

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

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Editors - Here is a little daily feature that we think is going to catch on. A six days' supply will reach you regularly with each issue of the Bulletin. -Science Service.

BEAT EDISON TO IT!

Do you know that-

There is no ground for the popular belief that sewer gas is injurious to health. Men who work in sewers are as healthy as any other class of laborers.

Firing a cannon at a waterspout in order to break it up is on a par with scratching the mast to raise a wind. Both practices are purely superstitious in origin.

About 3 per cent of the fires that occur in the United States are caused by lightning.

Serpents have an acute sense of smell. Some of them, including the American black snake, hunt largely by scent.

In the great eruption of the Volcano Tomboto, Dutch East Indies, in 1815, it has been estimated that 92 cubic miles of solid material was ejected.

BEAT EDISON TO IT!

Do you know that-

A goldfish, after being frozen solid in liquid air, will revive and swim about vigorously on being replaced in water.

At a weather station in Northumberland, England, a dead calm prevailed continuously for 56 hours, on Feb. 1-3, 1921, as shown by the instrumental record of wind.

Before the planet Uranus was discovered by Herschel, in 1781, one astronomer had observed it swelve times, and only the careless way in which he kept his notes prevented him from recognizing it as a new menber of the solar system.

More than 60 per cent of the dust found in the air of the New York subways consists of jagged splinters of steel due to the wearing away of brake-shoes, wheels and rails, according to Dr. J. G. Ogden.

Four younds of saccharin will sweeten as much coffee as a ton of sugar.

BEAT EDISON TO IT!

Do you know that-

Plans are under way to introduce the yak, the most useful animal of Tibet, into the Canadian northwest.

Occasionally there is a February with no full moon. There are two such cases is present century, viz, 1915 and 1961.

Much supposed "ivy" poisoning is caused by plants other than poison ivy. There are scores of plants that are more or less poisonous to susceptible people.

About 95 per cent of the manganese consumed in the United States is used in Making steel.

When Saturn's rings are turned exactly edgewise to the earth they are invisible even to the most powerful telescope. According to a recent estimate of Prof. Barnard. the rings are not more than 40 miles thick.

Do you know that-The speed of the pneumatic hammer ranges from 1,000 to 20,000 blows per minute.

A new alloy discovered by C. E. Guillaume, the inventor of invar, is called "elinvar." It is said to be more uniformly elastic than invar.

There are 6,400 technical journals published in Germany; 150 more than were published there at the outbreak of the war.

The taximeter was used in ancient times by the Chinese, and Vitruvius describes a device of this kind which the Romans attached to their chariots.

The centipede's excuse for existence is that it feeds on house flies, roaches, boths and other insect pests, probably including bedbugs.

BEAT EDISON TO IT!

Do you know that-

The first card catalogue of which we have any record was made by a French priest of the Revolution period, who wrote the titles of his books on playing-cards and arranged them alphabetically in a tray.

Salt evaporated from ocean spray and carried by the winds is deposited on the dunes of Holland to the extent of 6,600 tons a year.

The number of asteroids, or minor planets, discovered in 1920 was 39. Of these 20 were discovered at the observatory near Heidelberg, Germany.

The greatest speed attained by ocean waves is about 80 miles an hour. At a depth of 100 fathoms the greatest waves produce a movement too slight, as a rule, to affect anything but the finest mud.

A freezing-mixture of three parts of calcium chloride to two parts of snow will produce a temperature of 55 degrees below zero Centigrade, which is much below the freezing point of mercury.

BEAT EDISON TO IT!

Do you know that-

Ignis fatuus, or wil-o'-the-wisp, is called by at least fifty different names in various parts of the British Isles.

A race of pygmies inhabits the territory of Mongimbo, in the heart of the French Congo. The tallest members are never more than 4 feet 9 inches in height.

The wings of the leaf insect, or "walking leaf," are so much like real leaves, that confined leaf insects will, in the absence of leaf food, eat one another's wings.

Glaciers, although solid, flow like rivers, the center and surface moving nearly twice as fast as the sides which are retarded by friction with the valley.

A crude form of steam-engine was invented by Hero of Alexandria in the second century B. C. It consisted of a spherical vessel, supplied with steam, and turned on an axis by the reaction of escaping jets. It was nineteen centuries before the Valuable idea embodied in this invention was developed any further.

Editors - This is the second of a series of exclusive Science Service interviews.

THE NEXT GREAT STEP AHEAD.

2. In MOTION PICTURES.

An interview with C. Francis Jenkins, the inventor of motion pictures.

(By Schence Service)

Next we shall have movies taken at 70 miles per hour. Instead of photographing

at the pokey rate of less than three-quarters of a mile an hour which is the speed that is used in filming the dramas and comedies that you see at the corner motion picture houses, this summer will see the perfection of a motion picture machine that will photograph 100,000 images a minute on ordinary celluloid film that will race through the camera at the speed of the fastest express train.

-3-

This is the prophesy and hope of C. Francis Jenkins, the man who invented motion pictures in 1894. Working in his laboratory in Washington, he is now turning his attention toward the future.

The speed at which he aims has been achieved in test, and the principles are those that are used in a camera that today photographs at the rate of 48,000 pictures a minute as a regular performance.

If you could visit Mr. Jenkins' laboratory and see him project some of his hig! Speed films, you would say "Oh! how slow", not "How fast!"

Mr. Jenkins has a movie of a little girl jumping rope, who has been honored by being photographed more times per second than the highest paid movie queen. But when the rope jumping film is run through an ordinary cinematograph projector at the usual 16 pictures a second, the rapid motions of both girl and rope that are missed by the eye are slowed down so that they can be easily followed and analyzed.

This film is similar but much slower than "trick" baseball films or the stretches of slow motion that are sometimes included in the ordinary comedy. These commercial trick films are usually taken only about 8 times as fast as the ordinary films, and their making does not involve the difficulties and the new principles that Mr. Jebkins has been wrestling with for the past few years.

And it is not for the perfection of slap-stick comedy that Mr. Jenkins is working.

"The analysis of any high speed or quick movement by photo divisions of 800 to 1500 pictures per second is destined to disclose data of great value to the scientist and engineer," explains Mr. Jenkins. He believes that this will be the case in even unsuggested fields.

Consider the squashing of a rubber ball. The camera caught his ingenue movie queen in the act of bouncing an air-filled rubber ball. Perhaps the rubber tires that will shoe the modern auto will be further perfected by a study of the phenomena disclosed by this bounding ball.

"You will notice how the ball is flattened on contact with the ground," said Mr. Jenkins, as he showed the lazily moving ball floating on the projection screen. "See how it recovers its spherical shape in very much less time than it takes to rise from the ground a distance equal to its diameter. Apparently the force stored in the ball by its impact is largely exhausted in the recovery of its shape before it begins to rise. I am not aware that this has been observed before, and suggest that this phenomena may account for the heating of pneumatic tires when cars are driven fast over uneven ground, a heating that is much greater than that caused by the same speed over smooth roads. And this is only one of the many useful applications. What happens in the collapse of an airplane strut, the bursting of gasoline tanks or balloon bags, this new instrument will tell us. To rapid motions it is what the microscope is to minute objects. It increases the power of the eye to see that which unaided it cannot see."

NATURAL GAS WASTE COSTS MILLION A DAY

(By Science Service)

Washington, June .- Two and one-half million domestic consumers of natural gas in this country are wasting 1,500,000,000 cubic feet of this decreasing fuel each year, according to studies that have just been completed by I. V. Brumbaugh and G. B. Shawn of the Bureau of Standards. The artificial gas that must some day be used to replace this enormous loss will cost the country \$375,000,000 a year or over \$1,000,000 a day, at the present cost of \$1.25 per thousand cubic feet.

Faulty and inefficient appliances are causing this depletion of a valuable and strictly limited natural resource, which it is generally recognized will be entirely exhausted in a comparatively few years if waste continues at the present rate, these experts say. The ordinary burner that is used on cooking stoves in most natural gas regions is often only 6 per cent. efficient, while with but a slight change in the construction and adjustment of the burner and stove, it can often be made 50 per cent. efficient, or give eight times as much heat for the same amount of gas. Some types of hot water heaters are condenned by the tests which showed that they consume more gas in a day than would be required in a month if they were efficiently designed. On the average each domestic consumer wastes at least 5,000 cubic feet of natural gas a month, the report declares.

-4 -

Solid tops for gas stoves should never be used when cooking is being done, as they scatter the heat cut into the room, is one recommendation. Grids should be used instead, and for natural gas, the pans should be placed one inch above the burner, not two and a half to 3 inches as is usual in present stoves. Most of the burners should be fed more air, and the experts point out that this will eliminate the yellow gas flame and the troublesome carbon deposits on the bottom of pans. The tests have also shown that better results would be obtained if the gas companies would supply gas at much lower pressures than now, provided the appliances were designed for such use.

Appliances for artificial gas/now being investigated to determine what improvements and savings may be made in their use. Early results of the work show that many of the causes of natural gas waste are also present in the manufactured gas appliances, and that many of the same principles apply to both gases.

The present waste of natural gas is a heritage of the early days when this fuel was used extravagantly for all purposes. Streets at one time were lighted with natural gas flares that borned day and night, and the supplies were even unmetered.

HEALTH CONFERENCE TO DIS-CUSS INTERSTATE PROBLEMS,

(By Science Service.)

Boston, June .- Interstate health problems, among them the certification of water supplies used by common carriers for drinking and culinary purposes, will be considered at the nineteenth annual conference of state and territorial health authorities with the U.S. Public Health Service to be held here on June 3 and 4. The various states have been invited by Surgeon General Cummings of the Public Health Service to send health officers and sanitary officers as delegates to the meeting.

NO CHANGE IN TEMPERATURE SINCE REVOLUTIONARY TIMES.

(By Science Service)

Springfield, Ill., June .- The next time someone says to you: "The seasons are changing. We do not have the cold weather we did when I was a boy" show him this.

Figures that have been compiled by Clarence J. Root, meteorologist of the Weather Bureau Office here, indicate very clearly that since the time of the Revolutionary War, at least, there has been no permanent change in temperature. At New Haven, Conn., continuous temperature records have been maintained since February 1780, with the exception of a few months in 1795, and Mr. Root has averaged the average mean temperature values by decades. The resulting mean temperatures in fahrenheit degrees for ten year periods ending with the dates given are: 1790, 49.6; 1800, 50.0; 1810, 50.4; 1820, 47.5; 1830, 49.3; 1840, 47.8; 1850, 49.2; 1860, 49.9; 1870, 49.1; 1880, 49.7; 1890, 48.9; 1900, 49.7; 1910, 49.7; 1920, 50.5.

"It will be noted that the warmest three periods are those ending 1800, 1810, and 1920, and that the coldest decade immediately follows the second warmest," Mr. Root points out. "Considering the individual months and the individual years, it i found that the coldest January occurred as late as 1857. The coldest February occurred 8 years after the warmest one. The coldest March was as late as 1870 and again in 1885. The coldest April was in 1874, and many years after the warmest one. In May we find a number of years with the same lowest temperature - 1812, 1915, 1870, and 1882. The highest figures in June arc:in 1779, 1790, 1803, and 1876. In July the lowest was in 1816, with the warmest as early as 1780 and as late as 1876. The coldest August occurred 61 years after the warmest. In September the coldest months are in the earlier years, but for October, November, and December the coldest year came after the warmest year in each case. Thus it will be seen that in nine months of the year the coldest one of record occurred after the warmest one." ORGANIZING NATIONAL IN-STITUTE OF WATCHMAKERS.

(By Science Service)

- 5 -

Washington, June .- The Horological Institute of America is now being organized as the result of a meeting of leading watchmakers and jewelers that was held by the National Research Council. This organization will cooperate with governmental and private agencies to increase the interest and skill as well as the supply of watchmakers of the country. It is expected that it will be formally established at a meeting in the fall. In connection with the institute, a historical collection of timepieces is planned.

SIGMA XI ESTABLISHES NEW RESEARCH FELLOWSHIPS.

(By Science Service)

Schenectady, N. Y., June .- A new opportunity for young men and women who wish to devote themselves to scientific research has been opened through the establishment of two fellowships by the honorary scientific society, Sigma Xi. These will pay a maximum of \$1800 each for the academic year, beginning in the fall of 1921. The funds for these fellowships have been contributed by the voluntary offerings of the members of the Sigma Xi scattered throughout the country, many of whom have agreed to contribute \$2 a year for the purpose of encouraging graduate students to engage in scientific investigation. The fellowships are intended for those who have already received a doctor's degree. Applicants should present their qualifications to Dean Edward Ellery, Union College, Schenectady, N. Y., before August 1.

COMMON SULFUR AS A PLANT FOOD

(By Science Service)

Geneva, N. Y., June .- The finding of new plant-food materials has assumed nearly as important a place as the introduction of new or little-used human foods, and attracting considerable interest at the present time among the former is the use of common sulfur as a fertilizer. Frequent inquiries are received at the New York Agricultural Experiment Station regarding the value of sulfur, and experts at the Station state that while its general use as a fertilizer is still in an experimental stage, there is sufficient evidence to demonstrate its value on soil which has been cropped for a long time resulting in the depletion of the sulfur supply.

Sulfur plays an important part in the flavor of such crops as cabbage, turnips, mustard and onions, and is an essential element in the proteins that form the basis for growth.

Since all plant foods must be in a soluble form, free sulfur is of no immediate value to the plant but must undergo a change in its chemical form before it can be utilized. This change is brought about in the soil through the action of certain bacteria which, fortunately, are present in most fertile soils. The reactions which take place at this time also make available to the plant otherwise insoluble phosphorus and potash compounds and affect favorably the acidity of the soil for certain crops.

The beneficial effects of land plaster or calcium sulfate have long been recognized, and this compound is added to the soil whenever acid phosphate is applied. Under such conditions a sufficient supply of sulfur is probably maintained for all Ordinary purposes.

DON'T SWAT THE FRUIT FLY.

(By Science Service)

The times demand that everything in earth and heaven shall be brought into court to prove its usefulness or acknowledge its harmfulness.

So unmitigatedly cussed has the poor house fly been proved, and so greatly does she dominate the fly world that her reputation and her ruin seem likely to involve all her kindred of however remote degree.

But justice, always a near neighbor to self interest, calls for discrimination even toward flies. The Fruit-fly, gentlemen of the jury, is able to prove herself not harmful to man, but eminently useful to him. Not only is she not a carrier of human disease germs and a flounderer in human soup, but she is a carrier of chromosomes and a producer of mutants in ways that, once made known by investigation, throw much light into the dark region of human and all other kinds of propagation and heredity. The minute dgets that you shake off the t ina peel are teaching us the laws of evolution.

The Carnegie Institution of Washington has just issued a big volume by A. H. Sturtevant on the Fruit-fly under his trade name of Drosophila, in which it is daid that:

"The first paper on the genetics of <u>Drosophila</u> was published in 1906. Since that time about 150 books and papers dealing with heredity in the genus have been published. About 250 different mutant types have been discovered and studied, and at least 10,000,000 living individuals have been etherized and examined by more than a score of investigators. The problems studied include practically every branch of the subject of genetics. Not only has <u>Drosophila</u> been the most productive material for research in the subject, but it is now the standard object for laboratory instruction, and is used in many colleges and universities."

From such intensive research on this tiny fly has come the theory of heredity now accepted by the most active and highly specialized students in this department of biology.

TREES AS WITNESSES

(By Science Service) (First S.S. story by) (By Science Service) (Frent Those

Great tracts of southern hardwood timber, worth millions to the people of the United States, have been restored to the government in a series of suits recently concluded in the federal courts, with the trees themselves acting as star witnesses.

The whole trouble started back in 1847, when the original survey of the region in question was made. At that time the government paid surveyors not by the month but by the mile, and for "meander" lines, such as river or lake shore, it paid twice the rate given for the easier straight section lines. There was naturally a strong temptation to get a little "soft" money by marking in lakes where none existed, and this apparently happened pretty often, for maps made from these surveys, and still in use, show large areas as lakes which are really heavily forested dry land.

When the settlers came in, they could not legally file their claim on this socalled lake land. But they established themselves about the edges, partly cleared their claims, and raised their cotton and corn. So things went for many years.

Then came the big lumber companies. At first they bought up the timber on the surveyed lands, but when that was gone they looked about for more worlds to conquer. It occurred to some of them to purchase from the settlers their riparian rights, that is, the rights that property owners have to the bottoms of bodies of water adjoining their land, if the water should be drained or dry up.

But just as the lumbermen were thus succeeding in getting all this fine hardwood for nearly nothing, the Federal government stepped in, claiming that the original surveyors had made fraudulent reports, that there had been no lakes there in 1847, and that consequently the settlers had never had any riparian rights to sell. The suits very quickly came to a deadlock. The lumber companies claimed that these trees had grown since 1847, and produced a number of old settlers who testified that they had seen the lakes in the early days. The government attorneys produced other old settlers who testified that the disputed areas had always been dry land.

The next move obviously was to employ expert testimony. For this the government called in Prof. H.C.Cowles of Chicago University. Professor Cowles easily made the trees speak for themselves. Recently cut oak trees showed over three hundred yearly rings, and since no one could content that caks will grow in water, it was plain that at least three centuries must have elapsed since the draining "any lakes that might have been there.

But Professor Cowles, being a scientist, believed in doing the job thoroughly. It is known that plants do not move into a new territory, such as that left by the draining or filling of a lake, in a haphazard manner. The first to appear in such a place are the ones whose roots can stand a very wet soil. There is a definite succession of forms, as the land becomes drier. Thus, in a southern bayou, the first vegetation to appear is the lotus. This gives way to either a coarse grass meadow or a willow thicket. The latter is succeeded by a forest of cypress, sour Sum and water locust, trees that can tolerate marshy conditions and frequent flooding. Then comes a mixed growth of red maple, sweet gum, ash, pecan and other trees of a drier habit, and finally the "climax" forest of great caks and hackberry trees. Any one of these stages may be scores or even hundreds of years in passing. Since all the lands in question were in the oak stage, Professor Cowles testified that the lakes must have been drained at least two thousand years ago! The ownership of the