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FRENCH SCIENTISTS REPORT CONFIRMATION OF EINSTEIN'S THIRD PREDICTION

(By Science Service)

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Paris, June 29.- French scientists have announced that they have verified Einstein's third prediction, that the wave length of light from the sun is slightly longer than similar light produced on earth.

Monsieur A. Perot, in a recent number of Comptes Rendus, the official journal of the French Academy of Sciences, declares that his researches show that the wave length of the magnesium lines of the sun change in color toward the red, or are longer by about two parts in a million than the same kind of light produced here on earth. This, he points out, is exactly the difference that the Einstein theory requires.

Einstein's theory first scored one over Newton's when it accounted for the shift of 42 seconds of arc that the planet Mercury takes each century over and above that allowed it by the Newtonian law. This discrepancy had puzzled astronomers for two centuries.

When it was announced that the British astronomers who went to Africa to observe the eclipse of the sun on May 29, 1919 had found that a ray of light passing close by the sun is bent out of its straight course, this was the second confirmation of Einstein's theory, and that announcement set the general public talking about the Einstein theory.

The verification that has just been announced is the last of the three practical predictions that Einstein has suggested as checkable by observation. General acceptance of M. Perot's findings and further proof of the deviation of the light rays in a gravitational field (as reported by the British Eclipse Experiment) would practically amount to a proof of the Einstein theory.

The Fraunhofer lines, used in wave length measurement, can be seen as dark lines on the solar spectrum background and have their origin in the "reversing layer" of the sun. It has been believed that the pressure varies at different parts of this "reversing layer" and that this change in pressure caused the difference in wave length between the solar light and the earthly light of the same kind. But M. Perot by his interferometer measurements has come to the conclusion that the magnesium vapor of the sun is practically at zero pressure and not, as supposed, under high pressure, and that the Einstein theory is needed to explain the difference in wave length between solar magnesium light and the kind of magnesium light that is produced here.

Previously he had found similar differences when he compared the cyanogen solar lines with light produced by that terrestrial cyanogen producer, the arc lamp, and as the cyanogen vapor in the sun is supposed to be under little or no pressure, he considers this another check of the theory.

Now that M. Perot has shown the way, two other scientists have dug into old data and report that even these past records are proving that Einstein is right.

M. H. Buisson and Ch. Fabry have considered data giving differences of wave length of solar and earthly radiations that were obtained as early as 1896. At that time the discrepancies were explained by assuming that the pressures in the sun caused them. But now, by considering pressure absent or very low, these two investigators show to their satisfaction that the old observations can be made to prove the Einstein theory.

THE NEXT GREAT STEP AHEAD.

6. In Photography

An interview with Dr. W. F. Meggers, Chief of the spectroscopic laboratory of the National Bureau of Standards.

(By Science Service)

Photographing stars in broad daylight and lengthening the astronomer's day to twenty-four hours; better photographs taken by airplane camera and through long-range telescopes; a simple and thoroughly practical method of photography in natural colors that can be used by the amateur as well as by the scientist, effective increase in the power of the largest astronomical telescopes now known, and more knowledge of the color and temperature of the stars will be some of the practical consequences of the improvements that chemists will undoubtedly make in photographic materials in the next few years.

This is the prophecy of Dr. W. F. Meggers, in charge of the spectroscopy laboratory of the Bureau of Standards which during the war made the photographic plates for aerial use that look through haze and record the landscape that is obscured to the human eye.

These advances that will make photography more useful to man will come about through the improvement of dyes that are used to make photographic plates sensitive to all the visible spectrum and to infra-red light.

"Invisible light waves cause most of the image on the ordinary photographic plate", explains Dr. Meggers. "These are the very short light waves, the ultra-violets and the violets and blues that are on the limit of the visible spectrum. In the early days of photography these were called the actinic or chemical rays because they affect the silver halide that is used in photographic emulsions. In fact, Dr. R. W. Woods of Johns Hopkins University some years ago showed that if all the visible light is screened out photographs can still be taken with ultra-violet light. The ruby lamp of the dark room can be used because the photographic plate usually used is not red-sensitive".

In the last forty years it has been found that if the ordinary photographic plates are treated with solutions of certain dyes they will become sensitive to the visible yellows, greens, reds, and even the infra-red waves or the so-called heat waves that are very long. It is this process that is used in making the "panchromatic" plates and other "color-sensitive" plates now on the market.

Before the war Germany had a monopoly of the best of these processes and the dyes, but during the war two American government research laboratories reproduced and applied all that Germany had ever done and then went a few steps further. The color laboratory of the Bureau of Chemistry of the Department of Agriculture not only synthesized all known photographic dyes but evolved "Kryptocyanin", a new sensitizer for red light that has made possible plates that have many different applications. The spectroscopy section of the Bureau of Standards used this dye to make plates that could be used in aerial photography during hazy weather.

"The blue of the sky and the red of the sunset and sunrise are due to the scattering of the short wave length blue light", explains Dr. Meggers. Physicists have found that the shorter the wave length the more the light scatters when passing through a turbid medium such as the earth's atmosphere. This happens "inversely as the fourth power of the wave length", as they express it. Haze can be seen through only with difficulty because it scatters the short waves of the sun's light as they travel to earth.

Whether it is the earth obscured from above by haze, a star obscured by daylight, or a hazy panorama, the method of red photography is the same. A filter or glass screen that cuts out all the blue or short wave length light is placed in front of the lens. This allows only the red and infra-red rays to penetrate and form an image. Using this method of photographing through haze, pictures taken from two

miles above the earth were clean-cut and distinct, while those taken simultaneously on ordinary commercial plates show nothing but a mass of haze.

"But the most sensitive photographic materials now available are many millions of times less sensitive to the visible spectrum than the eye", declares Dr. Meggers, in stressing the fact that most of the progress in this line is still ahead of us.

(Editors: This is another batch of short daily features)

BEAT EDISON TO IT!

Do you know that-

Instead of there being only five senses as we usually think, there are probably as many as fifteen. Four distinct senses, for example, are found in the skin. These are heat, cold, pain and pressure. What we usually call touch is a combination of these sense qualities.

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The flesh of most molluscs and marine fish contains copper. That of oysters averages 34.7 milligrams per kg.

* * *
30.7 per cent of the people of the United States live in electrically lighted houses. There are 6,291,160 wired houses and 340,000 farm lighting plants.

* * *
The American Indians made flour from the rootstalks of the common cat-tail. Professor Claassen, of Cornell University, declares that cat-tail flour is a satisfactory partial substitute for wheat flour in bread-making.

BEAT EDISON TO IT!

Do you know that-

The remarkable volcanic region in Alaska known as the Valley of Ten Thousand Smokes actually contains, not ten thousand, but millions of smoking volcanic vents, besides various other wonders, such as Falling Mountain, where falls of rock occur every few minutes.

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The wireless telephone is now used by the Stock Exchange of Amsterdam for communicating prices to points all over Holland.

* * *
An association has been formed in Germany to encourage a wider use of fungi as food. The organization publishes a monthly journal.

* * *
"Cultivated pearls" have reached such perfection in Japan that rounded pearls, not attached to the shell of the oyster, are now produced. Experts are unable to distinguish them from natural pearls without destroying them in the process of testing.

BEAT EDISON TO IT!

Do you know that-

Yellow is the favorite color of the house-fly. Blue is its second choice, while red and purple attract it least.

* * *
Sword-shaped bars of iron were used by the ancient Britons as money, and many of these are now found in British museums. A recent investigation shows that six different denominations were used, distinguished by their sizes.

* * *
Plants live on oxygen and carbon dioxide from the air around them, but in an atmosphere composed only of these two gases sprouting potatoes soon die.

* * *
A certain German astronomer, having discovered a new asteroid, advertised in the newspapers that whoever first sent him a postoffice order for \$250 might have the privilege of naming it. The offer was taken up by Baron Rothschild, who sent his cheque with directions that the newly discovered body should be named after one of the ladies of the baron's family.

BEAT EDISON TO IT!

Do you know that-

About the year 1980 the present stand of forest timber will be exhausted, and thereafter a period of from 50 to 1000 years of timber famine will elapse before the trees now being planted come to bearing.

Under certain conditions fish meal, used as a fertilizer, is a violent explosive.

Austria may soon be able to resume her former production of porcelain, due to the discovery of extensive beds of fine white kaolin within her boundaries. Although Austria made large quantities of porcelain before the war, the kaolin from which it was made came from Germany.

The metamorphosis of a tadpole into a frog can be brought about at any age by feeding it with thyroid gland from any animal. Very young tadpoles have thus been turned into frogs as small as house-flies. A tadpole deprived of its thyroid gland does not become a frog at all, unless it is fed on thyroid.

BEAT EDISON TO IT!

Do you know that-

An oil with a pleasant, fruity taste and an odor similar to olive oil is obtained from cantaloupe seeds.

The island of Crete has undergone a remarkable tilting since classical times, rising at its western end and sinking at its eastern. A harbor at the west end of the island is now high and dry, so that one can walk about its floor, while the ancient quays and harbors works at the eastern end are now under water.

About three per cent of men and a smaller per cent of women have red-green color blindness from birth. Red and green look gray to them and they are unable to tell them apart. There are a very few people with total color blindness who see all colors as gray.

The United States is said to have more cases of rabies than any other country except Italy. There were 4,000 cases reported in this country in the year 1912.

BEAT EDISON TO IT!

Do you know that-

Bamboo stalks measured in India were found to grow nearly twice as fast at night as by day. The greatest growth for a single day was 13 inches. It took only 3½ months for the plant to reach its full height of 71 feet.

In the northwestern part of France, where the tides are very high, a plant is being built which will utilize the power of the tides for running turbines.

"Aeronautics", the leading aeronautical journal of England, recently published an edition in the German language.

The African plant "speckboom", one of the principal foods of the elephant, is to be introduced in southern California as a food for cattle and sheep. It will grow under the same conditions as the worthless chaparral.

SWEET-CORN STALKS MAY BE
COMMERCIAL SUGAR SOURCE

(By Science Service)

St. Paul, Minn., June .- We may soon be sweetening our coffee and tea with sugar made from the same plant that supplies the side dish of canned sweet corn if investigations planned by the department of agriculture of the University of Minnesota are successful.

Some preliminary tests last summer showed that some varieties of canner's corn contain as high as 15 per cent of sugar, and that a fairly palatable sirup could be made from it with proper preliminary treatment. This caused the Minnesota legislature to create a special fund for further investigation.

Dr. J. J. Willaman of the division of Agricultural Chemistry, University of Minnesota, is to be in charge of the investigations and will erect an experimental sirup mill in connection with the cannery at Wells, Minnesota. The best method of removing the juice, the proper eliminating of undesirable flavors, the stage of maturity of the corn best suited for sirup making, the most economical way of handling the plant at the factory, and the breeding of special dual purpose varieties which will not only furnish high quality ears for canning but which will also have stalks with abundant juice of high sugar content, are some of the problems awaiting immediate solution.

"There are three kinds of sugars in corn, glucose, fructose and sucrose", declares Dr. Willaman. "The latter is the same as cane sugar, and constitutes the crystallizable portion. It reaches a high percentage only at maturity of the plant. Since the sucrose and fructose predominate, the new sirup will be much sweeter than the present corn sirup, which is made from the starch of the corn grain and contains mostly glucose".

"At the present time there are thousands of acres of stalks in our sweet corn states that go to waste. If use can be made of this material both the canners and the farmers will realize once more the value of chemistry to modern industry".

Peter Collier of the U. S. Bureau of Chemistry once looked to corn stalks as a possible source of granulated sugar. He actually made hundreds of pounds of sugar from both sweet and field corn. But the yields were uncertain; and as about that time beets gained the ascendancy as the sugar crop of the country, the results with corn were soon forgotten!

FORECASTING THUNDERSTORMS BY STATIC ELECTRICITY

(By Science Service)

Norfolk, Va., June .- Thunderstorms, one of the greatest obstacles to routine flying during the summer months, are about to be spied upon by wireless. As a result of observations and experimental work at the Naval Air Station, Hampton Roads, Va. a means of forecasting thunderstorms by recording the "strays", "statics" and other atmospheric electric disturbances by radio apparatus, is being developed.

"At an aviation station it is important to know the approximate time of arrival of thunderstorms, their extent and duration", says Francis W. Reichelderfer of the station in an article in the Monthly Weather Review, the official Weather Bureau publication. "Unless these things are known, air craft may be caught away from shelter or safe landing place, and may be forced to land where they will be unable to return to their base for hours or days; or, worse still, conditions dangerous to craft and personnel may be encountered. If, on days when thunderstorm conditions prevail, the alternative is taken and flying is suspended in anticipation of thunderstorms which do not arrive for many hours or perhaps not at all, much valuable flying time is lost.

"A recording instrument is to be installed to keep a continuous record of the intensity of 'static' and a direction-recording instrument is to be devised. With these used in connection with the daily weather map and local meteorological data it is hoped to forecast with considerable accuracy the approximate time, extent and duration of thunderstorms occurring within 20 or 30 miles of the air station".

HOW TO IDENTIFY THE BLEMISH IN YOUR APPLE

(By Science Service)

Geneva, N. Y., June .- With apples selling at anywhere from five to twenty-five cents apiece, the discolored, corky area or the wormhole winding through otherwise solid flesh demands more than passing interest. Entomologists at the New York Agricultural Experiment Station have developed a method whereby it is possible to identify rather easily the insect or other agent which produced the malformation in the mature apple. The identification is based on a careful comparison of the injuries produced by different insects and by mechanical and other agencies where the fruit has been protected from possible injury from any other source. Thus it is possible, with a little practice, to determine the exact cause of the defect.

These experts also maintain that it is possible to eliminate almost altogether the common blemishes of apples if the orchardist will follow a routine system of spraying which has already proved effective in controlling the insect pests and diseases which contribute primarily to the production of defective fruit.

THE DIFFERENCE BETWEEN A PLUM AND A CHERRY TREE

(By Science Service)

Can you positively distinguish between a cherry tree and a plum tree in the spring of the year before the trees carry fruit? You may think that you can, yet, so similar are some cherry and plum trees that eventually you will surely fail unless you employ the simple rule that trained horticulturists follow. That one infallible guide is this: The leaves of the cherry, both in the bud and just after emerging from the bud, are folded together like the pages in a book, while those of the plum are rolled up like a magazine. And, by the way, the leaves of the peach are folded like those of the cherry, and the leaves of the apricot are rolled like those of the plum.
