

NEW DISCOVERIES



ALL OVER THE EARTH

How Volcanic Fogs and Sunspots Make Cold Weather

A New Explanation of the Unseasonably Low Temperature Such as We Have Had This Spring

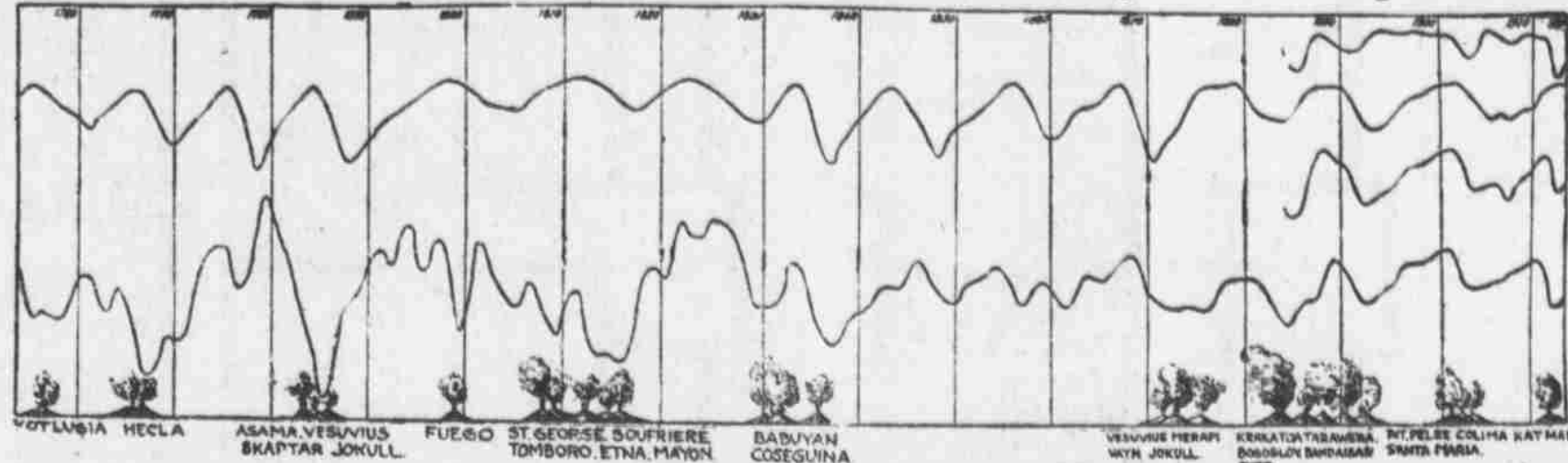


Diagram Showing the Most Important Active Volcanoes and Their Effect Upon the Heat We Get from the Sun. At Top Are Year Dates. Highest Irregular Line Shows Total Amount of Rays Received from the Sun. Next Line Below Shows the Increase and Decrease of Sunspots, Formerly Thought to Have a Decisive Effect on Earth's Temperature. Third Line is a Combination of These Two. Fourth Line is the Actual Variation of Temperature Recorded on Earth. At the Bottom Are the Great Volcanic Eruptions. The Falling of Temperature Shown After Each Eruption Indicates That They Have Shut Off the Sun's Heat in Combination with the Sunspots.

SCIENTIFIC experiments have now proved that the dust thrown up by volcanoes plays an important part in cutting off the sun's light from the earth. Since the terrible eruption of the Taal, the great volcano on the Island of Luzon in the Philippines, four new volcanic eruptions have occurred in the Pacific Ocean. They are those of the volcano Fama, in Japan, on May 8, 1912; of Mount Katmai, in Alaska, on June 6, 1912; of Ambrym, in the New Hebrides, and of Sakurajima, in Japan. The eruption of Katmai, one of the greatest ever recorded, has been made the subject of very thorough observations by Professor C. G. Abbott at Mount Wilson, in California, and by Professor E. Fowle at Bassour, in Algeria. The dust from the volcano was scattered entirely round the world.

other words, about one-fifth of the rays from the sun that entered the outer limits of the earth's atmosphere never reached the earth. In addition, observations with the new and ingenious instrument called the "spectroholometer" showed that the loss was particularly great in the infra-red region of the spectrum. The spectroholometer shows the proportion of heat carried by each color of the spectrum in a ray of sunlight.

The use of the spectroholometer is stated to have proved, among other interesting things, that the particles thrown into the air by the volcanic eruptions were larger than the corpuscles which produce the ordinary appearance of blueness in the sky. The blueness is due to the interception of rays from the violet end of the spectrum. The diminution of the transparency of the atmosphere was not confined to any particular locality, and was not much greater in the vicinity of the volcanoes than in places thousands of miles away. During the eruptions the sky presented a foggy appearance at every part of the globe.

The appearance was similar to that known as a "mackerel sky," although there were no vapor clouds. Similar suggestions concerning the loss of solar heat due to volcanic eruptions had been made before, but never was such positive evidence of the fact offered as after the Katmai eruption. Professor M. E. Marchand, working at the Pic du Midi Observatory, in France, noticed a diminution of solar radiation lasting from December, 1902, to February, 1906, following the eruption of Mount Pelee volcano, in Martinique. The quantity of heat received from the sun is also greatly affected by the spots which are periodically seen on the surface of our luminary. In proportion as the number of sunspots increases the amount of heat received diminishes. In order to make a calculation of the total amount of heat received, it is necessary to make a combined curve of sunspots and volcanic eruptions.

so many varying influences that general conditions are often completely hidden by secondary local causes. Temperature can therefore be only accurately determined from an observatory at a considerable altitude. Many scientific observers have shown that temperature on the earth shows a periodicity corresponding to the sunspots and that it reaches a maximum once in eleven years at the period of minimum sunspots. It is found, however, that the decrease of temperature is greater than would result simply from the reduction of solar radiation caused by sunspots. Therefore, it was argued that the sunspots are accompanied by some secondary phenomena which affect the terrestrial temperature. Professors Abbott and Fowle endeavored to find out whether by making a curve showing the influence of sunspots and volcanic fogs combined they could not obtain a closer correspondence between solar phenomena and terrestrial temperature.

They worked out one curve, the uppermost in the accompanying diagram, which is the regular curve of solar radiation for the period 1880-1910. The next curve is that of sunspots according to Professor Wolter. The third curve is a combination of the two preceding. The lowest one represents the actual course of temperature on the surface in the United States. Although the curves of sunspots and surface temperature show a general resemblance, they also show many points of divergence. For instance, the maximum of sunspots was greater in 1893 than in 1883 or 1906. The temperature curve, however, shows a general increase for the period of 1893. Similarly the temperature began to decrease in 1890, although the sun was at an epoch of minimum spots and began to rise again in 1892, when the spots had not yet attained their maximum. The other parts of the curves display similar discrepancies. If, on the other hand, we compare the combined curve of sunspots and volcanic fogs with the average of maximum temperature for the United States, the correspondence becomes more striking.

ALL INSECTS Are MAN'S ENEMIES

SCIENCE has discovered that in the insect world there exists an instinct to spread disease. It is this instinct which makes every insect an enemy of the human race and constitutes one of the greatest dangers that threaten mankind. Mosquitoes have the instinct to spread vicious malaria, yellow fever, blue tongue, and dengue fever. Infantile paralysis is spread by the instinct of some insect not yet identified with certainty. The housefly was long suspected, but has now been declared not guilty. The occasional and widely separated occurrence of infantile paralysis is proof that an insect of some sort scatters it; and so is the fact that it is a rural malady and occurs chiefly in the summer, when insect life is at its highest. Some scientists believe that it is spread by a tick.

jaundice among dogs and man. The brown tick instinctively gives African East Coast fever to men and cattle. The Cape Town tick causes another malignant fever. The red tick causes three different diseases. The tsetse fly causes fatal sleeping sickness to man and beast. Fleas carry plague, the bedbug is accused of leprosy; the sandfly is blamed for pellagra. The housefly kills babies and children and is an instinctive enemy of man through being the abode of the typhoid germ. Dr. Frederick Knob says that it is only recently that zoologists—doctors have neglected the whole matter—have recognized this insect instinct to kill off their human enemies by diseases which do not hurt the insects themselves. Disease microbes and insects have a co-operative, socialistic working agreement by which they are able to help each other along at the expense of higher forms of animal life. Since the discovery that blood-sucking insects welcome into their bodies these vicious bacteria of sickness and death, it has devolved upon men to start an eternal war of extermination against all insects, whether they simply crawl and eat or whether they suck blood. All of the insects which become associated with higher forms of animal life welcome disease germs into their tissues in order that they may gratify their instinct to spread disease among men. It is a question now whether man or insects shall survive. What the fate of the human race would be did we possess the disease-spreading instinct which insects have so strongly developed is too horrible to contemplate. Persons who refuse to be vaccinated to prevent typhoid, diphtheria and other diseases have almost the equivalent of this instinct of the insect world, but, fortunately, they are only a small minority of the human race.

How We EAT 8,000 TONS of CAFFEINE a Year

RECENT investigation has shown that (with the exception of the English) Americans are the greatest consumers of caffeine in the world. Most of it we take in the form of tea and coffee. Caffeine is an alkaloid of coffee. It is the stimulating agent in the beverage made from that berry. But it is also the stimulating ingredient of tea. The per capita consumption of coffee in the United States is six and a quarter pounds annually. In England it is only about one pound. But the English are much greater tea drinkers than ourselves, consuming over five and a quarter pounds of the herb per annum, whereas we use less than two and a quarter pounds. Strange though it may seem, tea leaves contain much more caffeine than does coffee. Coffee beans rarely have more than one and a quarter per cent of caffeine (usually less), whereas ordinary tea, as one buys it at the corner grocery, contains three and a third per cent of caffeine. The younger the tea leaves the higher the percentage of caffeine in them. In the youngest leaves it runs up to nearly five per cent. Inasmuch as the small, new leaves make the best tea, it follows that the higher price you pay for the herb the more caffeine you get per pound. Our per capita consumption of the drug caffeine taken in the form of coffee, 678 grains per annum. Taken in the form of tea, it is 462 grains. This makes a total of 1,140 grains of caffeine per annum for every man, woman and child in coffee and tea alone. There are 7,000 grains in a pound avoirdupois. Thus every American consumes one-seventh of a pound. Estimating the nation's population at slightly

more than 100,000,000, this makes a total annual consumption of nearly 15,000,000 pounds of caffeine, or almost 8,000 tons. England's annual consumption of caffeine is 1,180 grains. Holland comes third, with 1,002 grains. France is next, with 637 grains; then Germany, 508 grains; Switzerland, 505 grains; and Russia, 246 grains. This reckoning, however, includes only coffee and tea. Most people will be surprised to learn that we consume a good deal of caffeine in the form of chocolate and cocoa. The chocolate bean is not nearly so rich in caffeine as the coffee bean, but it contains a considerable percentage of the drug. We eat and drink in this country immense quantities of chocolate and cocoa—the latter being simply chocolate that has been deprived of most of its fat. The presence of caffeine helps explain why chocolate is so useful as a stimulant. It is, of course, one of the most highly concentrated of

foods, and all foods are stimulating. But the caffeine it contains doubtless helps a lot. Persons who are trying to get rid of the liquor habit find that chocolate quells the craving for alcohol to some extent; and the chocolate habit, which is harmless enough, may itself be not easy to leave off. The kola nut of Africa is rich in caffeine. So, likewise, are two South American plants, the "yerba mate," which furnishes a widely-used kind of tea, and the "guarana" of tropical Brazil. The latter is a climbing vine, and its caffeine is contained not only in the leaves and young shoots, which are dried for use, but also in the seeds, which are crushed, roasted, rubbed to a paste with water, and dried. These, it is believed, are the only plants in the world that contain caffeine. All of them have been known and utilized for many generations—which affords an interesting illustration of man's cleverness in discovering things useful to him.

CARBON to Take the Place of ICE

THE iceman may soon be a thing of the past and the type of refrigerators and cold storage plants now in use may all be discarded. This is what Igor Hisslaive, a Belgian chemist, predicts as the result of experiments he has been conducting with a view to finding a substitute for ice in the preservation of food by cold. Carbon is the substitute Professor Hisslaive has at last hit upon and he believes it offers a great many advantages over ice.

Under the new method, the food to be preserved is exposed to the fumes of specially prepared tablets of carbon. This vapor coats the surface of the food with an invisible film, thus effectually preserving it from the oxidation of the air and arresting putrefaction. The food treated remains for months in exactly the same condition, and it is said that it may be safely kept in any temperature thereafter. In applying the vapor it is necessary that the food shall first be placed in an air-tight chamber. Then the vapor is passed over it, and in a few moments the embalming has taken place. The vapor is obtained from the melting at 170 degrees Fahrenheit of a white tablet about the circumference of a twenty-five cent piece, but about four times as large. Ten different ingredients, that combine to produce a vapor of the purest carbon, go to make up these tablets. Before the preserved food can be eaten the carbon must be expelled, and this is accomplished by heating in the oven or boiling.

Why We Should Drink Goats' Milk

EXPERTS of the United States Department of Agriculture are urging us to raise more goats and to drink more of their milk. That there is money in goat raising can be seen from the fact that every year we import from other countries nearly thirty million dollars' worth of goat skins. And there is ample scientific authority for the statement that goat's milk is not only the most economical but the most healthful milk we can drink. Milk is furnished much more cheaply by the goat because the yield, when the size of the goat and the amount of feed and care are considered, is proportionately much greater than the cow's. Goat's milk is also far richer, more nutritious and more easily digested than cow's milk. Aside from its greater degree of richness there is no appreciable difference in its appearance or taste. Most important of all is the fact that the goat is the only dairy animal that is practically immune to tuberculosis. Its milk can be drunk

freely without risk of taking into the system at the same time the germs of this dread disease. According to Dr. W. Sheldon Bull, of Buffalo, there is hardly a part of the United States where goats would not thrive. While it is true that the ideal locality for goats is one that is high and rocky and overgrown with weeds, briars, brush and small trees, as they are by nature and preference browsing animals, in this respect being an exception to all other domestic stock, it is a fact that such a location is not essential. The milch goat will thrive and produce a plentiful supply of rich milk when tethered on grass land, in addition to stall-feeding, if comfortably housed at night and during bad weather, or even when kept constantly in a barn and supplied with all its rations there. This adaptability to confinement, together with its productiveness, makes the milch goat particularly valuable to the residents of cities and suburban places who desire to secure a regular supply of pure, new milk, without being dependent upon the milkman, whose "milkman's milk" is not always of the best quality and which, under the most favorable circumstances, is received and consumed with more or less suspicion as to its freshness, its cleanliness and its healthfulness.

When you buy ham, and it is hard and salty, try soaking it sliced in milk overnight. On Your House Plants. SOOT water is a good fertilizer for house plants during the Winter and will make them blossom. When a Jar Won't Open. IF a glass jar refuses to open, set it top down in an inch or two of hot water. This Good Health Hint. DON'T forget that microbes are apt to lurk about the mouth of the milk bottle. It should be carefully wiped off before the milk is poured out.

Where KING SOLOMON Got the GOLD for His TEMPLE

THE coast of southeastern Africa is not usually regarded to-day as a region of any especial interest. It mainly belongs to the vast undeveloped territory of Portuguese East Africa. The interior is wild and thinly inhabited, nor, apart from their political position and their rather trifling commercial importance, are the towns—Sofala, Mozambique, and their fellows—especially inviting places. Nevertheless, there is much that is of great, perhaps supreme, interest in this more or less derelict territory. It is certain that it has been in the past of great commercial importance. This is by no means an unparalleled phenomenon in history. The decayed town of Novgorod in Russia was once the emporium of northeast Europe; the awful desert of Mekran in Baluchistan has been a great trade highway. There is ample evidence that the region behind Sofala, part of which is now known as Mashonaland, was anciently of vast importance owing to its gold mines. It contains a remarkable series of

ruins, mostly, as is plain from the evidence afforded by them, those of gold-mining centers. One of these deserted settlements is tolerably well known under the name of "Zimbabwe," but it is only one of many. Concerning the people who built these settlements and exploited the mineral resources of this still aridiferous region there has been much controversy. So much seems certain, however, that they were not an African race. This at once rules out the Egyptians. The almost entire lack of artistic objects and their very poor character might seem to point to Phoenicians, but since the Cretan discoveries the Phoenicians are being relegated to a lower place in history than they have hitherto occupied, and purely Phoenician enterprise in southeast Africa is highly improbable. The indications rather point to Arabia. The commercial importance of Arabia before the Mohammedan era is certain. The Sabaeans of Yemen might very well have explored the eastern coast of Africa. The distance from Aden to Delagoa Bay is some 3,600 miles less than that from Tyre to the Scillies, and there is really no solid reason against the probability of the accomplishment of such a voyage by Arab seamen; it was merely a matter of lengthy coasting. The goldfields would furnish an irresistible argument for systematic settlement. It is indeed possible that the country is the land of Ophir wherefrom Solomon obtained his gold. We know that the treasure ships

sailed from Eilat-gehir on the Red Sea; we know also that Solomon had relations with the Sabaeans. The voyage was a long one; the ships are said to have come once in three years. This obviously points to a distant country, not to one comparatively near at hand, such as Somaliland. In 1896 a German scholar directly put forward the theory that Ophir was the inland of Sofala; he pointed out that the most important settlement was called Fura. Such comparisons are hazardous, but the facts remain that about 900 B. C. two Syrian kings built a fleet to exploit the gold treasures of a distant land. The geographers of the Roman Empire were perfectly aware of the commercial importance of southeast Africa. Ptolemy names several towns. One he places, of course vaguely, at 18 deg. 25 min. south and calls it Prasilum. The situation corresponds approximately with that of Kilimane at the mouth of the Zambesi. Other trading stations were known. Gold, however, is not mentioned. There is reason to believe that the settlements were then deserted. All show unmistakable traces of having been destroyed by fire, and presumably some eruption of savagery from the interior overthrew them. They were rediscovered about A. D. 1000 by the people of Mogadoko, and again became immensely important, but if they did indeed furnish Solomon with his treasure their older glory will probably always outshine that of later days.

YOU MIGHT TRY-- To Improve Ham. WHEN you buy ham, and it is hard and salty, try soaking it sliced in milk overnight. On Your House Plants. SOOT water is a good fertilizer for house plants during the Winter and will make them blossom. When a Jar Won't Open. IF a glass jar refuses to open, set it top down in an inch or two of hot water. This Good Health Hint. DON'T forget that microbes are apt to lurk about the mouth of the milk bottle. It should be carefully wiped off before the milk is poured out.

How FLEAS Pass from YOUTH to OLD AGE in THREE WEEKS IMPORTANT investigations upon fleas of late have been directed toward the discovery of how long a flea may live. This is more important, if possible, to discover about fleas than it is about flies and mosquitoes. Fleas, too, are bearers of many vicious parasites which disseminate all sorts of diseases. The rat-flea of India, the Philippines, America and other places is the happy hunting grounds of the bacillus which is the source of bubonic plague. The flea of the gopher, the chipmunk, the squirrel, the beaver and the prairie dog also seem to harbor plague bacilli. The British rat flea is the one which has been most carefully studied as to its length of life. It seems to pass through its infancy, schooldays, youth, middle age and senile decay within three weeks. If the days be dark, dreary, damp and hot it lives its allotted span of life in ten days or less. Professors Gautier and Raybaud have just announced their experiments upon the flea that bites the rat in the British Isles. These experimenters succeeded in keeping the militant English flea alive ninety days, on some human blood serum. This is an important discovery in view of the recent government notice that plague bacilli have been found in Havana and other parts of the Western Hemisphere. Moreover, these workers unearthed another startling fact. Fleas placed in ice chambers and refrigerators on no food whatever hopped around quite merrily for forty-one days, much to the surprise of the whole scientific world.

Artists Learn from "MOVIES"

PROFESSOR HENRI BERGSON, the French philosopher, is the latest scholar to declare his respect for the moving pictures and his belief that they are destined to be of inestimable service to mankind: One of the most useful things they have accomplished this year, he believes, is to put artists on the right path and teach them to produce more life-like pictures. "Moving pictures interest me," says Prof. Bergson, "just as do all inventions. The philosopher must keep in touch with the progress of life outside his own studies. Anything that I have been able to add to the sum of philosophical knowledge has been the result of a series of points, memory, like the moving picture film, is a continued flow of images. "Immobility is the state of death; movement is life. Certain students may conclude

—some have already concluded—that life is movement. Is it not a fact that the essence of light, of sound, is vibration? Is not the eye itself a moving picture camera? "The moving picture has put the painters in the right path. You are aware of the enormous revolution caused in painting by the invention of snapshot photography. Artists were able to see that the attitude of a race horse as depicted by them was not correct. They made the correction and here in what happened: Artists produced exclusively figures in which there was no movement, figures expressing no life. Mathematical exactness gained, no doubt, but the impression of truth was lost. "The moving picture came along to show the artists that photography had induced them to fall into error. Continuity of movement must be represented or the moving figure is not depicted. The artist, instead of limiting just one impression, must take a series of impressions, remould them in his imagination and thus arrive at the reproduction of life. "The moving pictures will be above all an inheritance of incalculable value for our successors. What a joy it would be for us if we were able to see, not perhaps Cleopatra, but Napoleon on a film. Already we can have the pleasure of seeing an enormous crowd in movement, a wild revolutionary scene, while placidly taking our ease in an armchair. "The moving picture, in conclusion, while amusing the people in general, will be a valuable ally of the artist, the historian and even the philosopher."

How FLEAS Pass from YOUTH to OLD AGE in THREE WEEKS

Dr. William Meall, an animal psychologist or "behaviorist" announces that the American rat-flea can jump away from the rat—its host, unwilling though it be—and live on air, water, vegetation, or nothing at all for at least one week. Then, like a bareback rider in the circus, it hops upon the back of some unsuspecting, innocent rat. This period of survival is longer in cold temperature and in the light than in warm ones and in the dark. Excessive dryness as well as excessive moisture seems to send fleas to a premature grave. Most worrisome, however, of all these new facts about fleas, so far as sanitary science and the protection of health are concerned, is the discovery by Dr. Meall that unborn embryos and fleas' eggs, will live as long as a year in sawdust, dirt, grain, clothes, brushings and the like.

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