

EDWIN E. SLOSSON, EDITOR HOWARD D. WHEELER, MANAGER

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SMALLPOX INCREASES WHERE LAWS ARE LAX.

(By Science Service)

Washington, September .- The increase in the prevalence of smallpox in the United States during recent years has been marked and definite according to a statistical investigation just completed by John N. Force and Dr. James P. Leake of the U. S. Public Health Service.

There has been an extraordinary increase of smallpox on the Pacific coast, the results of the investigation show. In the last three years, the cases per thousand inhabitants have increased from 0.16 to 2.38. Figures for the Central and Southern States, in spite of fluctuations, show that there has been a decided upward tendency in the prevalence of small pox, although the Central States maintain a level almost twice as high as that of the Southern states. The Eastern states have had a remarkably constant rate of smallpox during the period from 1915 to 1920, and there has been little deviation from an average rate of 0.04 cases per thousand. Twenty representative states, including the District of Columbia were considered in the investigation. Of these states New York with 0.026 cases per thousand of population had the lowest rate while Kansas with 2.00 cases had the highest.

In addition to determining from the official figures the prevalence of smallpox, the investigation showed that the increase of the disease varied with the laxity in the enforcement of vaccination laws.

"It is evident that smallpox in this country is dependent on the popular vote," the report says. "In general, the people obey laws which they have made. If pouplar sentiment in a state is behind a strong centralized compulsory vaccination act, smallpox is negligible in that state. If local authorities are given discretionary powers in the matter of vaccination enforcement, the rate tends to rise, even in the most favored sections of the country, whereas in the absence of compulsory features in the law, or where there is no law at all, smallpox reaches a high rate."

HOW MUCH MINERAL MATTER. IN YOUR CITY WATER?

(By Science Service)

New York, September .- When you take a drink of water how much mineral matter do you swallow? Dr. W. W. Skinher and J. W. Sale of the Bureau of Chemistry of the Department of Agriculture have made an investigation of the amount of dissolved mineral matter in the water supplies of seventy of the large cities of the country, and reported the results at the meeting of the American Chemical Society here.

If you are in Oklahoma City, Oklahoma, where the water contains the largest amount of minerals known, you will take in 12.1 grains with every quart. The inhabitants of Atlanta, Georgia, enjoy water which contains the smallest amount, 0.2 grains per quart. This is the first compilation of the figures of mineral composition of the different drinking waters, of our large cities, it was announced. The quantity of minerals in water is of interest to physicians, travellers, and certain industries which utilize processes influenced by the dissolved matter. The dissolved mineral matter ordinarily consists chiefly of dissolved limestone, together with smaller quantities of gypsum, common salt and soluble sand. Other constituents such as iron, magnesia, etc., have been tabulated also.

Quart, in the water supplies of the cities, is:

Akron, O., 2.4; Albany, N.Y., 4.3; Atlanta, Ga., .2; Austin, texas, 7.0; Baltimore, Md. 1.7; Bangor, Me., .6; Binghampton, N.Y., 2.1; Brocton, Mass., .5; Buffalo, N.Y., 3:4; Bullochville, Ga., .4; Charleston, S.C., 1.4; Chicago, Ill., 2.6; Cincinnati, O., 2.6; Cleveland, O., 3.4; Covington, Ky., 1.9; Dallas, Texas, 7.5; Decatur, Ill., 6.3; Denver, Colo., 4.0; Detroit, Mich., 2.2; Duluth, Minn., 1.1; El Paso, Texas, 6.6; Erie, Pa., 3.4; Fort Worth, Texas, 3.2; Grand Rapids, Mich., 2.1; Harrisburg, Pa., 1.2; Houston, Texas, 6.6; Jackson, Mich., 9.9; Jacksonville, Fla., .4; Kansas City, Mo., 8.9; La Crosse, Wisc., 6.3; Lancaster, Pa., 3.7; Lansing, Mich., 8.2; Los Angeles, Calif. (Los Angeles River), 7.4; Los Angeles, Calif. (Owens River), 6.2; Louisville, Ky., 2.4; Memphis, Tenn., 1.6; Milwaukee, Wisc., 2.6; Minneapolis, Minn., 4.1; Nashua, N.H., .6; Newark, N.J., .9; New Orleans, La., 3.1; Newton, Mass., 1.4; New York, N.Y. (Catskill), .4; Mawauke, N.Y. (Croton), 1.1; Norfolk, Va., 2.2; Oklahoma City, Okla., 12.1; Omaha, Neb., 8.9; Oshkosh, Wisc., 3.1; Orangeburg, S.C., .8; Pasadena, California, 3.2; Perth Amboy, N.J., .4; Philadelphia, Pa., 1.1; Pittsburg, Pa., 2.6; Portland, Me., .3; Portland, Ore., .4; Pueblo, Colo., 6.0; Rockford, Ill., 7.8; Sacramento, Calif., 3.9; San Diego, Calif., 6.0; Savannah, Ga., 3.7; Springfield, Ill., 5.3; Springfield, Mass., .5; St. Paul, Minn., 3.4; St. Louis, Mo., 3.5; Topeka, Kans., 8.6; Waco, Texas, 6.5; Washington, D.C., 1.5; Waterloo, Iowa, 4.0; Wilmington, Hel., 1.7; Youngstown, O., 3.55.

CATTLE RELISH SAWDUST FOOD.

(By Science Service)

Madison, Wis. September .- Sawdust for livestock feeding has become a real possibility through experiments which have recently been conducted at the Forest Products Laboratory here, in cooperation with the state Agricultural Experiment Station. While untreated sawdust is of no value as a stock food, sawdust treated with a weak acid has recently been fed to dairy cattle with good results.

Treated for less than an hour with chemicals that change one-fourth of the wood to sugar, and made the woody tissue more easily digested by a simple process known as hydrolysis, the new product was fed to dairy cattle during a four week period as a substitute for a part of their grain ration. The cows thrived on the change in food, and kept up their normal flow of milk during the course of the feeding trial. Since the treated sawdust is a fattening food, other grain containing protein, or muscle-building substances, is included in the ration. Further trials are planned to find out the commercial possibility of utilizing timber wastes in this manner, and to ascertain the food value of the treated sawdust, but indications already show that cattle may be fed the treated sawdust in a grain ration with good results.

BUENOS AIRES RECOVERING FROM INFLUENZA EPIDEMIC

(By Science Service)

Buenos Aires, Argentina, is recovering from an epidemic of influenza. At the height of the disease, the cases of influenza treated by the Public Assistance authorities free of charge rose to 220 per day, while there were 70 cases of pneumonia per day at the same time. The outbreak was marked by a large percentage of bronchopneumonia and pneumonia cases.

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MAKE COKE-LIKE COAL SUBSTITUTE FROM WASTE CULM AND PITCH.

(By Science Service)

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Release Tuesday, September 13.

Wilkes-Barre, Pa., September 12.- A coal substitute, made by coking a mixture of culm or waste anthracite coal and coal-tar pitch or other bitumens was described by Donald Markle of Hazelton, Pa. at the meeting of the American Institute of Mining and Metallurgical Engineers here today.

This new product, which has been named "anthracoal", is said to be superior to coke. Tests reported indicate that it is denser, harder, tougher and stronger than coke, and that when struck with a hammer or passed through crushing rolls, it breaks with an irregular fracture, similar to anthracite, but with very little fine material.

"Anthracoal can be made in a coke oven upon the same large scale as bituminous coke and can be produced with little greater expense; therefore it should prove a tremendous factor in utilizing the anthracite culm now going to waste. Its commercial development is the outcome of experiments, made in 1914, in the chemistry laboratory at Lehigh University," said Mr. Markle. "Tests made to duplicate, as far as possible, actual commercial conditions indicate that the process is practicable and the only difficulties encountered are of a mechanical nature that can be remedied and that anthracoal has demonstrated, by tests and actual use, its excellent qualities as a donostic fuel. Several carloads of anthracoal were shipped to different retail dealers, who reported that the customers were satisfied with the product and had no difficulty in burning it. Also, anthracoal commanded the same price as the best anthracite, and the customers to whom it was sold asked for more."

EXTINGUISH MINE FIRES BY SEALING SHAFTS.

(By Science Service)

Release Wednesday, September 14.

Wilkes-Barre, Pa., September 13.- How mine fires that can not be extinquished by direct attack can be fought by sealing the areas in which they occur was told by Douglas Bunting, general superintendent of the Lehigh and Wilkes-Barre Company at the meeting of the American Institute of Mining and Metallurgical Engineers here today.

"As most fires occur in accessible locations, they are naturally fought direct in their incipiency and in most cases are so extinguished. But the extinguishing of fires by direct attack has not been confined to small fires or fires in their incipiency as fires have been extinguished by this method after months of work. However, the direct fighting of fires over long periods of time is falling into disfavor and the safer and more efficient method of sealing where practicable is generally practiced," he said.

> THE WORLD OF SHELLS BY Edith E. Taussig

(Science Service)

To a dog, life is just one smell after another. But each odor has its meaning; his nose sends messages full of significance to his brain, the interpretation of smells is a vital matter for him, the basis of all his important activity. Undoubtedly to primitive man too, the odors of the universe were keen, distinct and vitally interesting. The sense of smell is the oldest of our senses, but one price of civilization has been the loss not only of keeness of scent (we are frequently grateful for that) but of the instructive mental pictures that for our primitive ancestors must have accompanied the slightest odorous whiff.

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Civilization has "jazzed" our small-associations. We have kept our olfactory sense and an astonishing memory for smells, but we put personal and varying meanings into them. Smells are pleasant, or unpleasant, faint or stifling, largely according to associations that have little to do with their source. As we near the seaside, we breathe ecstatically the "invigorating odor" of the ocean. But the sea has no smell. What we detect is actually the faint, sulphorous odor of decaying organic matter thrown up by the tide, a smell that in a laboratory would either be downright unpleasant or puzzling, because of a subtle combination of immediate discomfort and associated memory of pleasant things, the beauty of the summer sea, radiant sunlight and holiday spirit.

In short, it is a scientific truth that smells are in a class by themselves. Only in the laboratory can we, so to speak, put our finger on a smell. There we discover that we do not taste our food, but smell it. Aside from the four taste sensations of sweet, salt, sour and bitter, all flavors are due to smell sensations. A favorite laboratory test is to bind a subject's eyes, have him hold his nose, and then ask him to distinguish between bits of chopped apple and chopped onion on the tip of his tongue. They are indistinguishable so long as they do not reach the back of the mouth. There, their different odors rise to the olfactory organs in tiny gaseous particles and give them away.

A Dutch physiologist, Professor H. Zwaardemaker, devised a hollow, Cylindrical instrument for testing the relative capacity for smell in different individuals. Physiologists have amused themselves testing the relative olfactory responses of criminals and professional men, of men, women, and children, with inconstant results. Women are particularly puzzling. Criminal women have been found to possess smell discrimination like that of (innocent) professional men, far superior to that of their male fellow professional criminals. Women are supposed to be more primitive than men and the early French physiologists found them to have the (supposedly primitive) sense of smell more developed. On the other hand, the use of tobacco is credited with dulling the olfactory organs and the more recent experiments tend to show that women are now become more civilized.

Certain odors antagonize each other; when properly blended neither is apparent. Carbolic acid thus antagonizes the smell of putrefaction and has earned for itself the name of a "clean" smell. In moving picture houses we repudiate the evidence of our noses by releasing the scent of heliotrope which overcomes the odor of much-breathed air. Heliotrope does not compensate for lack of air, but it is not from lack of oxygen that we generally suffer in a close room. There is plenty of air, but it becomes stagnant and the odor of humanity and clothing becomes oppressive. The right proportion of heliotrope scent gives all the pleasing effects of excellent ventilation without the danger of draughts. Thus do we keep our civilization intact at the expense of the integrity of our noses.

PREDICTS NOISFLESS TAIKS FOR FUTURE WARS.

By Major. Raymond E. Carlson, who served in France as Assistant American Commissioner on the Anglo-American Tank Commission.

(By Science Service)

Whoever heard of the ponderous machine called a "Tank" being noiscless? To date no one has. Five years from now it will probably be an actuality. Contrast the first single lunged, horseless carriage that snorted about over the roads with the present six, eight, or twelve cylinder silent and smooth running cars. The buying public has demanded more and more in automobiles and the manufacturers have given them what they have demanded, and in some cases more. The Ordnance Department of the Army is a manufacturer catering to a very select and

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exacting clientele. The using service tell the Ordnance Department that they must provide improved types of tanks, and the Ordnance Department is studying the reduction of noise in tanks.

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The muffling of the exhaust from the engine is a comparatively simple problem. This demands a muffler of sufficient size so that the exhaust noise can be muffled without producing a serious back pressure. The location of this muffler and exhaust pipe from the engine is an important feature in the design of tanks because of the heat which must be carried away from the engine. The exhaust pipes usually have fins so as to radiate as much heat as possible and are located and protected so that the tank mechanic will not be burned through contact.

The noise due to improper shifting of gears in the automobile is not encountered in tank service because on account of the large horse power and heavy torques involved sliding gears cannot be used advantageously and epicyclic gears are therefore used. Changing speed in tanks is accomplished through brake bands with the gears always in mesh.

The caterpillar tracks offer the greatest field for the reduction of noise. It will be readily apparent that when a single tback shoe is taken from rest on the ground and accelerated to double the speed of the vehicle on the top of the track that unless the construction is mechanically correct there is a great possibility for the production of loud noises. The steel track rollers running over this track also produce noise. To minimize these effects as much as possible, the designer must have a thorough grasp of the underlying principles of caterpillar engineering. The track driving sprocket and the front idler sprockets must be raised somewhat off the ground, so that the weight of the vehicle will be carried by the supporting rollers under the middle of the tank. This insures a gradual change of direction of each track shoe, and when taken in connection with large diameter of track sprockets and idlers tends to reduce the noise considerably. Rubber cored track rollers have been employed. These rollers consist essentially of a solid truck wheel with dual rubber tires, around the outside of which has been fastened a steel rim which rides on the caterpillar track rails and prevents injury to the rubber tire. The rubber between the outer rim and the wheel is so arranged that it has sufficient space to expand and thus absorbs the shocks and deadens the noise. Means are provided to prevent overloading of the rubber, so that load carried will be approximately the same as the load carried by truck tires.

Rubber or other fabric has also been used on the track driving sprocket and on the idder sprocket where the track shoes come in contact with these surfaces, so as to reduce the noise of impact. Rubber pads have also been applied to the bearing surface of the track shoes themselves. Commercial tractors when used for Industrial work in hauling loads about large shops have been equipped with these rubber pads and have performed satisfactorily. The mobile gun mount, capable of running at speeds up to 30 miles an hour, uses these rubber pads in the track shoes as well as rubber for reducing noise in other places.

The advantage of a noiseless tank is at once apparent. The most important factor in the success of the first use of tanks was the element of surprise. Noiseless tanks would enable tank concentrations to be made without the enemy being aware of them so that tank attacks could be launched suddenly and without counter-measures having been developed by the enemy.

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(Editors: Here is another batch of fillers, or these six installments of odd or interesting things about science will provide a science feature every week-day.)

DO YOU KNOW THAT-

The chisel is an example of a tool that has not been improved in shape for 2,500 years.

Insect-eating birds as a rule do not eat butterflies.

The world's production of potatoes has increased more than 50 per cent since 1900.

The use of sphagnum moss for surgical dressings began on a large scale during the Russian-Japanese war. In the latter part of the World War the British alone produced 1,000,000 sphagnum dressings a month. Sphagnum absorbs liquids about three times as fast as absorbent cotton.

DO YOU KNOW THAT-

Mexico has produced more than one-third of the total output of the world's silver.

One of the satellites of Mars revolves around the planet faster than the latter turns on its axis. As seen from the surface of Mars it rises in the west and sets in the east.

Raindrops can be measured by allowing them to fall into a shallow layer of fine, dry flour. Each drop forms a little pellet of dough of its own size, which can be measured and photographed.

Icebergs attain to much larger dimensions in the southern hemisphere than in the northern. A berg 82 miles long was encountered in the year 1893.

DO YOU KNOW THAT-

Saws and crown drills with teeth of corundum or gem stones, used in Egypt 6,000 years ago, produced work equal to the best done by diamond drills today.

The United States Pharmacopoeia is revised every ten years by a convention of physicians and pharmacists. The current edition is now being translated into Chinese.

Aeroplanes were used this year in fighting a serious plague of grasshoppers in southern France. The aviators reported breeding grounds and scattered poisoned bran.

Small diamonds have frequently been found in meteorites.

DO YOU KNOW THAT-

A beefsteak frozen in liquid air becomes so brittle that it is shattered like china if struck a light blow.

Quicksands are generally due to springs finding an outlet under a bed of sand. The rising water keeps the grains of sand from adhering to one another so as to form a compact substance.

It is estimated that in the cattle-raising regions of the West a wolf or mothain lion destroys \$1,000 worth of live stock annually; a coyote or a bobcat, \$50 Worth; a bear, \$500 worth.

An intensely dry, hot wind called the "zonda," which blows down from the Andes upon the plains of Argentina, was formerly thought to owe its heat to volcances. It is really a "foehn," such as occurs in Switzerland and many other mountainous countries, where winds, robbed of their moisture in crossing the mountains, are heated by compression during their descent. DO YOU KNOW THAT-

Measurements of the temperature of pavements in hot weather have been made in a suburb of Chicago. Asphalt was hottest, with a maximum temperature of 124. Brick registered 118 and concrete 114.

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Different parts of the sun complete their rotation on the solar axis in different periods. At the solar equator the time of rotation is about 25 days, while near the poles of the sun a rotation occupies 35 days or more.

Silver Spring, Florida, one of the largest springs in the world, fills a basin 200 feet wide and 30 feet deep. The water, which is extremely transparent, issues from several orifices at the bottom of the basin at the rate of several hundred million gallons a day.

The observatory of Cracow, Poland, has issued some of its publications in a language devised by Prof. Peano, of Turin, known as "Interlingua". It is essentially a much simplified form of Latin.

DO YOU KNOW THAT-

More than 2,000,000 heaters for frost protection are in use in the orange groves of southern California.

There are not more than four or five volcano observatories in the world, the most important being those on Vesuvius and Kilauea (Hawaii). Professional volcanologists are also very scarce.

The ancient statement: "You can not make a purse out of a sow"s ear" is refuted at the Chemical Exhibition being held at New York by the exhibit of an artificial silk purse made by chemical processes from a sow's ear.

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Skunks are exceedingly beneficial to the farmer as they feed almost exclusively on mice, grasshoppers, crickets, white grubs, and other farm pests.

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