

BIOLOGY

Light Makes Migratory Birds Eat Faster

► MIGRATING birds preparing to take off on a long trip north fatten themselves before leaving.

Scientists believe it is the amount of daylight that causes their voracious eating and resulting fat deposits.

Reporting on a study of migratory birds subjected to artificial periods of daylight, a research team said that, when exposed to eight hours of daylight, the birds failed to gain weight or store fat. However, on 20 hours exposure, the birds showed a marked increase in weight with a marked increase in fat and a decrease in glycogen, another energy-giving compound important to animals.

This decrease in glycogen, the form in which carbohydrates are usually stored in the muscle tissues of animals, is very important, Dr. Fred I. Kamemoto told scientists at the American Society of Zoologists meeting in Bloomington, Ind. The State College of Washington zoologist said a migratory bird needs an increased energy supply and fat gives more energy per gram than glycogen.

In non-migratory birds, the English sparrow was studied, increased light was not followed by fat deposit. Glycogen even increased slightly.

Dr. Kamemoto and his associates believe that the presence or absence of light affects the pancreas, which secretes insulin. Insulin, in turn, is related to blood glucose and influences the presence of this energy "food" in the body.

So far migrating birds have not been studied in the fall. Andreas Oksche, Harold E. Cheyney Jr., and Donald S. Farner of State College of Washington and University of Marburg/Lahn, Germany, also worked on the project, which was supported in part by a National Science Foundation grant.

Science News Letter, September 13, 1958

ENGINEERING

Future Wars to Be Fought By Small Armored Teams

► WARS of the future may be fought by small widely dispersed teams of mobile armor bearing conventional weapons.

They will be under the constant threat of nuclear destruction, although the chance is that neither side would be willing to make the move that could bring on a general atomic holocaust.

In the *Military Review* (Sept.), published by the U. S. Army Command and General Staff College, Fort Leavenworth, Kans., Richard M. Ogorkiewicz furthermore warns that the gasoline engines of armored units should be replaced by the more economical diesel motors. Diesels use less bulk of fuel, thus easing the problem of supplying mobile units.

Mr. Ogorkiewicz, a mechanical engineer with the automotive manufacturing Rootes Group of London, believes the possession of nuclear weapons by the United States, Rus-

sia, Great Britain, and, perhaps in the future, other countries has destroyed the classical military tactic of massing troops for large scale breakthroughs.

"In this situation," he says, "armored forces should consist of hard-hitting, small, mobile groups composed of heavy self-propelled weapons, tanks, and infantry in armored carriers . . . Their primary aim would be to combat aggressor forces directly with skillful, mobile tactics and superior equipment and thus check aggression on the spot and in a nonsuicidal way."

By "nonsuicidal" Mr. Ogorkiewicz was referring to small tactical nuclear weapons. To use them, he believes, could lead to widespread and useless destruction. He describes a possible nuclear wartime situation in the following way:

"As both sides would ultimately possess them (tactical nuclear weapons), their employment would lead to the impossible situation of small, widely dispersed units stalking each other with over-powered weapons and pulverizing the country around them in the process. Thus even if the tactical employment of nuclear weapons did not start a disastrous all-out nuclear war, it would, in populated districts, kill off the population which ostensibly was being defended."

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PSYCHOLOGY

Institution Babies Get Less Care, Not Different

► INSTITUTION babies receive the same kinds of care as babies in their own home; it is the amount of care that differs.

Dr. Harriet L. Rheingold of the National Institute of Mental Health has devised a scale for measuring infant care. Using it, she compared the care given 3-month-old first-born babies in better than average homes with that given in a "good institution." Observations were made every 15 seconds during a period of eight hours.

Both the institution baby and the home baby are much more often held, fed, talked to and looked at than they are diapered, bathed, played with or rocked. But the mother spends much more time looking at the face of her baby, talking to him and holding him in her arms than does the busy nurse in an institution.

Home babies received some kind of care on 37% of the observations. Institution babies received care on only 8%. The home baby was cared for 4.5 times as often as the institution baby.

There was no activity performed by a mother in the home that was not performed, however infrequently, in the institution.

The home infant received almost all his care from his mother alone. In the institution, a baby received his care from six different nurses.

The home baby plays more with toys. The institution baby plays just as much, however. In the absence of playthings, he plays with his own hands or clothing.

Dr. Rheingold reported her research to the American Psychological Association meeting in Washington.

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IN SCIEN

PSYCHOLOGY

Snow, Fog or Sky May Cause Blank-Out of Vision

► TRAVELERS in Arctic snow on an overcast day, in fog, or under an unbroken sky may suffer a temporary loss of vision. This is not a blackout but might be called a white-out or blank-out.

The peculiar effect was reported to the American Psychological Association meeting in Washington by Drs. Walter Cohen and Thomas C. Cadwallader of the University of Buffalo.

They produced the effect experimentally in the laboratory by having individuals look into a milk glass sphere. Seven out of 13 blanked out, the condition often lasting for 30 seconds or more. The blank-out was found to be accompanied by bursts of brain waves of the type known to scientists as alpha waves.

The experience does not resemble being in darkness. The individuals reported it was as if they had "stopped seeing." Although they experienced neither black nor white it was as though they were surrounded by light that had no outside source.

Most individuals seemed to feel drowsy, yawned a lot and their voices took on a hesitant, drawing quality. They could get rid of the blank-out by considerable eye movement and an attitude of search or by blinking.

The experience of drowsiness as well as the presence of slow brain waves usually associated with sleep would seem to indicate that areas of the brain other than those simply associated with vision are important for the "blank-out" effect.

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ASTRONAUTICS

Navigation Between Planets Possible

► ROCKET scientists are already working out systems for interplanetary navigation.

Dr. E. V. Stearns of the Lockheed Aircraft Corporation's missile system division, Palo Alto, Calif., told the Congress of the International Astronautical Federation meeting in Amsterdam that instruments depending primarily on gyroscopic stabilization will not have sufficient accuracy for long term flights and that integrating accelerometer systems are troubled by the non-linear character of the problem.

A journey from the earth to Venus was projected in the study.

A solar-planetary triangulation system has been worked out by Dr. Stearns. In this, the thrust orientation is monitored by an accelerometer-computer system and the course-to-go is determined from a steering command computer.

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CI FIELDS

PHYSICS

A-Reactor Knowledge Wanted, Not Kilowatts

► THE UNITED States is more interested in trying out different types of atomic power reactors for the gain of scientific information than it is in rapidly putting large reactors into operation as part of a kilowatt race with other nations.

Besides, a power reactor authority cautioned, at the present time the choice of reactors "must be made on the basis of incomplete technical data and fragmentary operating experience."

Dr. Norman Hilberry, director of the Atomic Energy Commission's Argonne National Laboratory, Lemont, Ill., pointed out that there is no economic excuse in the United States for building large numbers of nuclear power plants whose costs for the energy produced are in excess of the cost of plants using fossils fuels."

He spoke before a session of the Second United Nations International Conference on Peaceful Uses of Atomic Energy ("Atoms for Peace" conference) in Geneva, Switzerland.

Dr. Hilberry predicted that 15 to 20 years from now America's power producers will have to generate four times today's electrical energy output.

"Long before the reserve of fossils fuels begins to be exhausted, problems of rates of production and transportation will make the use of nuclear fuels essential if the United States is to maintain its rate of expansion of electrical energy."

The actual time by which the U.S. will absolutely have to begin using nuclear fuels is not yet clear, Dr. Hilberry said.

In the meantime, he stressed, we still have a few years in which to conduct research toward finding the best types of reactors. We are not yet hard-pressed to put early designs into production, he said.

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MEDICINE

Radioactive Strontium-90 Does Not Leave Bones

► RADIOACTIVE strontium-90, the deadly bone-hugging chemical formed by atomic- and hydrogen-bomb explosions, is virtually "impossible" to remove from the bones of live humans once it has lodged there.

Strontium-90 is one of the most long-lived products of atomic fission, any given amount taking 28 years to be reduced by half. It is a bone-seeker, like calcium and radium.

Fifteen persons with radium in their bodies were studied by scientists from the Atomic Energy Commission's Argonne National Laboratory. They found the "main structural change in human bone contain-

ing radium was the plugging of the blood-carrying canals."

Robert E. Rowland reported these results of studies by him and his associates in an account prepared for delivery at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy meeting in Geneva.

The plugging of blood-carrying canals is believed to cause the death of small portions of bone, which must have a continual blood supply to live. Dead bone is usually removed naturally in the course of time. In cases of persons with radium in their bones, however, lifeless bone tended to remain in the body in the 15 cases studied.

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BIOLOGY

Spores May Be Universe's Original Space Travelers

► SPORES MAY be the first living things to survive a trip through outer space.

Or they may be already floating around, the original space travelers.

It is now known definitely that they can live in the virtually airless atmosphere found high above the earth.

For the first time spores of common everyday bacteria and fungi have been subjected to a vacuum equivalent to what a space traveler would find 100 miles above the earth and have survived "without evident impairment of growth."

In a report that was cleared, hand-carried and rushed to the American Institute of Biological Sciences meeting in Bloomington, Ind., Dr. Alton E. Prince of Wright-Patterson Air Development Center's materials laboratory, Dayton, Ohio, described his recently completed research. Analysis of results is still not complete, Dr. Prince told SCIENCE SERVICE, but the spores lived through 32 days of exposure to a laboratory facsimile of the air a space traveler and space ship would encounter. Beyond 100 miles, he said the density of the atmosphere does not vary greatly.

The spores, including the fungi, *Aspergillus niger* and *Aspergillus flavus*, and the bacteria, *Bacterium globigii* and *Bacterium mycooides*, were kept in a special space chamber developed for Wright-Patterson by the Litton Industries, Inc., of Beverly Hills, Calif.

Temperatures and other environmental conditions were normal and the spores showed no evidence of damage. There was no reduction in germination, no change in color, etc. Further research is planned to see if the effects of temperature extremes together with life in a near vacuum may harm the spores.

A last minute rescheduling of reports and scientific discussions was necessary to give scientists attending the meeting a chance to hear of these first results. Dr. Prince's research was believed to be so "red hot" that Dr. C. L. Porter of Purdue University, president of the Society for Industrial Microbiology, arranged for its immediate presentation to the society.

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GENETICS

Cell Changes Set Human Life Span

► A NEW MEASURE of the spontaneous changes in heredity in man, the "somatic mutations" or the variations in the living cells, was presented to the International Genetics Congress in Montreal by Dr. G. Failla of Columbia University's Radiological Research Laboratory, New York.

The measure can be derived from the mortality rate.

Studying mice, rats, fruit flies and men, Dr. Failla found that the spontaneous mutation rate for each per cell per year is very closely the same, if it is assumed that aging is due to somatic mutations.

The increase in mortality rate with advancing age is due primarily to the accumulation of somatic mutations, Dr. Failla suggested, and if this is so the lifespan is set by the inherent stability of the genetic system of the species.

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ENGINEERING

Revolutionary Propeller Increases Ship Speeds

See Front Cover

► THE UNITED STATES Navy has announced the development of a revolutionary ship propeller that it compares in importance to the development of jet propulsion for aircraft.

The propeller gets its kick from the same obstacle that severely limits the speeds attainable with craft driven by conventional propellers.

Development of the propeller is the direct result of work in the field of hydrofoils by Marshall P. Tulin, currently serving with the Office of Naval Research Branch Office in London. Hydrofoil cross-sections used in the propeller design make possible for the first time high-speed propulsion through the water at high efficiencies.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the "super-cavitating" propeller in action. It resembles the screw-like part of an ordinary kitchen food grinder. The two flanges of the propeller have squared ends rather than the tapered ends of the conventional propeller blade.

Heretofore, cavitation, the formation of a vacuum around speeding propellers, has been a barrier to increasing speeds. The vacuum, actually a vapor pocket, becomes so large that it seriously limits the propeller efficiency. When the pocket becomes greater than the width of the propeller, a condition of super-cavitation exists.

The new propeller provides a means of capitalizing on super-cavitation as a means of increasing the speed of ships.

The recent development of high-speed marine gas turbines appears to be ideally suited to the new design of propeller, the Navy said.

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