THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

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SLEEPING FLOWERS LEAD TO NEW ANESTHETIC

Flowers that persisted in "going to sleep", curling up their petals when they should have been gaily blooming were the clues to a new anesthetic which Dr. A. B. Luckhardt and J. B. Carter tested successfully as a method of putting animals and men to sleep at the University of Chicago. The flowers were carnations and the gas is ethylene, a constituent of ordinary illuminating gas.

As far back as 1908 florists complained that carnations when placed in greenhouses would "go to sleep" and those which had not opened would fail to do so, causing great loss in their business. Investigation proved leaky gas fixtures to be the cause. Gas contains four per cent. of ethylene and it was shown that one part of this gas in 2,000,000 parts of air caused already open flowers to close. Other investigations showed a similar effect of the gas on other plants.

Dr. Luckhardt and Mr. Carter recently thought it worth while to test the gas as an anesthetic . It was tried first on numerous animals such as frogs, mice, guinea-pigs, rabbits, and kittens who were all put to sleep by it successfully without any apparent after effects of a disagreeable sort. Before testing it on men, the anesthetic was finally "tried on the dog" who went out completely in less than five minutes on a mixture of 90 per cent. ethylene and 10 percent oxygen, and who was up wagging his tail happily three minutes after the gas had been turned off.

The experimenters then tried it on themselves. They describe the effect of the gas mixed with oxygen as exhilirating and giving a sense of well-being. They became unconscious and then subsequently recovered without realization that they had been unconscious. Several students then volunteered. Complete surgical anesthesia with muscular relaxation was produced in a few minutes. Subjects had pins thrust through their arms, were pinched severely enough to leave black and blue areas, and one was beaten on the soles of his feet with a Stillson wrench without any sensation whatever or memory of discomfort.

Recovery was complete in a few minutes. The only after effect was slight weakness and slight nausea. In every case the subject ate a full meal within a few hours after recovery.

It is claimed that the new anesthetic gives loss of sensation long before complete surgical anesthesia is established, that it may be maintained with complete muscular relaxation yet without any sign of asphyxia, shortness of breath, or effect upon the blood pressure; and that there is rapid recovery even after long administration without evidence of after effects.

It is also stated that it would seem to be of value in obstetrical cases as a loss of any sensation of pain is had from a relatively dilute mixture of the gas, and that it may be used in cases in which nitrous oxide or laughing gas would be dangerous.

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CLOSE TO ABSOLUTE ZERO RECORD COLD ACHIEVED

The nearest approach to the absolute zero temperature which has yet been attained has been recently achieved by Prof. H. Kamerlingh Onnes of the University of Leyden, Holland, according to advices received by the Bureau of Standards. The record temperature of 272.18 below zero Centigrade, or as the physicists express it, .82 degrees Absolute, was reached by the Dutch scientist in an unsuccessful attempt to solidify liquid helium. The temperature is equal to approximately 458 degrees below zero Fahrenheit.

At this temperature the liquid helium showed absolutely no tendency to solidify according to the report of Dr. Onnes who expresses the opinion that helium may remain a liquid even at the absolute zero.

This temperature, 273 degrees below zero Centigrade, denotes the entire absence of heat, or expressed in more scientific language, the entire absence of atomic or molecular motion. Heat is due to the vibrations of the atoms. The less heat, the less vibration until, as has been found through mathematical study of the problem, the temperature of -273 Centigrade means the cessation of atomic motion and the entire absence of heat.

Physicists have been trying to attain to this temperature for years because of the bearing that a study of the properties of matter under those conditions would have on the problem of the ultimate constitution of matter. For example, it has been indicated that at the absolute zero the electrical resistance of many if not all metals is approximately zero, or in other words, that although the atoms are entirely at rest, the electrons of which they are composed are free to move without the slightest interference.

According to modern theories an electrical current is a sort of procession of electrons, or particles of negative electricity; and it is supposed that at the absolute zero the atoms settle to rest in some form which leaves absolutely free paths through which the electrons may travel without any interference or "resistance".

Every gas has been both liquified and solidified except helium which has never been reduced to the solid state in spite of years of effort. In Dr. Kamerlingh Onnes' most recent attempt he evaporated the liquid helium in the most perfect vacuum attainable, the pressure at the surface of the liquid being only thirteen thousandths of a millimeter of mercury or about one sixty-five thousandth of an atmosphere. A battery of twelve glass and six iron Langmuir vacuum pumps, connected in parallel, was used to obtain this result.

The previous attempts to solidify helium having produced a temperature of 1.15 degrees Absolute, Dr. Kamerlingh Onnes undertook his latest attempt with the utmost refinement of technic. Although he was unsuccessful in getting any solid helium, he did succeed in getting the lowest temperature ever produced by man. It seems impossible, he states, to get temperatures lower by more than a few hundredths of a degree under those he has now obtained, but he adds, "We cannot accept such a limit otherwise than as a provisional one". The pursuit of the absolute zero will continue.

READING REFERENCES- Becquerel, Jean. Modern ideas on the constitution of matter. Smithsonian Institution, Annual report 1910. Washington, 1911. Ames, Joseph Sweetman. The constitution of matter. Houghton, Mifflin Company, New York, 1913. Hale, G. E. Joint investigation of the constitution of matter and the nature of radiation. Science 55:332-4, March 31, 1922.

Dr. Edwin E. Slosson

CHATS ON SCIENCE

THE SUN CURE

Old Tut-Ankh-Amen who figures so prominently in our daily press was brought up as a unitarian sun-worshiper but later relapsed into the priestly polytheism, which was a pity, for if a pepple must pick its god from natural objects, as the Egyptians in their blindness had to, it is better to take the sun than to adore cats, brocodiles, hippopotamuses and beetles. The sun is quite literally the source of our vital and mechanical energy, the sole support of all life and motion on the earth, as the ancient Egyptian hymn declares, and we are beginning to recognize, perhaps I should say re-recognize, that it may cure diseases too.

For man has a poor memory. He forgets much that previous generations have learned. The Romans used to make great use of the sun for the healing of sores and the maintenance of health. Pliny, in writing about how his aged friend, Spurinna, keeps his youthful vigor, says:

"When the baths are ready, which in winter is about three o'clock and in summer about two, he undresses himself; and if there happens to be no wind, he walks about in the sun. After this he puts himself into prolonged and violent motion at playing ball; and by this sort of exercise he combats the effect of old age."

But we northern races, having to wear thick clothing and stay in warm houses, got out of the habit of exposing our skins to sunshine. The invention of window glass led us astray, for glass lets through all the light that we can see, and we did not realize that it is opaque to the invisible ultra-violet rays which have the strongest effect upon the skin for good or ill. We thought if we had fresh air and sunlight (even though strained through glass) we had all that we needed from nature.

The rediscovery of the curative power of direct sunshine came by accident. In a hospital for rickety children it was found that the child who had the luck to lie in a certain cot exposed to the rays of the sun recovered with amazing rapidity. Thorough experimentation, first on white rats, later on children, proved that rickets could be cured either by sunshine or cod-liver oil. There is no question which remedy the children will take if they have their choice.

Dr. Rollier set up a sanitarium on the sunny Alps of Switzerland where the children work and play all day in the sunshine almost naked, and he reports remarkable cures of tuberculous bones and skin troubles. Similar establishments for heliotherapy have since been started in England and America. The treatment of the patients is begun with two minute doses several times a day and increased by two minutes daily for a fortnight, with protection for the eyes and head. It is necessary to avoid both chill and sunburn. Thin white cotton cloth does not seriously shut out the curative rays.

The aim is to get the skin tanned without being burned. Brunettes fare better than blonds. It seems that the curative effects do not come into play until the skin is well pigmented by exposure. No tan, no cure. When the skin of the greater part of the body is exposed to the direct rays of the sun blood pressure falls and respiration diminishes in rate but increases in depth, so the volume of air inhaled is greater. Sunshine striking the skin expands the capillaries and brings more blood to the surface. The number of white and red corpuscles increase and these promote the healing process. The best results are obtained when the skin is exposed to the unfiltered radiation from the sun and yet kept from overheating by a light breeze or bodily movement. In our winter rooms we get the reverse of this, overheating and no radiation.

If sunbathing becomes a fad it will put the police into the delicate position of having to determine in how far a coat of tan is a proper substitute for other clothing.

PRIMITIVE RHYTHM IN AMERICAN VERSE

By Mary Austin

Mary Austin is author of "The Land of Little Rain", "The Flock", and books based on American Indian Life.

To understand how verse forms become fixed in tribal life we must go far enough back in the period of the Dawn Mind.

Probably man first danced as the buck dances, and the pelican, from the recurrent seasonal urge, the intoxication of the sun coming up from the south and the new growth in the forest, when he was proud of himself or insolent with good feeding.

Thus he discovered that, by the making of rhythmic movements and noises, power comes. The senses are keyed up. That mysterious awareness of his prey, the instant intake and response to the environment, which is traceable to no discoverable sense, but is of the utmost importance to the hunting kind, appreciates. This is a state so satisfying that it invites repetition.

Man learned to resort to the dance when he felt helpless or fragmentary, when he felt dislocated in his universe. As he learned to know such states of psychic completion for states of power, he danced for the sake of the meal or the mate. Who can doubt that the Allness is moved by our signing, since it immediately begins to throb in us as the dance progresses? Will not the corn fill out in the ear even as the soul fills?

In this fashion poetry was first sought deliberately for its effective values. The greater suggestibility of the Dawn Mind makes it more than likely that though there must have been a first singer, the first song, the earliest remembered and reiterated pattern of thumps and vocables was communal.

We have here to take into account - later to come back to - the superior capacity of the Dawn Man for mimesis. One observes it in the false dawn of the ape mind, the flock and the swarm. When one of the great males of the Dawn tribe beat upon his breast with rolling noises, the rest followed. Consciousness is beaten into synchronous waves by the rhythmic impact and the track of the first poetic

line is laid in the group mind. The memory for these things in the group mind is more tenacious than in the mind of the individual. Every now and then when we run together under pressure of emotion, some hundred-thousand-year-old memory rises out of it to swamp all our recent acquirement.

It is probably the subconscious memory of the part played by all our members in this primitive coordination, that gives rise to the intricate variations and embellishments of Afro-American rhythms that go by the name of jazz, rhythms that can only be successfully achieved by unharnessing the body from its civilized inhibitions. In any group of jazz performers you can see the arm jerk, recalling the tortoise rattle, the whole torso quiver with the remembered rolling clash of shells.

The Europeanly derived American is too far from this form of response to make it an item in his own scale of expression. But there can be no doubt that his subjective appreciation of rhythmic form has been immensely stimulated by the new motor complexes, and the stream of new rhythmic impressions flowing to him from the American scene. That some sort of subjective coordination of this immense complexity of impression is what Whitman tried for, what Carl Sandburg, Vachel Lindsay and Sherwood Anderson are occasionally succeeding at, there can be, I think, no question.

READING REFERENCES - Jacob, Carey Franklin. The foundation and nature of verse. Columbia University Press. New York, 1918. Wallaschek, Richard. Primitive music; an inquiry into the origin and development of music, songs, instruments, and dances of savage races. Longmans, Green and Company, London and New York, 1893.

ROCKEFELLER GIFT OF $325,000 TO AID BIOLOGICAL INVESTIGATIONS

The Rockefeller Foundation has pledged $325,000 for biological research fellowships to be administered by the National Research Council over a period of five years, Dr. Vernon Kellogg, permanent secretary of the Council, has announced.

This makes a total of $1,325,000 now available to the National Research Council for the maintenance of research fellowships in various fields of science. Five hundred thousand dollars was recently given the Council by the Rockefeller Foundation and General Education Board for medical fellowships and $500,000 had previously been given by the Rockefeller Foundation for research fellowships in physics and chemistry.

Each of these series of fellowships is administered by a special board of the National Research Council composed of eight to ten of the leading scientific men of the country in the special fields of physics and chemistry, medicine, and the biological sciences. The fellowships are awarded only to men and women of proved capacity for research, who are assigned to universities especially well equipped for the particular investigations to be undertaken.

A new variety of barley which originated from a single plant from a stock of seed imported from the southern border of the Black Sea is now being distributed to American farmers.

Diamonds have been discovered in a district in Dutch Guiana which has yielded gold for over forty years.

The automobile of a few years ago would not run on the present day gasoline since improvement in engine design has made possible the use of the lower grade fuel.

LIQUID OXYGEN IS NEW HIGH EXPLOSIVE

The latest thing in blasting explosives, cartridges of lampblack soaked in liquid oxygen, was given a trial at a quarry in West Virginia recently. The tests were conducted by a representative of a German firm of manufacturers of liquid oxygen apparatus under an arrangement with the U. S. Bureau of Mines. The test was said to have been successful.

The liquid oxygen explosive has a number of advantages over the older sorts. It can be made on the spot, and the cartridge is perfectly safe until after the liquid oxygen has been poured into the hole into which it has been placed. The hole is then tamped and the cartridge exploded. No poisonous gases are set free by the explosion. If the cartridge fails to explode it is not a continuing source of danger but after about 20 minutes the oxygen evaporates from it and it again becomes harmless.

The explosive property is dueto the property of finely divided carbon of absorbing large amounts of oxygen when soaked with it in the liquid state. The cartridge explodes owing to an instantaneous combustion of the carbon in intimate contact with pure oxygen. Each cartridge contains about two ounces of lampblack which absorbs about 7 ounces of the liquid oxygen.

Owing to the expiration of earlier patents for the manufacture of liquid air, liquid oxygen can now be produced cheaply on a large scale. It is made from liquid air by permitting the nitrogen, which evaporates at a lower temperature to boil away, leaving practically pure liquid oxygen. The chief expense of its commercial production is said by manufacturers to be the cost of the steel pressure cylinders, tested up to 3,000 lbs., which are necessary for long distance transportation; but this is overcome when used for blasting by making it at the mine.

The Germans are said to have made much use of liquid oxygen for blasting purposes during the war. It was unsuitable for a military explosive and was used therefore wherever possible in place of the expensive nitrogen-containing explosives which were essential at the front.

PHYSICIANS ESTABLISH POPULAR HEALTH JOURNAL

The first issue of Hygeia, a national popular journal of individual and community health founded and published by the American Medical Association, will appear shortly, dated April.

The issuing of a medical magazine for laymen is considered a progressive step forward on the part of the American Medical Association in its work of placing authentic and interesting medical information in the hands of the public.

Dr. Victor C. Vaughan, formerly dean of medicine at the University of Michigan and past president of the association, heads the board of editors which includes Dr. Morris Fishbein and Dr. Arthur J. Cramp of the staff of the association.

A parasitic insect has been imported from Cuba to help fight the moth of the caneborer which does great damage to sugar-cane in Louisiana.

RADIOPHONE ON 10 METER WAVES

A possible solution of the problem of radio interference on point-to-point communication by means of directional transmission on very short wave lengths has been put forward by the Bureau of Standards as the result of recent experiments.

A parabolic reflector of cylindrical type designed for a 10 meter wave length was used. It was made by constructing a parabolic wooden frame with a 10 meter aperture. The frame was suspended in the air and 40 wires spaced one foot apart were suspended from it. The source located at the focus, consisted of a 50 watt electron tube. The output from the tube was coupled to an antenna, which was a linear oscillator of the Hertzian type, which was tuned to a wave length of 10 meters; the complete reflector system was arranged so that it could be rotated.

The receiving apparatus was located 170 feet from the reflector and consisted of a single turn loop antenna with a thermo-element in the loop circuit. A portable galvanometer was connected to the thermo-element.

Good directional transmission was obtained. With the reflector turned 20 degrees from the direct line to the receiver the received current dropped to one-half of what it was with the reflector directed to the receiver. The larger part of the radiated power was confined to an angle of 30 degrees and there was practically no radiation over an angle of 270 degrees in a general direction away from the direction of the way the reflector was pointing. Good radiophone transmission was obtained over a distance of three miles.

Long distance work on short wave lengths has recently made such rapid strides that American, French and British amateurs are now bridging the Atlantic on 200 meters in code. If point to point radiophone transmission can be developed to carry long distance on very short wave lengths, experts believe it will eliminate much interference and competition with the present broadcasting wave lengths around 360 meters.

UNIQUE SHARK TEETH IN NATIONAL MUSEUM

Agassizodus variabilis, a shark from Kansas, will soon have his once wicked tooth brought to foodless rest in the Un S. National Museum here. Dr. George P. Merrill, head curator of geology, has received as a gift from Dr. Frank Springer the paleontological collections of the late Orestes St. John which contain the fossil remains of this unique fish which chased its prey through a Kansan sea of many million years ago.

The cartilagenous body of the shark disintegrated, but a complete set of teeth, such as has never been found elsewhere, remained in the coal measures of Kansas to tell his story. Dr. St. John gave the name of Agassizodus to his find in honor of the famous Harvard naturalist, Louis Agassiz, who was his teacher.

The St. John collection contains about 3,000 other fishes which inhabited the seas extending over much of the Mississippi Valley in bygone ages.

MYSTERY SKULL SUGGESTS LOST AMERICAN RACE

A prehistoric female from Missouri has created a stir in science circles in Washington. Dr. Ales Hrdlicka, anthropologist of the U. S. National Museum, has just received a deformed skull, discovered in a small cave near Noel, Missouri, which suggests a people earlier than any known Indians of that section and connected with tribes found in South America.

The shape and markings on the skull, Dr. Hrdlicka said, indicate that the deformation was produced by tying a circular band about the head of the newborn infant. Thousands of skulls treated in this way have been found in Peru and Bolivia, but this is the third so far discovered on this continent. The Aymara people, contemporaries of the Inca of Peru and still found in that country, made this head tying a custom.

The treatment of the head in this way, Dr. Hrdlicka pointed out, was to produce a low-browed effect which these people evidently considered superior to the normal head. The pressure caused the head to be low-browed but the growing brain made the skull bulge out toward the back.

This desire for a low-brow probably originated in some religious belief. These people were probably trying to imitate in their young, the head-form of some animal which they regarded as superior or sacred. Later the binding may have become merely a custom associated with the belief in the superiority of the low, long skull.

None of the historic or late prehistoric Indians of Missouri had this head binding custom as far as is known. The fact that one of the two deformed skulls previously found in North America was from Vancouver Island and the other from near Lexington, Missouri, is taken to indicate the wide-distribution of these people, whom Dr. Hrdlicka estimates were here more than a thousand years ago.

Dr. Hrdlicka will not speculate yet on the connection of these skulls with Aymara people of South America, which may prove highly important.

READING REFERENCES- Hrdlicka, Ales. The genesis of the American Indian. Washington, 1917. Hrdlicka, Ales. New examples of American Indian skulls with low foreheads. U. S. National Museum, Washington, 1909.

WILL TAME TURKEY FROM ANCIENT AMERICA

An expedition of the U. S. Biological Survey is to penetrate Central America with the capture of live specimens of the beautiful Honduras spotted turkey as its objective. The result will be the first attempt ever made to domesticate this rare wild bird. Harry Malleis of the Department of Agriculture has left for Belize, British Honduras, equipped for the difficult task of bringing a number of these turkeys to the United States.

It is planned to place these birds on Sapelo Island off the coast of Georgia under conditions which it is believed will be favorable to their propagation. If they prove adaptable to this country, further steps will be taken to domesticate and introduce them.

Officials stated here today that prediction as to the outcome of the experiments could not be made at this time. They pointed to a large number of birds and animals which had upset calculation in the past. The nightingale introduced into this country soon died out, while the English sparrow multiplied rapidly.

The Honduras or ocellated turkey, the range of which extends over only a limited section of Yucatan, Honduras, and Guatemala, has been greatly admired for the brillian ly colored eye-like spots on its feathers and for its excellent meat. It is somewhat smaller than our domesticated turkey, but the taste is said to be similar.

Although it is found in the region occupied by the Mayan who had the oldest and most brilliant civilization on this continent, as far as is known it has never been domesticated.

The expedition will also secure a large number of curassow, a larger turkey-like bird with crested head. If practical, Mr. Malleis will visit Turneffe Island, off the coast of British Honduras and collect specimens of the wild life there. Little is now known of the natural history of this island.

TYPHOID FEVER DEATHS DROP TO LOWEST EVER

The death rate from typhoid fever continues to decline in the larger cities and for the year 1922 was at the lowest point of record, according to the eleventh annual summary of the deaths from the disease published by the American Medical Association on the basis of official repotts from all cities of 100,000 population or more. The total population of these cities, 69 in number, somewhat exceeds 28,000,000 and the total number of typhoid deaths reported was 953 or at a rate of 3.3 per 100,000.

Compared with this were rates of 4.0 in 1921 and 8.1 in 1916.

Generally speaking, the larger the city the lower the typhoid death rate, although the three cities reporting no deaths have neither of them more than 300,000 residents. But every one of the 12 cities with a population of 500,000 or more showed a rate of 5 or less.

Eighteen cities reported rates of 2.0 or less, the three reporting zero being New Bedford, Providence, and Yonkers. The three at the bottom of the list of the 69 are Birmingham, Trenton, and Nashville, with respective rates of 12.5; 15.9; and 16.2.

According to the report, outside infection is coming to bear a more and more important relation to the total number of city cases. Baltimore, for example, reports cases of outside origin as numbering about 35 per cent. of the total. Philadelphia reports 29 per cent. of the cases due to infection outside the city.

The great decrease in the number of deaths from typhoid within recent years can be measured by comparing the current death rates from that cause with those of a few decades ago. The average for the years 1906 to 1910 inclusive for Pittsburg was 65 as compared with 4.6 last year; New York, 13.5 as compared with 2.2; Chicago, 15.8 as compared with 1.0; Richmond, 34 and 4.4; Atlanta , 58.4 and 10.9; Los Angeles, 19 and 3.7; and Portland, Ore., 23.2 and 3.3. These comparisons are typical.

Of the 69 cities reporting, 46 show a diminished and 23 andincreased rate for 1922 as compared with 1921. The increases are generally slight, and the report declares that "it seems reasonable to suppose that the city typhoid rates will decline

still further. When a city like St. Paul, with a population of nearly 250,000 can report only 7 deaths from typhoid, three of which were in non-residents, it is plain that typhoid is at a low ebb."

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PREDICTS CROP YIELD LONG BEFORE HARVEST

Prediction of the yield of important crops considerably before harvest time is the prospect held out by J. Warren Smith, meteorologist of the U. S. Weather Bureau. He claims that his comparative study of crops and weather, when further extended, will make this possible.

The weather must be taken into consideration, he said, up to about the harvest date for oats, but the probable yield of corn can be determined by the end of July and of cotton at the end of June in the eastern part of the belt. July, and possibly August, weather must be considered in connection with cotton in the western part of the belt, while August may need to be taken into account in connection with corn in the central and western Great Plain States.

Prof. Smith made a careful study of weather conditions for certain regions, week by week, from the 1st of March to the 31st of August and year by year. An estimate was made of the unfavorable effect of features of the weather which were considered detrimental to the crop under consideration. From this data he was able to successfully predict the crop yield in advance.

In the case of cotton, however, he had to make corrections in his figures on account of the damage done by the boll-weevil.

The interrelation of the various weather factors and the differences in their effects through different periods of growth are extremely complicated, he admitted, and possibly await entirely satisfactory resolution.

Jesselton, a city in what was formerly the wilds of Borneo, is considering the installation of automatic telephones.

A new fiber substitute for jute, obtained from the malvavisco plant, has been discovered by Mexican Government laboratories.

The leading German plants for the production of dyes and other coal tar products, fertilizers, and the fixation of atmospheric nitrogen are located in the Ruhr district now occupied by French troops. -----