

CHEMISTRY

Create Hottest Flame

Fluorine burning in hydrogen gives hottest flame that man has ever created. Temperature found by direct comparison with that of the sun.

► **THE HOTTEST** flame that man has ever created, fluorine burning in hydrogen, at 8,000 degrees Fahrenheit was described by Dr. A. V. Grosse of Temple University's Research Institute at a meeting in Washington celebrating the National Bureau of Standards' 50th Anniversary.

Comparing the flame directly with the sun, Dr. Grosse and his team found that at ordinary atmospheric pressure the temperature was 7,000 degrees Fahrenheit (4,300 K.) which increased to 8,000 degrees Fahrenheit (4,750 K.) when under five atmospheres pressure. The sun temperature is 9,000 degrees Fahrenheit and with higher pressures the Temple University scientists expect to reach sun temperature on earth.

The oxy-aluminum torch in previous Temple experiments had been able to melt anything against which it was directed, but the even higher temperature of the hydrogen-fluorine torch will likewise melt everything so far known on earth.

The sun and the H-Fl flame were directly compared by matching their brightness through glass filters by what is known as the line reversal method.

A heliostat that had lain dust-covered and unused at Bryn Mawr College was used by Dr. R. H. Wilson, Jr., Temple University astronomer, to bring the sunlight to the laboratory for comparison.

Dr. J. B. Conway, of Temple and Villanova College, and Dr. A. H. Engelbrecht, Austrian UNESCO exchange student, were other members of the high temperature team.

So far the hydrogen-fluorine flame has no industrial use since the combinations of oxygen with aluminum, magnesium and zirconium provide sufficiently high heat for practical purposes.

Hydrogen and fluorine are both gases, fluorine being an unruly active gas that had little practical use before the Second World War.

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METEOROLOGY

Jet Streams Circle World

► **"JET STREAMS,"** the extremely fast currents of air which circle the earth from west to east two to three miles up in the sky, are probably the result of a mass of cold air from the north meeting a mass of warm air from the south.

This is the tentative conclusion of Philip F. Clapp and Jay S. Winston of the U. S. Weather Bureau's extended forecast section after study of one jet stream over the eastern Atlantic.

Jet streams reach speeds of 250 miles per hour or better. Pilots trying to set speed records usually fly from California eastward and try to fly on a day when a jet stream can help them. Commercial pilots, flying the Atlantic and Pacific, search them out with the help of weathermen.

Planes flying from Europe fly low to avoid them, planes going to Europe get a lift from them.

Jet streams vary in width from 400 to 1,000 miles and their borders are accented by a sharp increase in the speed of the wind. They seem to have considerable influence on the weather below them, being associated with an increase in rain and with stormy weather.

The coming together of two masses of air, one of which is cold and the other

warm, is known as confluence and the confluence theory of the formation of jet streams is one explanation put forward by scientists for their existence.

The two Weather Bureau meteorologists studied the records on a jet stream of April and May, 1944, as it gathered speed over eastern Canada, blew across the north-eastern Atlantic and then died down again. They found what they believe to be evidence backing up the confluence theory, although they say studies should continue. They reported their findings in the *JOURNAL OF THE AMERICAN METEOROLOGICAL SOCIETY* (Aug.).

In the last week of April and the first week of May, they found, there was a low pressure area over Baffin Bay between Canada and Greenland. The air was circling around this area. Coming down its western side was the cold air from the north. At the same time, a high pressure area over the southeastern United States was responsible for warm air moving from Mexico, the Gulf, and the Mississippi Valley.

These two streams began to flow together 10,000 feet up over James and Hudson Bays. Then, the action of the cold air sinking and the warm air rising brought about a loss of a small part of the potential

energy in the atmosphere. This was converted to kinetic energy, thus speeding up the flow of the air.

Toward the middle of May, the high pressure area weakened and the pattern in the atmosphere was such that cold and warm air were no longer being forced together. Then the jet streams died down, to start up again when a new confluence pattern was born.

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PSYCHOLOGY

Older Folks Avoid Home Accidents by Using Care

► **GET GRANDMA** to admit, without feeling unhappy or frightened, that she needs more light to see her way around the house, and Grandpa to admit, also without fear or resentment, that he is not so spry as he used to be and cannot run down stairs without holding the hand rail.

By such measures you may be able to cut down the dangerous accidents these and other old people are prone to have around the home.

The methods are suggested by a report of Hyman Meltzer, Washington University psychologist, to the Second International Gerontological Congress in St. Louis.

About one-third of all accidental deaths occur among persons 65 years and older, figures from the National Office of Vital Statistics show. Commenting on this, W. G. Cole of the Metropolitan Life Insurance Company said that it is "inconsistent" that lives which are being lengthened through the advances of science should be subject to sudden ending or to months and years of pain due to a preventable cause, namely, accidents.

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INVENTION

Plastic Equipment Made Safe from Fungus Damage

► **PLASTIC SHOWER** curtains, seat covers and other equipment in the home are safe from damage by fungi or bacteria if made of an especially treated polyvinyl chloride composition which contains certain chemicals destructive to organisms. It is claimed that the treatment does not injure the ordinary properties of the plastic as sometimes happens in other processes.

Inventor is Walter E. Field, St. Louis, Mo. Patent 2,567,905 was awarded to him. Rights have been assigned to Monsanto Chemical Company, also of St. Louis.

In the treatment a copper quinolinolate, well-known fungicide and bactericide, is used. The use of this copper chemical alone has been previously tried but it caused deterioration. In this process another chemical offsets the deterioration. It is one of the benzenesulfonamides or toluenesulfonamides.

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