PHYSICS

Winners See Furnace

See Front Cover

➤ A NEW SOLAR FURNACE that concentrates the sun's rays to produce temperatures nearly two-thirds as hot as the sun's surface was demonstrated publicly for the first time at the National Bureau of Standards in Washington.

Studies with the solar furnace are aimed at cracking the so-called "thermal barrier," the breakdown of all metals and alloys now known when subjected to extremely high temperatures. Such intense heat is found in jet engines, atomic reactors and when guided missiles rush through thin air at supersonic speeds.

Bureau scientists said they had reached temperatures as high as 3,500 degrees centigrade, or 6,300 degrees Fahrenheit, with the solar furnace.

Dr. Samuel Zerfoss, chief of refractories division, National Bureau of Standards, is shown on the cover of this week's SCIENCE NEWS LETTER with some of the young winners of the Sixteenth Annual Science Talent Search as they inspect the mirror of the furnace. The Search is sponsored by SCIENCE SERVICE and financed by the Westinghouse Educational Foundation.

The instrument consists of a large, flat mirror known as a heliostat, which electronically follows the sun across the sky, reflecting its rays to the concave surface of a parabolic mirror five feet in diameter. This mirror, a surplus Army searchlight, concentrates all of the solar energy reflected on it into a single hot spot about one-fourth of an inch in diameter.

Heating occurs only at this spot, where a test specimen of a heat-resistant material will shatter into pieces and other materials disintegrate into gases as the temperature soars almost immediately to 3,500 degrees centigrade.

The solar furnace is ideal for high-temperature studies because it furnishes "pure" heat, uncontaminated by containers or gaseous by-products such as result from heat created by fuels. In this instrument, the material itself is its own container.

Materials to be tested can be isolated by glass tubing at the tiny hot spot. The tubing can be almost a vacuum or filled with a particular gas. It is not affected by the sun's rays, since the solar image is not focused on it.

Besides being used to study temperature-resisting materials, the solar furnace can be used in "zone refining." This is a method of treating materials to produce extremely pure samples. Such oxides as uranium, thorium or zirconium can be purified in this manner.

Another group of Science Talent Search winners toured Walter Reed Army Institute of Research and the Armed Forces Institute of Pathology in Washington.

Science News Letter, March 16, 1957

ENTOMOLOGY

Build Own Homes

➤ THE TERRORS of the ant world are do-it-yourself home builders. They make air-conditioned hanging houses using thousands of their own suspended bodies.

The ants are the Ecitons, one of the two species of army ants of Barro Colorado Island, the Smithsonian Institution's tropical station in the Canal Zone.

Within their self-built houses, the colony's queen is sheltered, eggs are laid, young hatched and reared, Dr. T. C. Schneirla of the American Museum of Natural History reports. He calls their home-building behavior "unique in nature."

A typical house is a cylindrical mass hanging from the underside of logs or tree roots to the ground. Inside such a bivouac, Dr. Schneirla says, the queen and the young live in air-conditioned comfort.

They are protected from the wide tropical temperature ranges mainly as the result of worker behavior. The workers cluster more closely together at night as the temperature drops, making the bivouac walls tighter. After dawn, when increasing light excites growing numbers of ants to leave the walls, small holes develop, increasing the internal circulation.

Temperatures inside the hanging house are thus warmer than outside it during the night and cooler during the day.

Dr. Schneirla has observed the Barro Colorado ant colonies for nearly 25 years. The Ecitons are well known for the ruthlessness and military efficiency of their raids.

Their characteristic ability to cluster their bodies depends upon "the opposed recurved hooks present on the terminal tarsal segments of the workers' legs," Dr. Schneirla reports. The first ants to settle in a new place catch onto a rough or soft surface using these tarsal hooks until they are anchored by the added weight of others that have crawled down over the first ants' bodies, soon immobilizing them.

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ETHNOLOGY

Indian Toothache "Cure": Apply Red Hot Nail

➤ THE GUAYMI INDIANS of Panama have a heroic remedy for toothache that is reminiscent of an old joke.

The joke said that to cure toothache you should fill your mouth with cold water and sit on a hot stove until the water boiled.

The Guaymi treatment is just as rough. You attach a nail to a bit of wood and heat the nail red hot. Then you touch the hot nail to the parts around the aching tooth nine or ten times.

The Indians have a similar treatment for a swelling in which there is pus. In this case the red-hot nail is thrust into the swelling until the pus drains out.

These drastic treatments are among the Guaymi secret healing practices collected after patient years of observation by the Rev. Ephraim S. Alphonse, Wesleyan Methodist missionary in Panama, and reported by him to the Smithsonian Institution in Washington.

The secret healing practices of the Guaymi Indians are guarded more zealously, Mr. Alphonse reports, than is the whereabouts of gold. Outsiders are told nothing of the practices.

His descriptions of the remedies he was able to learn about have been published with a grammar and vocabulary of the Guaymi Indians by the Smithsonian Institution.

Science News Letter, March 16, 1957

MEDICINE

Ovaries Still Active After Menopause

➤ HUMAN OVARIES keep on producing the hormones necessary for youth long after the menopause, Drs. Henry M. Lemon and H. H. Wotiz of Boston University School of Medicine reported in Boston.

The ovaries of women 10 and even 20 years past the menopause still manufacture substantial quantities of these hormones, the scientists found.

This new finding cautions against what is getting to be a rather common medical practice today, the surgical removal of the ovaries and other reproductive glands in women past the child-bearing age. This is sometimes done to prevent the development of tumors and cancers of the uterus.

The ovaries should be kept in the body as long as possible, because no "drug store hormones" can be as effective as the natural ones in keeping women looking and feeling young, the scientists pointed out.

Two important exceptions to this are in patients with either breast or uterine cancer. Ovarian hormones often stimulate these cancers to grow and removal of the glands can help many older patients, they reported.

But evidence that ovarian hormones affect any other type of female cancer is lacking or inconclusive, they said.

Advanced breast cancer patients are now treated by removing several of the body's hormone-producing glands. These include the ovaries, adrenals, and/or the pituitary gland. Some patients have benefited from this type of surgery, but they have never been cured by it.

The research was reported by the American Cancer Society which supported the work.

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