

SCIENCE NEWS - LETTER

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No. 73

PLANTS' FRAGRANCE CREATES OWN COOLING SYSTEM

Reno, Nevada. Fragrance of flowers regulates their temperature, thinks Dr. Maxwell Adams, professor of chemistry of the University of Nevada here. He bases this belief on his recent experiments with the essential oils of certain desert plants. These oils serve as a protection against the extreme heat of noon-day and the chill of night.

The vapor of the oils which give plants their odor absorbs more heat than ordinary air, he says. Rose oil absorbs thirty-six times as much heat and anisol 352 times as much. By surrounding itself with a layer of such odor filled air, the plant reduces the amount of heat which reaches it in the daytime and also obtains a sort of air blanket to protect it against the chilly desert night.

Not only this, but air filled with the vapor of essential oil also hinders the passage of water vapor from the plant, as water containing small amounts of the oils evaporates more slowly than pure water. Fifteen experiments showed that one drop of oil added to fifty cubic centimeters of water caused the evaporation to be one-fourteenth less than that of pure water.

These oils are not found in desert plants only, although these plants are especially rich in them, many of the leading commercial products of this sort coming from the arid region growths. This led Dr. Adams to the investigation of the subject. Such trees as pines, while native of moist regions, are very odorous;

but they are also drouth resisting, he points out.

Fragrant odor of flowers is most often explained as an attraction to insects which carry the pollen from flower to flower, but the occurrence of odorous oils in the wood and bark of plants cannot be explained in this way. Even in the case of flowers in moist regions, it is probable, he thinks, that the odor may serve to retard evaporation and lengthen the pollenization period.

The occurrence of essential oils is not peculiar to the plants of the arid parts of western America but those occurring in other arid districts are rich in oils. Eucalyptol, frankinsense, cardamons and other oils of commerce come from the arid regions. Wormwood, lemongrass and other plants which are cultivated for their oils originated in the arid districts. It is true that many plants notably the conifers, are indigenous to the humid regions, but many of the pines are drouth resisting. *Pinus monophylla* is found on the dry mountain ranges of southern Nevada and *pinus sabiniana* grows far down on the foothills bordering the Sacramento and San Joaquin valleys of California.

CAN BANISH BOVINE TUBERCULOSIS

Washington. Within ten years over half this country will be free from cattle tuberculosis predicts D. S. Burch, Bureau of Animal Industry, U. S. Department of Agriculture. Results of five years' testing indicate that this disease can be completely eradicated, he claims. In 42 percent of the country less than one percent of the cattle are tuberculous. In certain scattered dairy districts, however, more than 25 percent of the cattle are believed to be tuberculous. The aggregate area of these tuberculous regions amounts to 50,000 square miles. Four hundred counties have already been freed from tubercular cattle and it is believed that by proper administrative measures that the entire United States will eventually be free from this cattle disease.

STUDY
SPEEDS SNAIL BY
AIRPLANE FLIGHT

Washington. Four days flight in an airplane has advanced by one year a study of land snails which is throwing great light upon the processes of evolution, according to Dr. Paul Bartsch, engaged in research for the Smithsonian Institution and the Marine Biological Institute.

Snails of a species called the cerion were transplanted from the Bahamas, Porto Rico, and Curacao to the keys of Florida about ten years ago. Later these were crossed with the native land snails with remarkable results, says Dr. Bartsch. Not only do the offspring show all sorts of individual variations, but characteristics so different from the parent stock are developed as to give them the appearance of entirely new species. The experiments throw considerable light on how new species are evolved and demonstrate that heredity and not environment is the determining factor.

By the use of a Navy plane, Dr. Bartsch was able to fly over the keys and chart upon his maps the position of the little grassy meadows where the native cerion makes his home. In this way, he estimates, a year's toilsome exploration by land and water was made in four days of investigation by air.

FINGER NAILS TELL DOCTOR
PAST ILLNESS OF PATIENTS

Baltimore. Police find finger-prints an infallible guide to identification, but finger nails carry a record of importance to the doctor.

"The hypersensitive nails are mirrors which reflect the disturbances of nutrition which fever and constitutional diseases have produced in our body", says Dr. William H. Rosenau of this city after a study of many cases in Vienna and at Johns Hopkins Hospital here.

"Small superficial depressions varying in size from that of a pin point to that of a pin head occur after about 95 percent of the cases of acute rheumatic fever and St. Vitus' dance, particularly when heart complications are present," he says. "These changes are temporary and may disappear to reappear after a recurrence of the same disease or some other infectious disease. A certain area of the tissue of the nail root is thrown out of function temporarily by the onset of the fever and five weeks or more later these little depressions are seen on the nail. This period corresponds to the time required for the part affected to grow out from beneath the skin. One may see these changes as late as fifteen years after the last attack of rheumatic fever."

On the average a nail completely renews itself in 105 to 106 days. In the child it grows within from eighty to ninety-six days and in the adult in from 120 to 132 days. The growth is more rapid in grown people than children and slowest in old age. On account of its smaller size, the child's nail is renewed in a shorter time than the adult's although it grows slower. Nail growth is more rapid in summer than in winter. Seven-tenths of the cases of active tuberculosis also show these pits, but they are often associated with grooves.

COLLEGE STUDENTS LEADING MORE HYGIENIC LIVES

Washington. American college students are leading more hygienic lives and avoiding practises that injure their health. This is the consensus of opinion of sixty-five college presidents as expressed in answer to a questionnaire sent out by the United States Public Health Service and the United States Bureau of Education.

The college student of today, they claim, realizes more fully than the student of an earlier day the dangers and severe risks to health involved in promiscuous sex relations, and as a consequence is much more circumspect in his conduct and has,

on the whole, a more enlightened attitude toward all sex matters.

In explaining the forces responsible for this change the presidents specify a number of factors which they consider as paramount in influencing the sex life of the young man in college. The effective forces, loosely classified, are, first, education, both popular and academic, in matters of health, with an increasing emphasis on the hygiene of sex and venereal diseases; second, a more active concern on the part of the college in the physical well being of its students, including increased opportunities for physical training and play activity; third, improvement in environmental factors, such as the elimination of the saloon and the suppression of prostitution; and, fourth, the influence of coeducation upon the "atmosphere" of the college.

NEED DATA ON THE FISH IN THE SEA

San Pedro, Cal. How many fish are in the sea? Are we catching them too fast? Can we keep up our Friday diet on other days and be sure that the taste we are cultivating will continue to be satisfied? Nobody seems to know, Will F. Thompson of the California Fish and Game Commission has told the American Association for the Advancement of Science.

He thinks we are taking long chances by not finding out and wants biologists to get accurate figures on the subject. We can not continue to double the catch every ten years without reaching the limit some time, and we ought to know the reasons why a whole lot come to net some time and not so many the next. The weather and ocean conditions have a tremendous effect as well as other natural changes which have nothing to do with over-fishing. We ought to know how fast they grow, and where they go when they are not here.

The biological facts most needed relate to the rate of growth, the migrations, and the causes of variations in abundance of the fish. The taking of experimental catches by special apparatus has proved both expensive and futile, he claims, and the commercial catches furnish the best evidence.

(A Chat on Science)

ATOMS OF LIGHT

By Dr. Edwin E. Slosson

The discovery of the X-rays in 1895 acted like the discovery of gold in an unexplored country. It opened the way to the exploration of a field of unsuspected wealth of new knowledge and to the radical reconstruction of some of our time-honored and fundamental conceptions. It opened up to us the atom, the ne plus ultra of the chemist, and showed within it a system of revolving bodies far more numerous and complicated than the solar system. Already our knowledge of these electrons, whose existence was unsuspected a few years ago, is greater than our knowledge of the molecules, and we can study them with much more facility because they carry charges of electricity which betray their presence in the minutest number. A single electron can be detected while the smallest number of gas molecules which can be discerned with the spectroscope is about ten million million.

The tendency of the times is to extend the atomic theory into new fields, to speak of atoms of electricity, of energy and of light. The corpuscle, the smallest known particle of negative electricity, is only one seventeenthundredth the mass of the atom of hydrogen. The smallest unit of positive electricity on the other hand seems to be equal to the atom of hydrogen. It is possible, however, that this positive particle may be a complex of many positive and negative particles and that the individual positive corpuscle when isolated as the negative one has been may prove to be equally minute.

The discovery of the enormous stores of energy compact in the atom in the form of the electrostatic potential energy of its negative corpuscles gives one a peculiar sensation. It is like finding out that there is a barrel of gold and a dynamite bomb in the cellar of the house. But a gram of hydrogen would be capable of developing more heat than the burning of thirty-five tons of coal.

Since energy is wealth we have everywhere enough to make us all rich "beyond the dreams of avarice" forever, but we have no way of unlocking this storehouse. This may be fortunate for us since Professor J. J. Thomson of Cambridge says, "if at any time an appreciable fraction were to get free the earth would explode and become a gaseous nebula". Professor Thomson, in compensation for our natural disappointment at being frightened off these preserves by such a terrifying spring-gun, reminds us that on every sunny acre 7,000 horse-power of radiant energy from our solar dynamo is going to waste and that it is neither impossible nor dangerous to utilize it.

NEWS OF THE STARS

The Heavens 25,000 Years in the Future

By Isabel M. Lewis,
of U. S. Naval Observatory

About 9,300,000,000,000 miles. That is the distance that will be traveled in the next 25,000 years by our own particular star, the sun, and its planets, including this small world of ours, in their journey through the universe. In the meantime other stars, possibly attended by other worlds, will also have moved equal or greater distances through space in various directions.

What effect will these motions of the heavenly bodies with respect to one another have on the scenery of the heavens as we view it from our rapidly moving world? We say rapidly moving for twelve and a half miles per second, one million miles a day, or four times the distance from the earth to the sun in a year, seems to us a pretty fair speed for the solar system to maintain century by century. Yet the majority of stars in the vicinity of the sun are traveling on the average at nearly twice this rate and a few exceptional stars are moving with velocities of between one hundred and two hundred miles per second.

It has been estimated that the average first magnitude star moves in one year about one fourth of a second of arc across the heavens. If we multiply this by twenty-five thousand we find that the result is about one and three-fourths degrees. The angular diameter of the moon is one half of a degree so the average first magnitude star moves a distance across the heavens equal to about three and a half times the angular diameter of the moon in twenty-five thousand years. This is of course sufficient to change appreciably the outlines of the principal constellations as they appear to us today. In general, however, the first magnitude stars are the nearest and stars of fainter magnitudes are moving as a whole less rapidly across the line of sight. The average annual motion across the line of sight of a sixth magnitude star, for instance, which is the faintest star visible to the naked eye is only one-twenty-fifth of a second. In twenty-five thousand years then an average star of the sixth magnitude moves a little over one half the angular diameter of the moon. The displacements of stars of the second, third, fourth and fifth magnitudes would lie on the average between the limits given for the first and sixth magnitude stars and would be quite sufficient to modify considerably the present appearance of the principal constellations which are outlined chiefly by stars of the first four magnitudes.

In speaking of the angular motions of stars across the line of sight we have been careful to refer to the average stars of each magnitude for individual stars of a certain magnitude are often exceptional in this respect. Some stars of great brilliancy such as Canopus and Rigel are moving very slowly across the line of sight while others such as Arturus and Sirius have sensibly changed their positions in the heavens in the past two thousand years. Also certain stars of the sixth magnitude or fainter known as runaway stars are moving at such high velocities across the line of sight that in twenty-five thousand years they will be many degrees from their present positions. The most noted of these stars is an eleventh magnitude star discovered by Prof. E. E. Barnard at Yerkes Observatory in 1916 that is moving across the line of sight at a rate that will carry it entirely around the heavens in a period of about 130,000 years. This star is also the second nearest star to the solar system. Very few of the stars will change appreciably in brightness in a period of 25,000 years for the distance we travel in this time amounts to only one and a half light years and within a radius of fifteen light years of the earth there are but twenty known stars. Only in the nearest of these would we note any marked change in brightness.

Radio News of the Week

POWERFUL ANNAPOLIS RADIO
HAS IMPROVED ANTENNA SYSTEM

Washington. wireless
Annapolis, the government's most powerful/station,
has recently had two more large towers added to its antenna system. Now the power-
ful Navy station is nestled beneath a huge rectangle of six towers, 600 feet high,
enclosing an area of 2,000,000 square feet.

The towers are triangular self-supporting steel structures and the four towers originally provided were spaced on a square with the station in the center. So great however is the available energy of the arc generators that a larger antenna system was required to absorb it. This present tower arrangement embraces the greater portion of Greenbury Point including farm buildings, orchards, alfalfa fields and a hog farm operated by the Navy Department.

Not the least of the problems arising from the enlarged tower enclosure was the design and erection of the antenna system. The antenna system not only must be strong enough to support its own weight of seven tons under all conditions of the elements, but must be arranged for ice removal by electrically heating the wires. Were this provision overlooked, an accumulation of 100 tons of ice on the twelve miles of antenna wire would overstress the towers with disastrous consequences. To prevent this contingency the antenna, by simple connections is made in effect a gigantic electric toaster from which all ice may be melted in a few minutes time. But it takes power to do this - two thirds of the station maximum generator capacity of 750 KW is required, enough to operate a thousand electric toasters of domestic size or 12,500 forty watt lamps.

The aerial wire itself is a curiosity. Like the wire used by amateurs it is of silicon bronze in seven strands. Each strand, however, is of the No. 12 wire,

the seven making a cable greater in diameter than the rope by which most antennas are hoisted, and having a tensile strength of more than a ton. Each wire is secured at the far end of the antenna, and is then run through specially designed pulleys at the intermediate supporting cables which are known as "triatics". The antenna wire tensions are adjustable by turn buckles located at an anchor block at the station end. The antenna wires are supported by porcelain insulators nearly six feet long, and the "triatics" or cross cables, by double porcelain strain insulators eight feet long overall and weighing nearly 300 lbs.

The aerial system at Annapolis, considered among the most efficient ever erected at a high power radio station was designed and erected by H. E. Hallborg, radio research engineer of the Navy Department under the general supervision of Commander S. C. Hooper, head of the radio division, bureau of engineering.

MAYA CALENDAR WILL FIX ANCIENT AMERICAN DATES

Rio de Janeiro. Prehistoric ruins in America will soon be accurately dated. This was the opinion expressed in an address on "The Chronological Yardstick of Ancient America" by Dr. Sylvanus G. Morley of the Carnegie Institution of Washington, before the Twentieth International Congress of Americanists here.

Dr. Morley's "yardstick" is the marvelous Mayan calendar by which the ages of the ancient cities of Guatemala and Yucatan will eventually be determined more accurately than the ages of the cities of ancient Egypt, Babylon, and Greece ever can be known because of the extraordinarily accurate character of the ancient Mayan calendar.

There was a desultory trading in Mayan pottery carried on with the peoples in Mexico, Peru, and the southwestern United States. This pottery found among these

other peoples and its Mayan date determined by comparison with similar pottery in Central America may lead to an approximately accurate date being set upon the cliff dwellings of the United States and ruins in Peru and Mexico, Dr. Morley thinks.

He also told of his researches into the great walled city of Tulum in Yucatan. The walling of a city was exceptional in Central America and this fortified town on a bluff overlooking the Caribbean Sea with a wall on the three land sides represents the crude work which followed the breakdown of the great Mayan civilization in the 15th Century after Christ when these early city-states fell to fighting their own race.

CANADA TEACHING APPLES TO THRIVE WITHOUT FURS

Ottawa, Canada. "Ultimately we shall be able to offer the settler of the northern great plains a number of varieties of apples of good quality and sufficiently hardy to withstand his trying conditions," says E. S. Archibald, Director of the Dominion Experimental Farms, in discussing the efforts which are being made to improve this fruit for the more severe districts.

"It is the work of many life times," he holds, "but if each generation can but add its little quota of progress, what appeared impossible forty or fifty years ago will become an accomplished fact."

This work was begun in 1890 when 3000 trees, grown from seed imported from Russia, were planted. Several varieties have resulted from experiments since then. Rosilida, a cross between Pioneer and McIntosh, and Wapella, a cross between Pioneer and Northern Spy, are the best of these and if they prove hardy for the Northwest, will mark a permanent step in the development of satisfactory apples for the prairies where it was impossible to grow edible fruit. By careful selection and testing a list of varieties may be created.

BIRDS FAR SURPASS
MAN IN AIR FLIGHTS

Washington. The Sampaio-Correia, giant man-made sea bird winging its way to Rio de Janeiro has as competitor a true bird, the duck. A recent report received by F. C. Lincoln of the Biological Survey tells that a blue wing teal banded in Lake Scrugog in Canada sixteen miles from Lake Ontario was found in Trinidad two months and seven days later, having covered the 3,000 miles in that time. It covered a route similar to that taken by the S-C.

It has been thought formerly that the ducks whose breeding place was in Canada made their winter home in our Southern states while the ducks of Nebraskan game regions were the ones which migrated to South America. The flight of this blue wing teal, however, would seem to indicate that the Canadian water fowl make a flight which outstrips that of our western ducks.

Although the migration of birds has been studied for over thirty years, it was not until recently that individual bird flights have been accurately followed on an extensive scale by banding.

But the champion long-distance migrant of the world is not the duck but the arctic tern. Its winter and summer residences are a mere 11,000 miles apart. It breeds on the south coast of Greenland and on northern borders of North America as far north as it can find land on which to build its nest, and in winter wings its way across the two Americas to far beyond Cape Horn as far south as there is open water to furnish it food. The tern makes a round trip of 22,000 miles each year.

Many North American birds take an annual trip to South America. Most of them follow a route which necessitates a flight of 500 to 700 miles across the Gulf of Mexico. A few, however, enter South America by way of Florida and the West Indies, while in fall the golden plover flies over the ocean from Nova Scotia to South America a distance of 2,400 miles.

No. 73.

DO YOU KNOW THAT -

The first of the month comes three times a day on Mars as one of its moons makes three complete revolutions around the planet in one Martian day which is about one-half hour longer than our day.

The first device for the mechanical manipulation of figures was a consecutive number machine invented in 1650.

A minute fragment of connective tissue cells of a chicken isolated by Dr. Alexis Carrel ten years ago is still growing as rapidly as ever and has passed through 19,000 generations.

Although a greater part of the inhabitants of the Red Sea district of Arabia are herdsmen and shepherds deriving a constant supply of milk from their flocks and herds, condensed milk is always in demand in their larger cities.

DO YOU KNOW THAT -

If all our cane sugar had to be raised in Maine it would cost about a thousand dollars a pound, as the cane there grows only a few feet high and is not sweet.

A waterfall is hotter at the bottom than at the top -- the falling particles of water, on striking the ground, generate heat.

It is claimed that the African elephant can charge for a short distance at the rate of fifteen miles an hour.

Small Chinese firms have found it cheaper and more efficient to hire a truck to do their hauling than to employ the necessary number of coolies.

DO YOU KNOW THAT -

The largest single consignment of electrical apparatus ever made in the world was recently shipped to Chile for use by the Chilean State Railways which are to be completely electrified.

Beavers destroy the fish productivity of many streams by building dams which make the water too warm to be congenial for cold water fishes and also block the fishes way to the natural spawning places at the headwaters.

The sixth magnitude star is the faintest seen by the naked eye. A fifth magnitude star is two and a half times as bright as the sixth.

Algerian sheep are being shipped into France in great numbers on account of continuous drouth in northern Algeria which is rendering pasture lands insufficient to keep sheep alive.

DO YOU KNOW THAT -

French government weather forecasts received in the various communes by radio from Eiffel Tower three times daily may be transmitted to the farmers in the fields by a code of sound signals from church bells.

Halley suggested, and succeeding astronomers evolved, the discovery of the method of ascertaining the sun's distance from the earth by means of the transit of Venus.

The water power of Swedish streams is estimated at 6,750,000 horsepower.

Aviation insurance covering all classes of travelers in airplanes is procurable in Germany.

DO YOU KNOW THAT -

The small pineal body which arises from the middle of the human brain is believed to be the remnant of a third eye which animals had in the tops of their heads millions of years ago.

The Government of Guatemala manufactures vaccine and vaccinates cattle and hogs against cholera and other diseases.

Thomas Cochrane, who took out the first patent for the application of compressed air to tunneling in 1830, served in the British navy, later was a political reformer in Parliament, speculated heavily in stocks, was convicted of fraud, and escaped from prison.

The Colorado potato bug, dreaded in Europe for almost 50 years, has just made its appearance in France.

DO YOU KNOW THAT -

If the practically illimitable interior energy of the atom could be liberated and controlled, we would not have to worry about the steadily decreasing coal supply.

In one half-hour fifty acres of fruit trees overrun with caterpillars were recently sprayed from an airplane more cheaply and effectively than possible by other methods, according to an English report.

A branch of the Mexican Medical Association will celebrate the 100th anniversary of the birth of Louis Pasteur, the French scientist, by awarding prizes to local physicians for the best papers on local diseases.

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FRAGMENTS OF SCIENCE

We find, at the top of each class of animals, the ants, the parrots, and the monkeys, all combining the greatest sociability with the highest development of intelligence. The fittest are thus the most sociable animals, and sociability appears as the chief factor of evolution, both directly, by securing the well-being of the species while diminishing the waste of energy, and indirectly, by favoring the growth of intelligence.- Prof. J. Arthur Thompson.
