

the landscape's 'natural' characteristics. Rather than stemming from the earth and environmental sciences as might have been expected, it was the disciplines of landscape architecture and ecology that became most significantly involved. A book *Design with Nature* by Ian McHarg, developed ideas initially applied to the city, subsequently providing a method whereby environmental sciences, especially ecology, could be used to inform the planning process.

See also: CONSERVATION OF NATURAL RESOURCES, ENVIRONMENT, ENVIRONMENTAL SCIENCES, PERCEPTION

Further reading

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OCEAN CIRCULATION

The circulation of the oceans is a complicated process affected by the rotation of the Earth, winds, salinity and temperature gradients, and the position of the continents. Ocean circulation is characterized by a six great surface circuits or geostrophic gyres in the north and south Atlantic, north and south Pacific, and in the Indian ocean. Water flows westerly along the equator (the north and south equatorial currents), then towards higher latitudes along the western edges of the oceans, then easterly towards the eastern boundaries of the ocean, and finally back towards the equator to join the equatorial current. In the north Atlantic, the current along the western boundary is the Gulf Stream, this joins the easterly North Atlantic current, and the southerly flowing water mass along western Europe and north-west Africa is the Canary current. There are also two smaller, counterclockwise currents in the North Pacific and North Atlantic. The Antarctic circumpolar current flows in an easterly direction around Antarctica driven by almost continuous westerly winds. If there were no

continents, ocean circulation would likely be more like the circumpolar current with bands of east and west moving water masses. These surface currents are driven by winds. Near the equator, the trade winds blow from east to west causing the westerly equatorial currents. The continents deflect the currents north and south. At mid-latitudes, westerly winds drive the currents towards the eastern margins of the oceans. Another important force affecting ocean circulation is the Coriolis effect. This is an apparent force due to the turning of the Earth. The Coriolis effect causes moving water masses to curve to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. The net surface ocean circulation is mainly a result of the interaction of winds and the Coriolis effect.

See also: THERMOHALINE CIRCULATION

Further reading

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PARADIGMS

A paradigm is a philosophical and theoretical framework of a scientific school or discipline in which theories, laws, and generalizations and the experiments performed in support of them are formulated. Thomas Kuhn (1922–1996), a philosopher of science, presented the word ‘Paradigms’ in the sense of its modern meaning when he referred to the set of practices that define a scientific discipline during a particular period of time. However, in his book *The Structure of Scientific Revolutions* Kuhn defines a scientific paradigm as that which is observed and scrutinized and the sort of questions that are supposed to be asked and answered in relation to a subject, how these questions are to be structured, and how the results of scientific investigations should be interpreted. An additional component included in his definition is how should an experiment be conducted, and what equipment is available to conduct the experiment? Within normal science, the paradigm is the set of exemplar of experiments that can be copied or mimicked. ‘Paradigm shifts’ tend to be most dramatic where they are least