

ZOOLOGY

Smithsonian Exhibits Elephant With 2-Ton Skin

➤ AN ELEPHANT with a two-ton skin was unveiled at the Smithsonian Institution's Natural History Building. The specimen is described as "the largest land animal of the modern world." It stands 13 feet 2 inches tall at its shoulder.

Shot in 1955 by Hungarian-born big-game hunter J. J. Fenykovi, who came across its huge tracks in 1954 while on a rhinoceros hunt in Africa, the elephant measures 20 inches taller than the famous Jumbo at the shoulder.

The skin was so heavy that a crew of 23 natives could not lift it. A truck load of salt was required to preserve it in the field. The skin was carried hundreds of miles through wilderness for shipment to the Smithsonian Institution.

In shaping the hide to depict an alert animal moving at a fast walk, trunk lifted and ears fanned out, Smithsonian taxidermists used more than 11,000 pounds of clay.

Science News Letter, March 21, 1959

ENGINEERING

Road-Building Machine Has 8 Electric Wheels

➤ A NEW ROAD-BUILDING machine has eight electrically driven, six-foot wheels. It can self-load and haul 50 tons of dirt in one trip.

Built by R. G. LeTourneau, Inc., Longview, Texas, the machine has an electric motor geared into the hub of each wheel. These motors, as well as other motors spotted over the machine, are powered by a dynamo under the hood, which is driven by a 600-horsepower diesel engine.

The machine has two "buckets," not so much to haul the 50-ton capacity, but mainly to facilitate self-loading. The rear bucket serves as a pusher to help load the front bucket. The weight of the loaded front bucket then increases tire traction to help pull-load the rear bucket.

During this operation, the bottom of each bucket becomes a huge electrically controlled spade, digging and scooping to load itself.

Simple electric controls govern all functions of the 74-foot-long machine. No clutches, transmission or other mechanical-drive components are used.

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ENGINEERING

"Laminated" Ceramic-Metal for Jet Engines

➤ "LAMINATED" ceramics and metals offer a new approach to the problem of making a heat-resistant material suitable for missile cones or jet engines of the future.

Attempts to combine ceramics and metals, strongly encouraged by the Air Force since World War II, have so far been concentrated on joining the individual particles of ceramics and metals, somewhat like mixing

salt and pepper. The results have been generally unsatisfactory.

Under the new concept evolved by Prof. Francis R. Shanley and William J. Knapp of the department of engineering at the University of California at Los Angeles, molten metals and ceramics are first flame-sprayed in alternate thin layers on a rotating disk.

After cooling, the layer "cake" is crushed into small grains, with each grain retaining the laminated, or layered, ceramic-metal structure. The grains are then hot-pressed in a graphite mold at temperatures of up to 2,200 degrees Fahrenheit.

The resultant ceramic-metal, or cermet, material resists both extreme heat and pressure. The mixture is considerably less brittle than ceramics, because the metal layer provides "slippage" for the ceramic layer.

Encouraging results have been attained by mixing 70% to 80% aluminum oxide for the ceramic layers with 20% to 30% stainless steel for the metal layers.

The two UCLA engineers hope that ultimately the laminated cermet mixture, besides its military potential, will have numerous civilian uses, especially for load-bearing structures exposed to very high temperatures.

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METEOROLOGY

Weather Bureau Will Report Discomfort Index

➤ MANY UNITED STATES Weather Bureau offices will this summer for the first time report the "discomfort index" on an experimental basis.

The discomfort index is a combined measure of the temperature and relative humidity. It is the weatherman's modern version of the old saying, "It's not the heat, it's the humidity."

Although every person has a differing reaction to the heat and humidity, Earl C. Thom, a Weather Bureau climatologist, has calculated the discomfort index based on averages. Index figures will enable managers of all kinds of buildings to judge when they should turn on their air conditioners, and public utilities to judge the power load therefore required.

The discomfort index is the figure 15 added to four-tenths of the sum of the dry and wet bulb thermometer readings. Ordinary household thermometers are dry bulb instruments. Wet bulb ones measure the air's dryness.

The discomfort index reaches 75, which many persons find oppressive, when the temperature is 75 degrees Fahrenheit and the relative humidity is 100%. It is also 75 when the temperature is 80 degrees and the relative humidity 60%, or the temperature is 85 degrees and the relative humidity 30%.

Mr. Thom, who invented the term, "discomfort index," estimates that in the summer about 10% of the population will be uncomfortable even before the index reaches 70. When it passes 75, more than half will be uncomfortable. At 79, all persons will be uncomfortable, and many will be acutely miserable.

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IN SCIENCE

METALLURGY

Alloy Is Strong as Steel And More Machinable

➤ A NEW STEEL-like material may offer engineers a replacement for plain steel forgings and permit design flexibility of castings.

It was developed by General Motors Central Foundry Division and GM Research Laboratories, and described to the American Foundrymen's Society meeting in Milwaukee, Wis.

Known as CentraSteel, the material consists of iron plus the following elements: 1.70% carbon, 2.25% silicon, 0.40% manganese, 0.10% sulfur, 0.05% phosphorus, 0.01% boron and some tellurium.

The metal has a high elastic modulus of 28,000,000 pounds per square inch, very nearly equal to that of steel. This means it will not deform until this pressure is exceeded. The material has the equivalent strength of steel and better castability and machinability. It does not require extensive heat treatment, costly addition agents, injection apparatus or low maximum sulfur content.

The material's high silicon, low carbon content is the reverse of normal iron founding experience, but this proportion accounts for the material's high modulus and great versatility. This high elastic modulus suggests applications to parts for which many presently available cast materials would be unacceptable.

The metal is still in an experimental stage. Work is underway on foundry problems that will have to be solved before high-volume production is begun.

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OCEANOGRAPHY

Wind to Chill Water Along Florida Coast

➤ WIND WILL lower temperature of an 85-mile stretch of Florida coast water by some ten degrees this summer, oceanographers of the U. S. Coast and Geodetic Survey report.

While the water along the coast below Charleston, S. C., is usually in the mid-80's during July and August, there is a very good chance that the water between Daytona Beach and Canova Beach will be a mild 75 degrees Fahrenheit.

After analyzing water temperature, sea level and winds, Charles B. Taylor Jr. and Dr. Harris B. Stewart Jr. found that the wind was responsible for the lowered temperatures. The prevailing winds, blowing out to sea, sweep the warm surface water out to sea and allow the cooler water below to "upwell" and come to the surface. There is also a slight drop in sea level in the area of the Daytona-Canova beaches.

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E FIELDS

DENTISTRY

Most False Teeth Could Have Been Prevented

➤ FALSE TEETH are usually the result of years of slipshod dental hygiene.

Most dentures could be "postponed forever" if individuals would only take proper care of their teeth, Mrs. E. Arthur Underwood, D.D.S., Vancouver, Wash, said at the 14th National Conference on Rural Health meeting in Wichita, Kans.

Dentist Underwood's solution? Start with youngsters. Children should be taken to the dentist at about age three. Instill in them the necessity of brushing, including the correct technique and length of time, three minutes twice a day.

Switch after school snacks to celery sticks and carrots, radishes, tomatoes, or even cheese wedges or left-over meat cubes on colored toothpicks. Cut down on the amount of gooey candies, snacks or party dishes.

In addition to these rules, which also apply to those not exactly in the "younger" set, frequent visits to the dentist to have cavities filled are a "must" on the list. The tartar that accumulates on the enamel should be removed periodically, too.

Dr. Underwood, who also is president of the Woman's Auxiliary to the American Medical Association, emphasized the role that fluoridation plays in the prevention of caries, tooth decay, by making the teeth disease-resistant. If fluoridated water is unavailable, the dentist can apply fluorides to the teeth themselves, she said. The use of fluoride can reduce the amount of caries a dentist will see in his practice by from 40% to 50%.

Dental disease is the nation's most chronic and expensive health problem, she said.

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MEDICINE

Student Suicides Cause Concern in England

➤ THE BRITISH are concerned over the large number of suicides in English universities, especially the older institutions, Cambridge and Oxford, Sir Alan Rook of the University of Cambridge reports in the *British Medical Journal* (March 7).

Statistics compiled by the University Health Service during the past ten years show that the commonest cause of undergraduate death is accident, but this is followed closely by suicide, Sir Alan reports.

Comparison of the suicide figures for men at the universities with men aged 20-24 in the general population of England and Wales showed that the rate per 100,000 living is 21.8 for Cambridge and 30.5 for Oxford as compared with only 6.1 for the general population. The suicide rate among men at seven British universities is only 7.9.

The suicide rate at Yale University in the United States is much lower than at Oxford and Cambridge, 13.0, but there, too, suicide is the second most frequent cause of student death.

The rate for women students is much lower than for men. In a student population of about 40,000, of which 20% were women, there were only two woman suicides.

A striking finding at Cambridge is the high incidence of suicide among colored undergraduates. In the average year, there are about 350 dark-skinned students and the suicide of three of these men in the ten-year period gives a very high rate of incidence—85.7 per annum per 100,000 living. But Sir Alan comments, "in view of the smallness of the numbers involved, this figure must be regarded with suspicion."

Two periods of time seem to be important in connection with the student suicides: near examination time and at the beginning of the academic year. There were five deaths in May, two in June, four in October and one each in January, March and April.

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TECHNOLOGY

Lamp May Improve Health and Moods

➤ THE FLIP of a light switch may soon bring relief to asthma, hay fever and sinus sufferers, and even persons "feeling down in the dumps."

The switch would control a special ultraviolet lamp that researchers at the Westinghouse Electric Corporation are now developing. The lamp produces sizable amounts of negative air ions, tiny charged particles that circulate in the air we breathe.

Evidence in recent years indicates that these ions have a pronounced effect upon our health and even our moods, E. G. F. Arnott, director of research for the Westinghouse Lamp Division, said.

When the air is charged with positive ions, there is a noticeable increase in discomfort, Mr. Arnott said scientists have found. The discomfort may take the form of fatigue, dizziness, headache, asthma and sinusitis. The positive ions have also been found to affect rheumatism and arthritis, cause mental depression and slow healing according to some reports.

But when people or animals were subjected to air containing negative ions, scientists noted a definite improvement in comfort.

It has been generally known for many years that Sterilamp ultraviolet tubes produce ions. These lamps have been in use in hospitals, schoolrooms, air conditioning systems, and for poultry and food protection. Occasionally reports were received that certain lamps relieved asthma. It was assumed that the minute amount of ozone generated by the lamp oxidized the allergens and thus relieved asthma.

Now it appears that the relief was due to the negative ions produced by the lamp. Lamps are now being tested for future installation into home air conditioners and heating systems.

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ENGINEERING

New Radar Design May Improve U. S. Defense

➤ ENEMY MISSILES may be detected as far as 3,000 miles from our shores as a result of a newly-found design principle for radar antennas. At the 15,000-mile-per-hour speeds of today's intercontinental ballistic missiles, this could mean 12 minutes' warning.

The principle, known as TETRAC (Tension TRuss Antenna Concept), is claimed to offer greater accuracy, higher rigidity-to-weight ratio, and lower construction and maintenance cost than conventional methods. It was developed by Narmco Industries, Inc., and will enable engineers to build radar antennas more than 20 stories high.

David L. Grimes, president of Narmco, said TETRAC "will enable us to extend the range of our defense radars so that we can determine the precise distance, speed and direction of missiles better than 3,000 miles away, within minutes after they are launched."

Essentially, the TETRAC antenna consists of a series of concentric compression rings made of lightweight metal, plastic, glass fiber or other sandwich material for optimum rigidity at light weight.

These rings hold a giant reflector made of solid sandwich or open mesh material, and are stabilized by pre-stressed radial tension rods that work on the principle of giant bicycle spokes.

The new design makes possible the fabrication, erection and operation of radar antennas to extremely close tolerances while maintaining a highly efficient ratio of weight to deflection, Narmco engineers said.

The lightweight reflectors can be transported and assembled easily and conveniently. Their parts are interchangeable.

TETRAC is also expected to facilitate important advances in space technology, radio astronomy and the harnessing of solar energy for practical use.

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CHEMISTRY

Intense Reactor Heat May Catalyze Chemicals

➤ THE INTENSE radioactive heat found deep in the heart of an atomic reactor may offer a promising way of making chemicals more easily and profitably.

Atomic Energy Commissioner Willard F. Libby told a forum on natural resources conservation meeting in Washington that a "chemical reactor" has been proposed for production of nitric acid.

The Atomic Energy Commission has been asked to study feasibility of irradiating air in an air-cooled type reactor to make nitrogen oxide, the precursor to nitrogen dioxide and nitric acid.

Dr. Libby said this is such an early development it is "very difficult to assess," but that "the possibilities look bright and encouraging, and there may be other instances of where chemical reactions may be profitably catalyzed by the intense radiation in atomic reactor."

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