

# The problem of acid rain

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Acid rain is a rain or any other form of precipitation that is unusually acidic, i. e. elevated levels of hydrogen ions (low pH). It can have harmful effects on plants, aquatic animals, and infrastructure through the process of wet deposition. Acid rain is caused by emissions of sulfur dioxide and nitrogen oxides which react with the water molecules in the atmosphere to produce acids. Governments have made efforts since the 1970s to reduce the release of sulfur dioxide into the atmosphere with positive results. Nitrogen oxides can also be produced naturally by lightning strikes and sulfur dioxide is produced by volcanic eruptions.

The corrosive effect of polluted, acidic city air on limestone and marble was noted in the 17th century by John Evelyn, who remarked upon the poor condition of the Arundel marbles. Since the Industrial Revolution, emissions of sulfur dioxide and nitrogen oxides to the atmosphere have increased. In 1852, Robert Angus Smith was the first to show the relationship between acid rain and atmospheric pollution in Manchester, England. Though acidic rain was discovered in 1852, it was not until the late 1960s that scientists began widely observing and studying the phenomenon. [6] The term "acid rain" was coined in 1872 by Robert Angus Smith. 7]

Canadian Harold Harvey was among the first to research a "dead" lake. Public awareness of acid rain in the U. S increased in the 1970s after The New York Times promulgated reports from the Hubbard Brook Experimental Forest in New Hampshire of the myriad deleterious environmental effects demonstrated to result from it. Occasional pH readings in rain and fog water of well below 2. 4 have been reported in industrialized areas. Industrial acid rain is a substantial problem in China and Russia and areas down-wind from

them. These areas all burn sulfur-containing coal to generate heat and electricity.

The problem of acid rain not only has increased with population and industrial growth, but has become more widespread. The use of tall smokestacks to reduce local pollution has contributed to the spread of acid rain by releasing gases into regional atmospheric circulation. [13][14] Often deposition occurs a considerable distance downwind of the emissions, with mountainous regions tending to receive the greatest deposition (simply because of their higher rainfall). An example of this effect is the low pH of rain (compared to the local emissions) which falls in Scandinavia.