

PHYSICS

Gallium Thermometers Give Direct Readings

► GALLIUM thermometers that gave direct readings of temperatures up to 1,200 degrees Centigrade have been discovered in Germany by British scientific investigators. The gallium thermometers showed temperatures which otherwise would have been measured by thermocouples, disappearing filament pyrometers or other indirect means.

Gallium, generally found as an impurity in zinc blends, melts at 30 degrees Centigrade, but it is not very volatile in red heat.

One of the German gallium thermometers was found in the furnace bath of an aluminum reduction plant and another was used in a coke calcining retort. The gallium thermometers consist of a quartz capillary inside a quartz envelope. The capillary contains pure gallium with a slight trace of iron.

A technical report on the thermometers is now available to American scientists.

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CHEMISTRY

Insects Meet Death In Operation "BUGS"

► SUCCESS in the Navy's wartime fight to produce a better weapon against malaria-carrying mosquitoes brings to the world a chemical that both kills and repels mosquitoes and other "bugs" and promises better living in peacetime.

The story of "Operation BUGS" was told by Lieut. Comdr. Michel Pijoan when he appeared as guest of Watson Davis, director of Science Service, in *Adventures in Science*, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

The new chemical, officially known as NMRI 448, was developed by Lieut. Comdr. Pijoan and Lieut. L. A. Jackowski at the Naval Medical Research Institute at Bethesda, Md. It gets its name from the initials of the Institute and the fact that it was the 448th of many compounds developed by the Institute. In their development theory and chemical structural changes were closely followed with reference to repellent action, Lieut. Comdr. Pijoan said.

The new anti-bug weapon both kills and repels insects. The killing feature is important for ridding an area of insects.

The repellent feature gives personal and animal protection.

In the search for a repellent, the Navy scientists had to find a chemical that was powerful, safe and easy to use. It had to be something a man could use himself, cosmetically acceptable and not injure him. In addition it had to be something that would not dissolve in water so that it could not be easily washed off by tropical rains and sweat.

In 448 they found what they were looking for. In the tropics a single application repelled mosquitoes, chiggers, sand flies and bedbugs for a long time. It is effective anywhere from 5 to 13 hours. How effective it will be in temperate climates and for repelling insects from a house or barn is now being investigated.

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CHEMISTRY

Paper Mill Waste May Make Yeast

► PLANS to use waste sulfite liquor from paper mills in the production of yeast are being developed in Wisconsin. If successful, this program will not only bring added revenue to mills amounting to millions of dollars, but will also do much to eliminate stream pollution in the paper mill areas.

A total of 12 companies, 11 of them Wisconsin paper firms, have organized the Sulphite Paper Manufacturers Committee on Waste Disposal, and are cooperating with the Institute of Paper Chemistry at Appleton, Wis., in research on this subject. A chemist has been sent to Germany to study plants there.

A process has been developed which allows yeast from sulfite liquor to be used for animal feeds, principally poultry at this time, although feeds for cattle are also likely. There is a possibility that foods good for human consumption may be reclaimed from the waste.

The yeast process uses the wood sugars in sulfite pulping liquors, and further research may, it is hoped, find uses for the lignin solution remaining after the sulfite is drawn off. A site is now being sought for an initial reclamation plant for the research.

The Marathon Corporation, one of the cooperating group, is already reclaiming a number of by-products from these wastes, including water softeners, chemicals for aiding concrete mixing, plastics and vanillin.

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IN SCIENCE

FOOD TECHNOLOGY

Eggs Keep Better In Cool Weather

► EGGS will keep better in your refrigerator if they have been kept cool from the time they were laid. From nest to kitchen stove, heat and not humidity threatens egg quality. Since heat aids the growth of bacteria on the shells, a few degrees may make a difference in bacterial growth between Grade A eggs and cheaper ones.

Cover the egg basket with moist burlap to keep eggs cooler. This farm trick is recommended by the poultry specialists of the United States Department of Agriculture. The evaporating moisture leaves eggs cooler, just as evaporating sweat from the farmer's brow leaves him cooler.

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NUTRITION

Milking Machine for Guinea Pig Aids Research

► SCIENTISTS are after the poor guinea pig again—this time with a milking machine. The machine, smallest milker in the world, is mounted on a board 18 x 6 inches, and Prof. B. L. Herrington, dairy researcher at Cornell University, expects milking guinea pigs to be valuable to nutrition studies.

Milking guinea pigs is a two-man operation, with one person holding the animal, and it takes about 10 minutes. The record milk yield so far is 7.8 grams, or about one-fourth of a fluid ounce, from one guinea pig.

Rats, rabbits and possibly hamsters, a rat-like rodent, may all be milked with the midget milker, using slight adjustments, Prof. Herrington said.

Seeking an experimental animal with a nutrition system and milk with a lactose content all similar to that of humans, the Cornell scientists hit on milking the small laboratory animals.

After the guinea pigs are milked chemical analyses are made of the milk for lactose, protein, ash content and vitamins. Particular emphasis is being placed on the lactose, important in the manufacture of penicillin.

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E FIELDS

SEISMOLOGY

New Map Reveals Earth's Structure Below Surface

► A NEW underground map of the Caribbean area revealing the structure of the earth down to 500 miles below the surface may come from studying the seismograph records of the recent earthquake off the Dominican Republic, U. S. Coast and Geodetic Survey seismologists disclosed.

With this new picture, a more accurate location will be possible for future quakes in the West Indies. The study, combined with data gathered on the Cuban tremor in February, 1932, will show the speed of seismic waves in the Caribbean area.

Seismologists know that the speed of these quake waves varies in different areas of the world, but a standard figure is now used because information is lacking about the regional differences.

With the new information, seismologists will know more about future earthquakes, but they still will not be able to predict them in advance. The places can be noted that might have quakes, but no one can forecast when they will happen, warn the seismologists.

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PSYCHOLOGY

There's More Than Talk Behind Jive Cats' Cracks

► TEEN-AGERS' amazing melange of slang, double-talk and wise-cracking serves other purposes than its primary ones of exchanging information and gossip and establishing social contacts, Dr. Mary C. Jones of the University of California told the meeting of the American Psychological Association, in Philadelphia.

In a four-year study of the daily conversation of 200 adolescents, she found that their talk was also used "to release tensions, bolster the ego, and channel aggression." Adolescent language, she stated, "was typically colorful (slangy, idiomatic); highly charged (vituperative, ecstatic); ostentatiously careless; centered largely in personal and interpersonal relationships."

But alas, time takes its toll, even in the golden age between 13 and 17. By the time her chin-happy 200 had reached the estate of high-school seniors the bright bloom of their speech had already begun to fade; they were beginning to use at least a little more ordinary English.

Negro girls from the North make a better showing than their sisters from the South when it comes to college intelligence tests, Dr. S. O. Roberts of Fisk University stated at the same session. He found that the occupations of the girls' mothers appeared to have more influence on their scores than their fathers' occupations.

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ENGINEERING

Cruisers Will Be First Of Air-Cooled Fleet

► EXPERIMENTAL air-conditioning of two heavy cruisers now under construction will be the forerunner of a virtually completely air-cooled fleet, the Navy indicated.

Denying that the Navy is "trying to mollycoddle its personnel," Vice Adm. E. L. Cochrane, chief of the Bureau of Ships, declared that efficiency and not comfort was the main aim of the program.

"Admittedly the ships will be more comfortable in tropical climates," the Admiral explained, "but that consideration is not paramount."

"It is to improve the battle-effectiveness that this is being done," he said.

Battle experience in World War II showed that long periods in the heat of the tropics lowered efficiency in proportion to the strain and fatigue of ship crews, Adm. Cochrane said.

Emphasizing that all major combatant ships must be air-cooled in the future, the chief of the Navy's Bureau of Ships reported that installations on the new heavy cruisers Salem and Newport News are experiments to determine what type of air conditioning will best meet the Navy's need.

The USS Salem, being built at the Bethlehem Steel Co. shipyard, Quincy, Mass., has steam-jet air-cooling equipment, while the Newport News, under construction at the Newport News Shipbuilding and Drydock Co., Newport News, Va., will use high-speed freon compressors. Both ships are scheduled to be completed late next year.

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PSYCHIATRY

Finger-Painting Diagnoses Two Mental Diseases

► FINGER-PAINTING, an artistic outlet for young children, can be used to help diagnose and treat two serious mental diseases, Peter J. Napoli, of Binney & Smith Co., New York, told the American Psychological Association at Philadelphia.

Finger-painting revealed distinct differences between patients with schizophrenia and paranoia and between mentally sick and normal persons, Mr. Napoli reported from a study of approximately 900 cases.

In the finger-painting test, an individual's performance is described in terms of his physical behavior and reaction. Such factors as handedness, color, motion, rhythm, texture, balance, order, symbolism and verbalization are considered.

First group tested was made up of patients who had been diagnosed by qualified psychiatrists and psychologists. Schizophrenics and paranoids were found to have sets of definite characteristics.

In later tests, the diagnosis was not made known and the finger-painting revealed patients of the two diseases, as confirmed by physicians after the tests.

Mr. Napoli said that treatment can accompany diagnosis of the mental disorders using the finger-painting technique, a device that encourages self-expression.

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CHEMISTRY

New Wax Comes From Lignite, Peat

► WAX extracted from lignite and peat, leaving the peat to be used as fuel, is a wartime research result in England. This wax, an ester, served as a substitute for montan wax which is important in the preparation of carbon paper and many polishes. It is useful also as an insulating material because of its hardness and dielectric properties.

About 5% of lignite and 3% to 12% of dry peat can be recovered as crude wax, reports the Department of Scientific and Industrial Research. The wax content of peat depends upon the kind of vegetation from which it was formed. Peats derived from cottongrass, heather and sedges are relatively rich in wax.

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