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## MISCELLANEOUS.

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### WINDS AND THEIR CAUSES.

Nothing in nature seems more variable than the succession of winds; yet a careful investigation discloses a regular system of circulation in the atmosphere, which would manifest itself in a rigid regularity of phenomena, if all the disturbing causes were removed. The variableness exists chiefly in the temperate zones, while in the tropics the regularity of winds is remarkable. One of the phenomena which most strikingly impressed the companions of Columbus was the constancy of the east wind, which blew their ships steadily toward the west, and seemed to prevent all possibility of return to Spain. Even on the coasts of England and France, the wind blows about two-thirds of the year from the southwest, verging more directly towards the west in the higher latitudes. There is thus an approach to regularity, even in the temperate regions. Winds result from the disturbances of the equilibrium of the atmosphere. The atmosphere is composed of successive layers of air, of different degrees of density. When these successive layers of air are in equilibrium, they produce calm; when in motion, wind. They are set in motion chiefly by heat. Thus an air thermometer—formed of bulbs filled with air, in which the two columns of air are separated from communication with each other by a drop of alcohol between—is so sensitive that, on the approach of a person within two yards of it, the heat radiated from the human body will immediately cause the drop to move. If, in nature, an upper layer of air is of equal or greater density than a lower one, there will be a downward current toward the earth; if in one part of a layer the density is greater than in another part of the same layer, there will be a horizontal motion parallel to the earth's surface. Thus a fire in a stove heats the air inside till it becomes exceedingly rare, when the outside air rushes in with a strong draft, corresponding in nature to the rarification of air in one locality, and the rushing in of colder air causing a gale of wind. A grand general cause of the unequal temperature of the earth's surface is the spherical form of the planet, which causes an unequal distribution of the sun's rays, and gives us the great zones of temperatures, or the astronomical climates—the torrid, the temperate, and the frigid. To this inequality other causes are to be added. Thus the whole would be less variable if the sun were to remain stationary at the equator, instead of moving, as it does, over the wide space between the tropics. The hottest part of the earth's surface is that which is most directly under the sun's rays; and as this region is continually changing from one tropic to another, the great system of winds will in like manner keep continually changing with the motion of the sun. Another cause of disturbance is found in the different effects of the same degree of heat upon the land and water. The land absorbs the sun's rays more rapidly than the water, and also more rapidly gives up the heat which it has received. On a summer day, if a piece of cold iron be put by the side of a bucket of cold water, the iron will become warm to the touch, while the water will be still cool. Land