METEOROLOGY

Worst U.S. Heat Waves In 1930's and 1950's

➤ DESPITE what anybody may say, 1963 is not the hottest year ever. There have been far hotter summers in the history of the United States.

A hot summer in 1778 scorched the East Coast while the country was still struggling for its independence. There were two more in 1793 and 1798, when the yellow fever epidemic was taking its toll. The summer of 1825 was also one of the hottest on record—Boston recorded 100 degrees three times that July.

The summers of 1830 and 1860 were also exceptionally torrid, with the famous "hot blast" of July 9, 1860, producing temperatures of up to 115 degrees in the Great Plains States.

The 20th century began with another record-breaker; the summer of 1901 set many new records, most of which stood for 30 years, and some of which are still standing today. However, the worst heat and drought ever undergone by the U.S. in recorded history took place in the 1930's.

Held in the grip of a depression, the country was subjected to three record-breaking heat waves in 1930, 1934 and 1936, each more intense than the one before it. This was the time of the terrible dust storms that laid waste millions of acres in the Midwest. Most of the records established during this period are still unsurpassed.

The most recent hot years were the late 1950's—1955 was one of the hottest years ever in the eastern part of the country, while the period 1956-1960 was the worst in 60 years in the Southwest. In particular, 1959 was a hot year; Yuma, Arizona, averaged 109.4 daily maximum that July.

• Science News Letter, 84:72 Aug. 3, 1963

ASTRONOMY

Speedy Film to Explore Fine Details on Moon

➤ A NEW TECHNIQUE to photograph the moon's surface so that details the size of Yankee Stadium will be clear and distinct was reported to the American Astronomical Society meeting in College, Alaska.

E. P. Martz Jr., supervisor of the space optics group of the California Institute of Technology, said very short exposure time photographs of the moon already have been made with 10,000 ASA film and telescopes with long focal lengths and large apertures. The combination overcomes the blurring found in other moon photographs.

He photographed the moon at Kitt Peak Observatory, Ariz., using a 60-inch aperture, 300-foot focal length McMath solar telescope. Exposure times were a hundredth of a second.

Even though the visibility on Kitt Peak was "very poor," he reported, the surface resolutions he got were comparable to the best photographs taken to date with conventional methods on the 100-inch reflector.

Since the exposure time is twice as fast as that used for ordinary moon photographs, much of the fuzziness is eliminated. He was able to increase the film's speed by heating the camera back to 115 degrees during exposure and development.

He said the film's speed could have been increased another five times by "fogging" it. This is a technique now used for daytime photography.

The fogging technique is being refined for use at night. This, he said, should make it possible to photograph the moon in a thousandth of a second at f/60.

With such film and the McMath telescope, he said, a resolution of 77 thousandths of a second of arc should be achieved, yielding moon surface details as small as 500 feet.

• Science News Letter, 84:72 Aug. 3, 1963

GENERAL SCIENCE

Backyard Picnickers Burn 350,000 Tons of Charcoal

➤ THIS YEAR picnickers and backyard chefs in the United States will burn an estimated 350,000 tons of charcoal, most of it as briquettes.

Nearly 90% of the briquettes will be produced in the East, made mostly of low-grade hardwoods gleaned from Tree Farms and other privately owned woodlands, and from sawmill leftovers like slabs and edgings.

Compared to the consumers, industry will use only about 150,000 tons of charcoal in 1963, although at one time nearly all charcoal produced was for industrial purposes.

The popularity of charcoal stems from the fact that it has about the same fuel value as coal but is odorless and nearly smokeless when burning. Hence food can be cooked to meet a gourmet's taste; the natural flavor of steaks, chops, roasts—even hot dogs—is enhanced by smoke from their own drippings.

Oak, maple, hickory, beech and birch wood make the best charcoal. A cord of any one of these hardwoods will produce about 40 bushels, or 700 pounds, of lump charcoal, the natural form of carbonized wood.

Briquettes are made of "fines," the leavings after the lumps have been screened out, or from pulverized lumps. Starch and water are added before molding. The starch serves as a binding and also slows the burning rate, considered a disadvantage by some users because they do not want to fuss with long-burning embers after the food has been cooked.

Charcoal is produced in a number of ways, all of which use the principle of charring wood by limiting the amount of available air. By limiting the oxygen, temperatures can be maintained that drive off the volatile vapors in the wood, leaving a carbon residue—charcoal.

It may come as a surprise to many outdoor chefs that when they fire up their grills they are in a way helping to reforest the nation. The charcoal market is giving tree farmers a little extra income since they can sell the charcoal producers defective and low value trees, and even limbs and tops, that would otherwise be wasted.

• Science News Letter, 84:72 Aug. 3, 1963

IN SCIEN

ASTRONOMY

Supernova Explosion Forms Heaviest Stars

➤ THE HEAVIEST stars of the universe, which weigh some 6,200 million million pounds per cubic foot, are formed during the supernova explosion of other stars, Dr. H. Y. Chiu told the American Astronomical Society meeting in College, Alaska.

Dr. Chiu, of the National Aeronautics and Space Administration's Institute for Space Studies, New York, has calculated that a supernova explosion occurs at a temperature of six to seven billion degrees.

The supernova is the final stage in the so-called neutrino process, one of the ways stars are believed to evolve from birth to death. Neutrinos are massless, chargeless particles having very little interaction with matter.

The universe as a whole has much of its energy in the form of neutrinos, possibly more than the total energy in the form of light.

Neutrinos can be produced by the so-called "annihilation process," in which a star loses energy by creating a pair of electrons and positrons that then destroy each other to form pairs of neutrinos. When the neutrinos leave the star, they carry away energy.

On the average, Dr. Chiu has calculated, one-fifth of the total energy radiated by a star in its lifetime is in the form of neutrinos.

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VETERINARY MEDICINE

Beef and Dairy Cattle Poisoned by Arsenic

➤ ARSENIC POISONING occurs every day among beef and dairy cattle, but no arsenic remains in the meat and milk used for food.

The daily dose of poison comes from the herbicides and insecticides that farmers normally spray on cattle feed.

Experimental dairy cows were tested for the amount of arsenic in their systems by S. A. Peoples of the University of California in Davis.

Although the cows had arsenic in all body fluids and tissues, none appeared in the milk, the toxicologist reported at the New York Academy of Sciences' Conference on Veterinary Toxicology in New York.

This contradicts earlier findings based on rats, which accumulated and passed on the poisonous substance. Experiments with other animals showed that rats are unique among animals in their accumulation of arsenic.

The cow's body, in comparison, stores only a single dose and the rest is rapidly excreted.

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CE FIELDS

VETERINARY MEDICINE

Toxic Plant Causes Deformities in Lambs

➤ DEFORMED BABY LAMBS are very likely if the mother eats western hellebore, skunk cabbage or wild corn during the first few weeks of pregnancy.

As many as 25% of the lambs in one herd may be born with one eye in the middle of the forehead, two eyes close together, no eyes at all, a distorted forehead, or a snout-like projection about two inches long.

The poison, scientifically known as Veratrum Californicum, was definitely related to these congenital deformities by a controlled grazing and feeding experiment in the Rocky Mountain meadows where the malformations occur regularly.

Wayne Binns, Lynn F. James, and James L. Shupe of the U.S. Department of Agriculture in Logan, Utah, reported these findings at the New York Academy of Sciences' Conference on Veterinary Toxicology in New York.

• Science News Letter, 84:73 Aug. 3, 1963

TECHNOLOGY

Machine Can Recognize Pictures of People

➤ A "CONDITIONED reflex" machine that can learn to recognize photographs of aircraft and even people has been developed for the Air Force's aeronautical systems division at Wright-Patterson Air Force Base in Ohio.

Called CONFLEX, the machine is capable of recognizing 4,800 previously learned patterns, including picture displays, letters, numbers and geometric designs, with 99.6% accuracy.

With modifications, it eventually may be used to recognize speech and higher frequency patterns. Because of the random way in which it learns, the machine's "intelligence" can be increased merely by adding memory units.

The machine, built by Scope, Inc., of Falls Church, Va., is desk size, occupying about 25 cubic feet.

• Science News Letter, 84:73 Aug. 3, 1963

BIOLOGY

Snails May Point to Viking Settlement

➤ HITCHHIKING SNAILS, which probably came with the Vikings to the New World about 1000 A.D., may guide archaeologists to evidence of Viking settlement and exploration on this continent.

Specimens found near Halifax, Nova Scotia, indicate the snails hitched a ride from their native Scandinavian coast with the Vikings about 1000 A.D. The theory that the Norsemen actually settled in North America received some support last year when ruins, probably Scandinavian, were uncovered at Lance aux Meadows in Newfoundland. Further specimens of the snails, scientifically known as *Littorina littorea,* may help scientists to determine specifically where the Vikings explored and settled. The snail, used for fishing bait and food, can survive for long periods of time in the bottom water of open boats and conceivably could have crossed the Atlantic.

This theory was suggested in Science, 141:275, 1963, by Nils Spjeldnaes and Kari E. Henningsmoen of the Blindern Institute of Geology in Oslo.

• Science News Letter, 84:73 Aug. 3, 1963

MEDICINE

Promising New Drug For Cancer Treatment

➤ A NEW DRUG developed in the United States, combined with an important cell compound, is showing promise for treating cancer, the International Congress of Chemotherapy was told in Stuttgart, Germany.

The drug is 5-iododeoxyuridine, or IUDR, and the cell chemical is thymidine, which protects bone marrow that otherwise is harmed by IUDR. The combination has been used a few times with varying success on humans suffering the last stages of cancer, IUDR was synthesized at Yale University. Before it was used in combination with thymidine, the drug was deadly to cancer tissues but also had undesirable side effects, Dr. Arnold D. Welch of Yale's School of Medicine reported to the congress.

When applied locally, IUDR is also successful in treating herpes simplex keratitis, a major cause of blindness.

Dr. Welch is continuing his work in collaboration with Dr. Robert J. Huebner of the National Institutes of Health, Bethesda, Md., in suppressing the development of cancer in newborn hamsters brought on by giving the animals the cancer-causing DNA-virus, human adenovirus type-12.

• Science News Letter, 84:73 Aug. 3, 1963

SURGERY

Skin Snipped by Drill Helps Diagnosis

➤ PAINLESS SAMPLING of skin for diagnosis is now being done by an electric core drill touched momentarily to the skin with a flick of the wrist motion, three Baltimore physicians reported in Nature, 199: 296, 1963. One sampling of a baby's skin was so gentle that the infant slept through the procedure.

Surgical removal of tissue to determine diagnosis is most useful to the geneticist for cell culture. With the adapted punch drill, the biopsy can be performed without anesthetic in the patient's home or doctor's office.

Samples of skin have been taken from adults' shoulders and forearms, but almost any area of the body could be used, Drs. Ronald G. Davidson, Saul W. Brusilow and Harold M. Nitowsky reported.

• Science News Letter, 84:73 Aug. 3, 1963

MILITARY SCIENCE

Underground Bomb Tests Awkward, But Effective

➤ LIMITING the testing of atomic bombs to underground explosions, as proposed in the recent Moscow talks, would make any future atomic tests awkard and more expensive, but far from impossible.

The big cost would be in digging testing holes and tunnels. The bigger the bomb, the bigger the hole must be.

Underground tests also limit knowledge about the bombs' effect on various surface structures, which primarily interests the military.

Maj. Gen. A. W. Betts, the Atomic Energy Commission's director of military applications, however, told a Congressional committee that weapons can still be developed using underground tests—without detection.

He said such weapons include at least half of all tactical atomic devices now being worked on, such as relatively low-yield bombs and battlefield explosives as small as one kiloton (equal to a thousand tons of TNT).

He said countries can test still larger atomic weapons underground without detection using the "big hole" method. This involves widening the hole so that much of the blast is muffled to the point where earthquake detection is unreliable. Seismic signals of a 30-kiloton bomb can be reduced to a 3-kiloton level, which is said to be undetectable.

Some scientists contend that no underground nuclear explosion can be detected unless the atomic debris is found by digging a hole.

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VITAL STATISTICS

Medical Research Pays Off in Lives, Health

➤ MEDICAL RESEARCH pays off not only in longer lives and better health, but also in dollars and cents.

The National Health Education Committee in New York has compiled statistics to prove both points.

Life expectancy of the average U.S. citizen has increased from 63.3 years in 1943 to 70.2 years in 1961, the latest year for which figures are available. The incidence of death from tuberculosis, influenza syphilis, polio, rheumatic fever and dysentery has decreased 80% during the same period.

These programs now cost slightly more than one billion dollars a year—$881 million in taxes to NIH, $135 million to voluntary agencies.

However, the estimated 2.6 million people whose lives have been saved by medical advances in the past 20 years are earning $5.5 billion a year, $962 million of which goes into taxes. Even discounting the increased earning power of the rest of the country due to reduced hospitalization time, the national economy has thus benefited from medical advances.

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