

CLIMATOLOGY

World's Heaviest Rains Cited by Weather Bureau

► WHILE MUCH of the nation shivers in snow or freezing temperatures, the Weather Bureau reported on the world's heaviest rains.

The greatest rainfall observed in one minute was at Unionville, Md., on July 4, 1956, when 1.23 inches were recorded. Holt, Mo., holds the record for the highest quantity of rain in less than an hour: in 42 minutes, 12 inches of rain fell on June 22, 1947.

These figures give some indication of how hard it can rain. Concerning how long it can rain, Cherrapunji, India, holds all the records for periods of seven days and longer. The rains result from monsoons, the seasonal storms that bring on-shore winds in late spring and summer at lower latitudes. The moisture-laden air flows inland from over the warm oceans, resulting in very heavy rains for long periods, particularly in India where the mountains force the air to rise and cool, thus producing precipitation.

Cherrapunji has had 131 inches in seven days and 1,605 inches in two years, records set respectively in June 1931 and 1860-1861.

For the highest observed 24-hour rainfall in the U.S., New Orleans and Galveston, Texas, are about tied for the record, with slightly more than 14 inches each. Jacksonville, Fla., comes next with a little more than ten. Ranking below them are New York, St. Louis, Boston, Los Angeles, Washington and Portland, Ore., ranging from nine and a half to seven.

Chicago, Denver, Cincinnati and San Francisco have had from six and a half to four and a half inches within 24 hours, whereas Salt Lake City and Albuquerque, N. Mex., have had between three and two.

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SURGERY

Synthetic Resin "Glue" May Replace Sutures

► SURGICAL "glue" made of synthetic resins may some day replace sutures in operations involving fragile tissues.

Drs. Bradley R. Straatsma, Raymond A. Allen, Phillip Hale and Ruben Gomez of the University of California, Los Angeles, Medical School report promising results with new adhesive compounds in delicate eye surgery in animals.

The new adhesive agents, made of synthetic resins, have proved effective in holding together delicate tissues such as the cornea and sclera of the eye.

In some instances, adherence was maintained for more than eight weeks, long enough for natural healing to occur. The compounds do not appear to cause excessive tissue reaction.

Since surgery was first practiced by the ancient Arabians, sutures have been the fundamental method of joining tissues and achieving wound closure. Dr. Straatsma pointed out. With all the advances of modern surgery, little effort has been made

to introduce new methods of closing incisions.

The need for better methods of closure in working with fragile tissues, such as those of the eye and tiny blood vessels, has long been apparent. The new adhesive compounds may be the answer to this problem.

The materials used in surgical "glue" are special synthetic resins, Eastman 910, a cyanoacrylate; Borden's AD/HERE, an experimental resin for which no chemical name is available; and Resiweld plastic alloy 620, a polyvinylepoxy resin.

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PHYSIOLOGY

Key Agent In "Clamming Up" Is Discovered

► CLAMS maintain muscle tension over long periods of time due to a locking protein in the special muscle attached to the shell.

Key agent in "clamming up" is a fibrous protein, paramyosin, that freezes muscle tension. When paramyosin is plastic, the muscle is flexible. If paramyosin crystallizes to a solid, the muscle is locked firmly.

This new theory is being proposed by Dr. Andrew G. Szent-Gyorgyi, who won the 1937 Medicine Nobel Prize, and Dr. William Middlebrook at Dartmouth Medical School. Dr. Szent-Gyorgyi came to Dartmouth in 1962 from the Marine Biological Laboratory, Woods Hole, Mass. The theory is being studied in a five-year Government-supported research project.

Under normal muscle locking, such as those which occur when a man grits his teeth, a clam would use up so much fuel in maintaining the tension that its body would burn up in three days.

Muscle tension in the clam is originally built by actomyosin, the basic muscle-protein system that takes part in all muscle contraction. Paramyosin, according to the new theory, acts to lock the formed muscle tension for an indefinite period.

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BIOCHEMISTRY

Ring Shape Found for DNA in Bacteriophage

► A NEW CLUE in the mystery of life is the discovery that life's basic genetic material, DNA, is ring shaped in a small, simple virus, called Phi X 174.

This research finding by Drs. Robert L. Sinsheimer and Walter Fiers of the California Institute of Technology is significant because other DNA molecules are in long, usually double, intertwined strands of genes.

Three years ago Dr. Sinsheimer announced that the Phi X virus has only a single strand of DNA. This suggested that the Phi X, which is a bacteriophage that infects only bacteria, may transfer from generation to generation its genetic information by a unique process.

DNA is deoxyribonucleic acid.

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IN SCIEN

ZOOLOGY

Natural Cockroach Lure To Be Made Synthetically

► A PURE, natural cockroach attractant has been isolated which can be used to lure male cockroaches to insecticides.

The substance secreted by the female of the species is expected to be known structurally by chemists within the next month or two. In efforts to produce the attractant synthetically, Dr. Martin Jacobson and Dr. Morton Beroza of the Agricultural Research Service of the U.S. Department of Agriculture are analyzing one or two drops of the pure material. In large quantities the substance could aid pest control by determining the degree of cockroach infestation or by combination with a chemosterilant or a toxic insecticide.

The pure substance is obtained from air which is circulated around 8,000 female cockroaches. It is separated from air moisture by extraction with hexane. The hexane-attractant combination is concentrated to contain about one half of one per cent of the natural substance. This method, developed by Dr. Robert T. Yamamoto, who obtained the first pure material, yields about three drops of mixture a week.

The cockroach used in this study is the American cockroach (*Periplaneta americana*), one of the five species which inhabits homes, markets and other buildings. The species is native to Southern states.

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TECHNOLOGY

Glass Floats on Molten Tin in New Process

► AN ENTIRELY novel method of manufacturing clear, flat glass of the highest transparency has been developed in the past ten years at the famous English glassworks of Pilkington Brothers in Lancashire.

The molten glass floats upon molten tin during the critical period in which it gradually solidifies from a broad, shallow stream of viscous liquid into an endless band of plate glass and thereby is spared the denting, scratching and disfigurement of its surface which would result if it were to make contact with solid materials. One of the prime necessities in making perfectly flat glass is to cast or mold it against an ideally flat surface so that it will acquire a surface of this quality during solidification and retain it permanently.

Glassmakers had never discovered a solid material that could permanently retain a flawless mirror-like surface when in continual contact with molten glass. The usual casting or rolling processes could produce only thick, flat sheets of glass having a rough surface which had to be laboriously ground smooth and polished.

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CIE FIELDS

BOTANY

Rapid Food Transport Key To Giant Kelp's Growth

► THE GIANT kelp is among the world's fastest-growing plants because of its rapid food transport system.

This is suggested by Dr. Bruce C. Parker, University of California, Los Angeles, botanist, who has found that food manufactured by the king-sized seaweed moves through the plant at the rate of at least seven feet per hour.

This is about twice as fast as food moves through land-based plants.

Dr. Parker used radioactive carbon to trace the food (sugars) made by the plant's photosynthesis. The large mature leaves growing beneath the surface of the ocean appear to manufacture more food than they require.

Most of this excess food is apparently transported through the kelp stalk to the rapidly growing apex of the plant. The immature leaves at the apex are not capable of synthesizing enough food for accelerated growth.

Some food may be transported to the base of the plant where darkness minimizes photosynthesis. Such food may be stored in the portion of the plant attaching it to the ocean floor. This would serve as a depot to supply regrowth in case the bulk of the plant gets torn away by surging tides.

In the plant's stalk is a system of tubular cells separated by sieve plates. These appear to form a capillary system by which the sugars may be transported throughout the plant.

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ECONOMICS

Food Distribution Cost Still Growing

► THE COST of food distribution is a still-growing percentage of the cost of food because supermarket operations are not as efficient as commonly thought.

Dr. Ralph Cassady Jr., professor of marketing at the University of California, Los Angeles, believes that a reversal of this trend is due, perhaps through the development of new food sale techniques, such as discount house food departments and possibly from new type institutions such as bare-walled, serviceless warehouse outlets which were the forerunner of the present-day supermarket. They might well return to favor as a result of the present high-cost situation.

Recent figures indicate that operating overhead of supermarkets is close to 17.5 percent, even though sales have greatly increased. These higher costs are due to current wage levels and to increased services, including elaborate facilities, customer

conveniences and prime locations, Dr. Cassady says.

Dr. Cassady predicts that some single-store independents with an efficient wholesale supply source and retailing know-how, together with an understanding of their competitive strengths and weaknesses, can more than hold their own against fair competition from even the largest chains.

Dr. Cassady's new book, "Competition and Price Making in Food Retailing," discusses many aspects of supermarket operation and the retail food business.

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BIOCHEMISTRY

Heparin Natural Snake Bite Antidote

► THE BODY CHEMICAL heparin is a natural antidote against snake bites, bee stings and infections, Prof. Robert D. Higginbotham of the University of Texas Medical Branch in Galveston, reported at the American Chemical Society's Southwest Regional Meeting in Dallas, Texas. Heparin is well known as an agent that prevents the coagulation of blood.

Experiments in which mice were injected with snake venom and other poisons have indicated that heparin acts on these poisons and destroys their toxicity. The agent also appears to have the general function of protecting body tissues from the effects of burns, allergic reactions, pinching, and other injuries.

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ZOOLOGY

Change in Anthrax Treatment Suggested

► ANTITOXIN in addition to antibiotics as a treatment for anthrax, the often-fatal disease of cattle, horses and sheep sometimes transmitted to man, has been suggested.

Anthrax toxin (poison) was found in the blood of rhesus monkeys infected with anthrax, which apparently had died of toxemia, six researchers at the U.S. Army Biological Laboratories, Fort Detrick, Frederick, Md., reported in *Science*, 138:1331.

Although the importance of toxin in affecting the treatment of anthrax in man is yet to be determined, the investigators said it seems probable that the effect of toxin in man is the same as in other animals.

Since the introduction of antibiotics, treatment for anthrax, caused by *Bacillus anthracis*, one of the largest of the disease-causing bacteria, has been antibacterial.

Virtually all Russian recommendations on treatment of any type of anthrax infection has put primary emphasis on the use of antiserum (a substance containing antibodies).

Frederick Klein, Dean R. Hodges, Bill G. Mahlandt, William I. Jones, Bertram W. Haines and Ralph E. Lincoln reported the study, concluding that the development and use of specific antitoxin seems warranted.

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PUBLIC HEALTH

Only Alaska Has Excess Radioactivity in Milk

► IN ONLY ONE location in the United States—Palmer, Alaska—was the atom-testing radioactivity in milk in excess of the acceptable values during the 12 months ending in October, the U.S. Public Health Service reported. Iodine-131 rose in that city to 36,990 micro-microcuries during the 12-month period, whereas the intake deemed acceptable for infants and very young children is set at 36,500 and for adults it can be ten times larger.

The average daily levels of iodine-131 during October were equal to or slightly more than the 100 acceptable per day at Chicago, New York, Syracuse, N.Y., Pittsburgh, Cleveland, Detroit, Milwaukee, Des Moines, Minneapolis, and Minot, N. D., as well as Palmer. Values for strontium-89 and strontium-90 did not exceed the acceptable health risk.

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PUBLIC HEALTH

Automobile Exhaust Blamed for Ion Size

► AUTOMOBILE exhaust is the cause of particles in the air, called ions, becoming predominantly intermediate or large in size in cities. In rural areas the air ions tend to be small.

Just what this indicates and whether there is any effect on human health or feeling of well-being is a matter for discussion. Ions are small particles in the atmosphere which consist of molecules, groups of molecules, condensation nuclei or they have microscopic dust. Air contamination from automobiles appears to be the dominant factor in the change of the natural ion levels, because when the large ions are observed there is a larger concentration also of lead which gets into the air through the anti-knock additions of tetraethyl lead added to the gasoline burned.

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TECHNOLOGY

New Buildings Use All Gas Energy

► A NEW BREED of building uses natural gas for all its energy, for air conditioning, electrical energy, hot water and all other such needs. The gas-energized buildings include a school in Texas, an industrial plant in Ohio, office buildings in Illinois, a shopping center in Arkansas and a restaurant designed for the 1964-65 New York World's Fair.

Such buildings have no power lines strung through the air from utility poles. Many of the buildings will be windowless, since operating economies allow high lighting levels and complete environment control. Interior rooms will be possible, substantially cutting down construction costs.

The total-energy gas turbine system has high efficiency, from 60 to 70 per cent in the total-energy system.

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