meaningful when coordinated with other apparent sky conditions, enabling the user to make simple short range forecasts.

The Importance of Wind Direction

The earth does not receive the sun's energy uniformly over its surface. Some areas receive more energy and heat up, while others cool down. It is a scientific fact that things move from high concentration to low concentration towards equilibrium (the earth tries to equal out the temperature over it's surface). This causes wind, which is the hot (or cold) air moving from where it is to where it is not.

The other fact about our planet is that it does not have a uniform surface. There are oceans, lands, large forests, mountains, plains, a huge variety. When air travels over different surfaces it can change. For instance, if warm hot air coming from the centre of a desert moves from that desert and then over a large ocean, it will evaporate some of the moisture and carry it along with the movement of the air, similar to what a fan heater does in a bathroom, you notice that water on the floor will evaporate and the air will become humid.

We will now talk about the conditions in the Southern Hemisphere (South America, Australia, Southern African and New Zealand). When air comes from the equator, especially from desert areas, such as central Australia it will be warm and will loose some of this heat as it travels south. Air coming from the South, especially off the Antarctic frozen continent will be cold as it travels north. It is cold because where it comes from doesn't receive much heat from the sun.

Other Things To Help You Predict The Weather

Another thing that is a very important determinant of the weather is the geography of the land, especially mountains and hills and the movement of air.

A great example of this is the Southern Alps, a mountain range that runs from the top of the South Island of New Zealand to the bottom of the island, like a spine. Similar geography occurs in many countries, for example the Andes in South America.

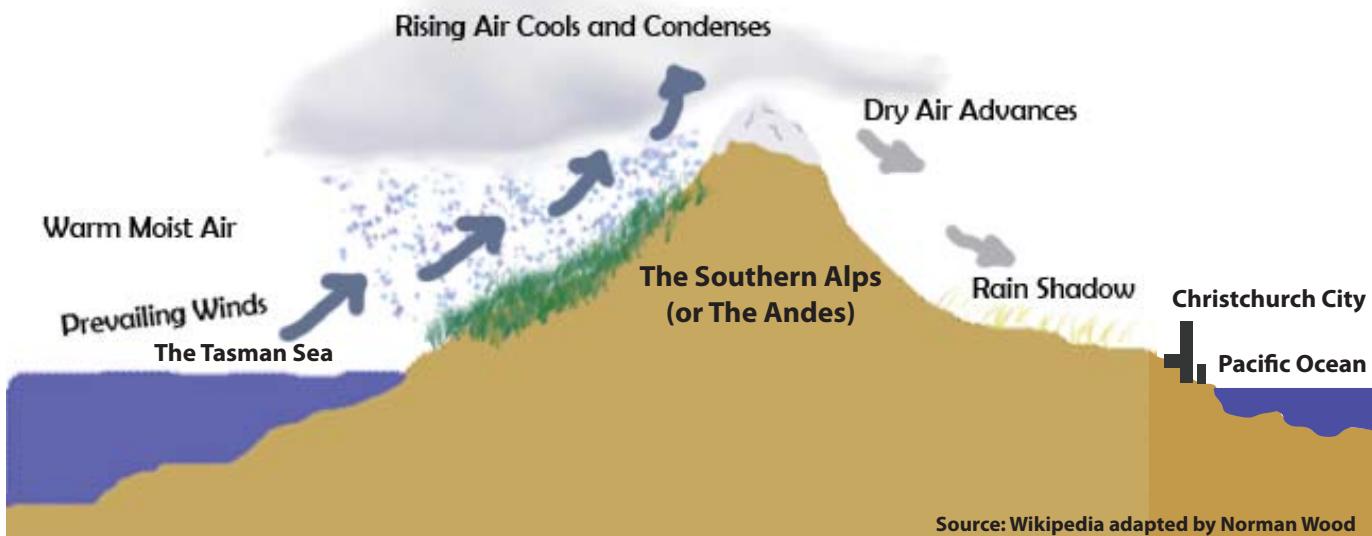
In New Zealand, the prevailing wind direction is from the West (from the direction of Australia across the Tasman sea), or Westerly winds. This air starts by being warm and dry (as it has heated up and dried out over the Australian Outback Desert). As this warm air travels across the Tasman Sea it picks up moisture (the warm air evaporates the water it travels across). Now this air, called an air mass, is warm and wet (or humid) on its way towards New Zealand. We would feel this air mass on our face as a wind.

Another fact to know about air and water is that the air can hold more water in it (as a gas) if it is warmer. However, if the air cools, the air can't hold the water anymore and it falls, or forms on surfaces. You see this as rain, dew, and damp grass. Thinking about the bathroom example again. If you had a shower without a fan heater going, the walls would get all wet, water would drip (rain) from the ceiling, the mirrors would be all misted up, and the air would be full of steam. However, on a hot summer's day, with the fan heater going, the room will stay dry, although it might feel "heavy" or humid.

Also, another thing you may recall is hiking up into the mountains, or driving over a mountain pass. When you get out of the car, or as you get higher you will notice that the air is colder. The surface of the earth is relatively warm (because it absorbs the sun's heat) the further that you travel from the earth the cooler you become, similar to moving away from a heater.

This is also true for large amounts of air, these air masses travelling across the earth's surface as a wind. If they start to travel up the side of a mountain, they will rise up,

Orographic Rainfall, Rain Shadow and the Effect of Mountains on the Weather



Source: Wikipedia adapted by Norman Wood

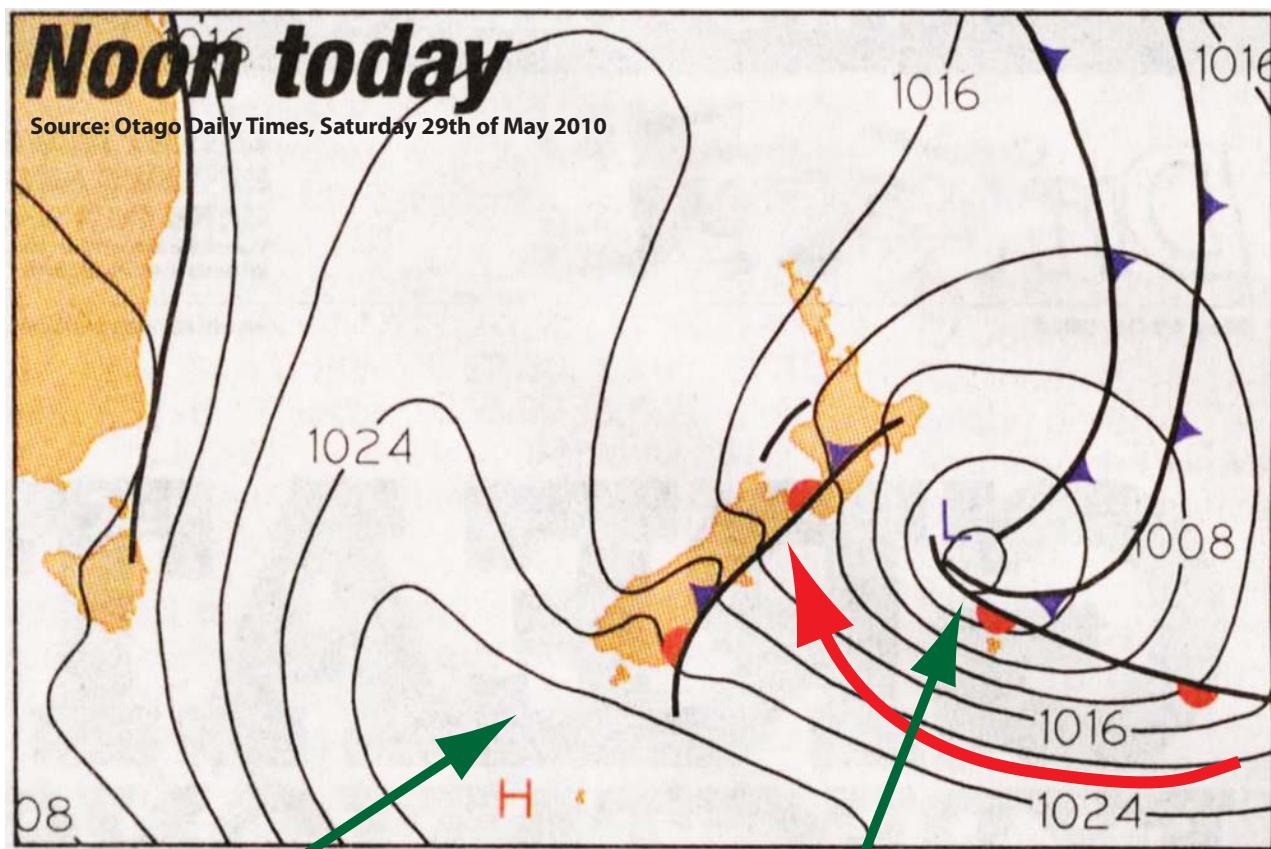
like you walking up the side of a mountain. As they do, the air starts to cool, as it does, like a cold shower room, the moisture starts to form into mists and clouds, dew starts to form and then the air can't hold all the moisture and it rains. If the air has come across the sea, and was warm to start with, it will hold lots and lots of water, until, it gets cold and it rains hard.

This type of weather pattern has a name, Orographic Rainfall.

Interestingly, the opposite occurs when the air reaches the top of the mountain and starts to go down the other side of the mountain. As it falls with the fall of the land, it starts to warm up again, there are many reasons for this, being close to the earth's surface, the other is that as it goes lower, there is more air above it, this weight of air increases air pressure. It is a fact that if the air is under more pressure or weight from above it will warm up. Remember when you pumped up a bike type, you are putting air under pressure

An Usual Weather Map for New Zealand, South Easterly Winds, and a Cyclone.

The weathermap below shows an unusual weather pattern. The cyclone off New Zealand's East Coast would be bringing wind in a direction that would make a weathervane point in the South East direction. Air from here would collect water from the pacific as it hit the Southern Alps it would rise and large amounts of rainfall would result. This was the case on this day, with large amounts of flooding occurring on New Zealand's East Coast.



An area of high pressure where air is falling, warming and drying. Air from here will be moving out from the centre in an anti-clockwise direction. These airmasses normally bring warm weather, clear skies, sunny days, not much rain.

An area of low pressure where air is rising, cooling and condensing (rain is forming). Air will be moving towards the centre in a clockwise direction. These airmasses normally bring cool weather, cloudy skies, rainy days. In addition, wind speeds can be high.

with a pump and then forcing it under pressure into the tire. If you feel the pump afterwards, you'll notice it is warm because it has held air under more pressure inside.

However, something has happened to this air, as it travelled up the mountains it dumped lots of its water on the side of the mountain, when it falls, it warms up, but this time it is warm and dry. It is very unlikely that this air mass will bring any rain or moisture with it. In these areas, with such a prevailing wind pattern, you normally find dry arid landscapes, deserts etc. For instance, In New Zealand there is to be found one of the most remarkable rain shadows anywhere on Earth. On the South Island, the Southern Alps intercept moisture coming off the Tasman Sea. The mountain range is home to significant glaciers and 250 to 350 inches (8.9 meters) of rain falls per year. To the east and down slope of the Southern Alps, scarcely 30 miles (48 km) from the snowy peaks, yearly rainfall drops to less than 30 inches (0.8 metres) and some areas less than 15 inches (0.4 metres). This is called a rain shadow effect.

This doesn't mean this is always the case. Wind direction is not always the same. For instance in the weather map on the previous page you can see that the complete opposite is occurring. The wind is not coming from the North West, but from the South East. The moist air mass will hit the Southern Alps on the Eastern Slopes, the air will rise, and it will rain heavily on the Eastern Coast, often to great relief of the farmers there who might be in drought.

Another useful piece of information is that when you see a "L" on a weather map it means an area of low pressure because the air is rising (cooling and possibly raining),

air moves in towards an "L" low pressure, in the Southern Hemisphere its movement is in a clockwise direction, and in the Northern Hemisphere the movement is in a counter clockwise direction towards the centre. These air masses are called depressions (low pressure) or if they are intense depressions they are called cyclones or in the Northern Hemisphere, hurricanes.

The opposite of this airmass is the anticyclone. Which is an area of high pressure (air is falling, warming, drying), it moves out from the centre of this airmass in an anti-clockwise direction in the Southern Hemisphere or clockwise direction in the Northern Hemisphere.

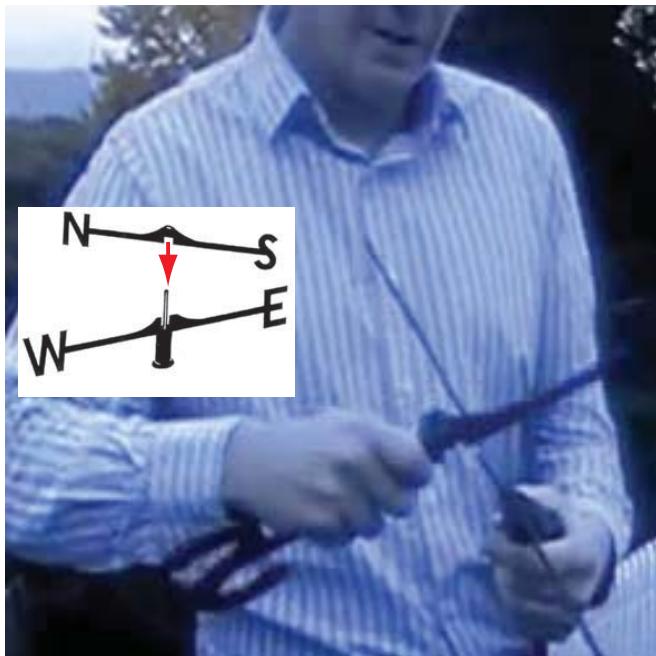
Hence, with a little bit of knowledge about the geography around you and importantly the wind direction, you can predict what the weather is likely to be. The weathervane is a very useful tool to help you do this.

Installing the Weathervane

Assembly is relatively easy. Full written instructions are here, but you can also see an instructional video on youtube, just type "Weathervane how it works".

The image shows a YouTube video thumbnail for a video titled "Weathervane: how it works" by the channel "epiplastics". The thumbnail features a man in a blue shirt and glasses standing outdoors, holding a weathervane. The background shows a house and trees. Below the thumbnail, the text "How does it work?" is displayed, followed by the subtitle "The ball gets pushed back by the wind and the rooster looks into the wind".

First, get the "N-S" and place it on top of the "W-E" make sure that the letters are not upside down.



Then the Rooster is placed on top of the "spindle" or "axle" on which it spins pointing into the wind.



There are a number of methods of attaching the weathervane to a house, fence etc. The assembled weathervane can sit on the top of a 25mm dowel (like a broom handle), it will need to be screwed into position so that the



whole weathervane doesn't rotate, it must be fixed and only the Rooster should move. There is a small indentation in the base which is where the screw needs to be placed - you may need to drill a hole out.

The broom handle (cut down to size) or 25mm dowel then can be fixed to the side of a house or fence.



Alternatively, a small block of wood could have a socket drilled out, using a 25mm drill

bit or blade. The hole into which the dowel is placed should not go all the way through the wooden block as preferably two screws



need to come up from the bottom to hold the dowel in place, alternatively the dowel could be glued into place with "no more nails". The block is then screwed to the top of the house or turret. Make sure that the "N" for North is actually pointing to the North.



If you do this you'll have a very happy rooster on your house with a lovely view.

Where Can I buy the Weathervane?

EPI Plastics is a manufacturer and doesn't sell directly to the public. However, you should be able to buy the Weathervane from any good garden centre and DIY store, in addition they are sold via online shops such as www.thefactoryshop.co.nz and on trademe.

THE FACTORY SHOP 

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Where Kiwis Buy and Sell

If the garden centre or DIY stores don't have our weathervane ask them to contact us and we'll send it to them for you. Our contact details are at the bottom of this page and you can pass these on to them.

If you visit www.epiplastics.co.nz you can click on the weathervane information page to get details on the retailers who have received dispatches recently, including a map of their location.

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