METEOROLOGY

Cities 20 Degrees Hotter

Temperature difference of 20 degrees Fahrenheit found in San Francisco between city center and undeveloped land in Golden Gate Park.

➤ THE SUBURBANITE who claims he can feel a 15- or 20-degree drop in temperature as he drives out of the sweltering city is right. Scientists have now measured temperature variations from city center to suburbs and find a 20-degree difference in at least one case.

The cities whose temperatures were taken officially are San Francisco, Palo Alto and San Jose, Calif. The 20-degree Fahrenheit difference was recorded between the densely built-up business district in San Francisco and the undeveloped land of Golden Gate Park.

Dr. Fowler S. Duckworth, on leave from the U. S. Weather Bureau, and Dr. James S. Sandberg of Stanford University, Calif., took the temperatures as part of a classified study.

Thick clustering of buildings makes downtown sections "heat islands," with fingers that extend outward along built-up business streets. Parks and other open areas offer cool oases in such heat islands.

Many factors can increase temperatures in an urban area, the scientists state. "Most obvious" is man's artificial heating of his dwellings, releasing the energy of coal, fuel oil, gas and electricity to the atmosphere as heat. Smoke pall over a city may increase temperatures by changing the radiation balance. Exhaust fumes from motor vehicles show measurable effects in busy streets.

Even human body furnaces make their own very minute contribution to higher temperatures.

The most important single factor, the scientists point out, appears to be the physical structure of a city, the tall concrete and brick buildings crowded together between cement and asphalt pavements. Such buildings have a high heat capacity, and can store much solar heat during the day and liberate it at night. This effect, they conclude, accounts "for well over half of most observed urban temperature differences."

Their studies gave a three-dimensional picture of the temperature changes from suburb to business district from the ground up to the 1,000-foot level. Automobiles with temperature-measuring devices on poles attached to their front bumpers gave readings six and a half feet above the ground. Temperature variations up to 1,000 feet were taken by balloon-mounted equipment simultaneously at urban centers and open areas.

No matter what the weather conditions, a characteristic temperature pattern near the ground was found for each city. The temperatures increased from bordering open land to the built-up center in direct proportion to structure density.

However, they found that the air directly above any particular point in a built-up area sometimes gave lower temperature readings than air above an open spot in the surrounding country.

At some point between 100 and 300 feet, the temperature readings over built-up and undeveloped areas usually were the same. This, the scientists say, indicates a possible limit to the direct effect of heating from city buildings. The limiting point was approximately three times as high as the roof level over which the temperature was measured.

Drs. Duckworth and Sandberg have no explanation, as yet, for why the cooler air can sometimes be found above built-up areas. Vertical mixing, a convection cell in the city, or radiation loss because of smoke and carbon dioxide might contribute to this effect, they suggest.

Drs. P. A. Leighton, W. A. Perkins, S. W. Grinnell, F. X. Webster, and R. W. McMullen of Stanford University's department of chemistry cooperated in the study, which is reported in the *Bulletin of the American Meteorological Society* (May).

Science News Letter, August 7, 1954

ASTRONOMY

Blazing Star Spotted in Heavens

➤ A NOVA, or new star, has blazed forth in the heavens. Its outer shell is expanding at a high rate, several hundred thousand miles per hour, but further observations will be required before the speed can be pinned down more exactly.

The suddenly brilliant object can be seen in the constellation of Ophiuchus, the serpent holder, visible low on the southern horizon in the early evening hours. Its magnitude is now about nine, so it can be seen with a small telescope.

This nova is the second to be spotted during July in this region of the sky. (See SNL, July 17, p. 36.) Its location, based on 1875 celestial coordinates, is 17 hours, 20.8 minutes in right ascension, minus 27 degrees, 39 minutes in declination.

The object was discovered on July 21 by Dr. Victor Blanco of the Warner-Swasey Observatory, Cleveland, on infrared spectrum plates taken July 2. News of its discovery has been telegraphed to observatories throughout the country by Harvard College Observatory, Cambridge, Mass., clearing house for astronomical messages in the Western Hemisphere.

Science News Letter, August 7, 1954

BLADED NOZZLE — High-velocity water flowing through a transparent plastic nozzle is used by engineers at General Motors to study effects of turbine blade shapes and angles for possible use in automobile torque converters and automatic transmissions.

ARCHAEOLOGY

Find Ancient Village in Arctic

➤ BURIED IN the frozen ground of the eastern Arctic are the remains of an entire village of more than 100 houses last occupied more than 1,000 years ago.

The village, discovered by a team of archaeologists from the University of Pennsylvania Museum and the National Museum of Denmark, is expected to yield valuable information about the little known Dorset era and the people who lived in it. Their culture was distinct from and older than that of the whale-hunting Thule Eskimos of the eastern Arctic.

The Dorset village remains are the largest archaeological site thus far found in the eastern Arctic. The site is about 80 miles north of the Arctic Circle on the Melville Peninsula in Canada's Northwest Territories. Discovery of the site was announced by Dr. Froelich G. Rainey, director of the University of Pennsylvania Museum. The expedition is headed by Jorgen Meldgaard, Danish archaeologist, who is assisted by Richard Emerick.

Test excavations already have revealed the presence of more than 100 houses, in addition to graves, implements and other finds, which identify the site as belonging exclusively to the Dorset cultural era.

Included are organic remnants containing abundant carbon. Such organic remains will enable scientists to date them through radiocarbon 14 analysis.

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