

## Fading Away

Our whole universe seems to be fading away to a point where practically no matter will remain, and all space will be filled with radiation, travelling from nowhere to nowhere. The possibility of this state, in the far distant future, is indicated by calculations made by Dr. Louis S. Kassel, of the Gates Chemical Laboratory of the California Institute of Technology. The current issue of the *Physical Review* carries the technical details of his calculations.

Dr. Kassel bases his work on recent theories of P.A.M. Dirac, prominent English physicist, on the nature of the proton that makes up the inner part of the atoms of matter. According to these theories, the electrons, the other parts of the atom, can exist in certain states in which its mass is negative, or less than nothing. In such a state, according to Dr. Kassel's summary of the Dirac theory, the electron's energy is also negative, or less than none at all, and becomes still less the faster it moves. Dr. Kassel derives mathematically an equation which permits a "vanishingly small amount of matter."

"Our result may be regarded as in some measure supporting the view that if any matter is to be preserved in the final equilibrium of the universe it must be rescued by the tendency of matter toward aggregation," Dr. Kassel says. "But the evidence of astronomy suggests that the stars are constantly gaining matter in the form of dust and meteors, transforming it into radiation and sending it back into space; this may mean, of course, that the universe cannot save its matter by any device and that it is steadily fading away. On the other hand the evidence of the cosmic rays may be supposed to indicate that in the depths of space radiation is converted back into matter; if this process is occurring it can only mean that the foregoing calculation, and all others of a similar nature, are utterly incorrect."

*Astronomy*  
*Science News-Letter, April 19, 1930*

## Vitamin in Salmon Oil

Salmon oil, now looked upon as a fisheries by-product of no great value, is a good source of the rickets-preventing vitamin D, now considered essential for the raising of chicks and other young animals as well as for the proper rearing of children.

So the American Chemical Society learned at its recent meeting from

E. M. Nelson of the U. S. Department of Agriculture and J. R. Manning, of the U. S. Department of Commerce. The two chemists tried out a number of oils from commercially handled fishes, and discovered that salmon oil, though not the most abundantly produced of these, is nearest to cod liver oil in its vitamin D concentration. As extracted by the present methods, which are not especially good from the vitamin standpoint, salmon oil is about equal in potency to the poorer medicinal grades of cod liver oil. Since the potential supply of salmon oil is five times as great as the present domestic supply of cod liver oil, these findings are regarded as significant.

*Nutrition*  
*Science News-Letter, April 19, 1930*

## Squeezability

Measurements of the speed of ultra-sound waves, vibrating 400,000 times a second, twenty times as fast as the shrillest audible sound, in various solutions of chemicals was described by three Johns Hopkins University chemists. Speaking before the section on physical and inorganic chemistry of the American Chemical Society, Drs. E. B. Freyer, J. C. Hubbard and D. H. Andrews told of their work with the sonic interferometer. From such measurements can be determined the compressibility, or "squeezability" of the liquid. The chemicals tested were solutions of chlorides, bromides and iodides of potassium and sodium, including common salt.

*Physical Chemistry*  
*Science News-Letter, April 19, 1930*

## Great Wall at Ur

Ur of the Chaldees, the place in which the patriarch Abraham spent his boyhood, was a town of canals and harbors, and round the city limits rose a great encircling wall, according to a report just received from C. Leonard Woolley, director of the Joint Archaeological Expedition of the University of Pennsylvania Museum and the British Museum to Mesopotamia.

For two and a half miles, the excavators have traced the remains of the wall which once defied the enemies of Ur. The wall was built by King Ur-Engur, who ruled about 2300 B. C., or about three centuries before Abraham's time.

The base is a rampart of mud brick, surmounted by a burnt brick wall. The defense rose 26 feet high and spread 70 to 90 feet in width.

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The front of the rampart sloped sharply down, and for much of its length was washed by the waters of a wide canal.

"One of the most surprising discoveries we have made is that the Ur of 2500 B. C. was a city of waters," Mr. Woolley states. "We found that it was almost entirely surrounded by water. The Euphrates ran to the west of it, canals along its north and eastern ends, and to all appearances a canal was dug right through the middle of the town close to the limits of the Sacred Area."

A large harbor enclosed by long walled moles reaching out from the rampart, and a smaller harbor inside the town wall, have been located.

Four temples, one built by Nebuchadnezzar, and two built earlier, in the days of Abraham, have been brought to light, Mr. Woolley reports. Two of the temples are now being excavated. One of the temples of Abraham's time was dedicated to the Water-God, and the other to a deity named Ningishzida, the brother of Adonis.

*Archæology*  
*Science News-Letter, April 19, 1930*

## Kava

"Ginger moon" paralysis, which has recently caused public health officials in some of the southern states a good deal of trouble, has an analogue in certain of the happy isles of the South Pacific. Only there the paralyzing effect of the local beverage is known and allowed for in advance, and its consequences are not so serious as they are in this country.

The natives of the islands of Western Polynesia, says Prof. W. J. G. Land of the University of Chicago, make a drink called "kava" out of the root of the shrub *Piper methysticum*, a member of the pepper family. Prof. Land had an opportunity to observe the peculiar effect of this potent variety of home brew some years ago, when he was on a botanical exploration trip in the South Pacific region.

The drink has two mutually opposing effects on its imbibers. When a man has taken a sufficient quantity of it, he becomes exceedingly quarrelsome, but at the same time he becomes completely paralyzed from

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the waist down. He thus forms all sorts of hostile intentions, but is unable to move a step toward putting them into execution.

When the men of a village prepare for a kava drinking party, Prof. Land says, they seat themselves on the ground, leaning against the posts of one of their big circular huts. They maintain intervals that will just permit them, by stretching a bit, to pass a coconut shell full of the brew from hand to hand. The shell goes round, replenished at proper intervals by girls who do not drink any of it themselves.

The drinkers soon begin to grow intoxicated and quarrelsome. They curse each other, to the extent that the limited Polynesian vocabulary of impoliteness will permit, and utter dire threats of mayhem and murder. But their legs are helpless, so all the sound and fury signifies nothing. Presently the liquor finishes its work, and the drinkers topple over and fall asleep. By morning their legs and tempers are all right again, and everybody goes off amicably to try his luck at fishing.

*Toxicology*

*Science News-Letter, April 19, 1930*

### Genghis Khan Destroyed It

Rich finds from an ancient city destroyed by the Mongol conqueror Genghis Khan have been made by Prof. B. P. Denike, of Museum of Oriental Culture, of Moscow. Prof. Denike has returned from an expedition which carried him southward through Soviet Central Asia as far as the northern border of Afghanistan.

Near this border he found the ruins of old tombs, and the high walls and fortifications of the city of Termeza, abandoned since the middle ages. A survey showed that the ruins spread over a large area of the barren, dead region. His excavations brought to light a large building decorated with fine carvings, which show the close relations between the art of Central Asia in the middle ages and the art of the Tigris and Euphrates valley. This supports the records of medieval travelers and geographers, who described the trade relations of these regions.

Three successive cities had stood on the site. The oldest was a Buddhist city, fragments of Buddhist statues

and architectural ornaments showed. The upper part of a terracotta statue of Greek type was also found buried in this far-away Asiatic city.

The expedition is considered very successful in that it has revived knowledge of the former culture and art in this forgotten corner of Asia. The area explored was once a stopping place along the highway traveled by merchants from China and other parts of the East heading into western Asia and Europe.

*Archæology*

*Science News-Letter, April 19, 1930*

### Bees' Mental Clocks

Bees don't carry wrist watches and they don't have any alarm clocks in their hives, but they are always on time for meals just the same. Not only that, but they quickly learn of changes in feeding-time and adjust their schedules accordingly.

The time sense of bees has been investigated by I. Beling of Berlin-Dahlem, who has reported his results to the scientific journal *Die Naturwissenschaften*. He set out saucers of sugar-water at a given hour of the day. In a couple of days the bees knew when to expect the "hand-out," and turned up on time, or even a little before time. They kept it up even when he stopped offering free food.

Then he changed the hour, and also increased the number of feedings to two, and in some experiments to three. The bees quickly learned the new schedule.

*Comparative Psychology*

*Science News-Letter, April 19, 1930*

### Night Landing

An aviator coming to earth through a dark sky can see a landing field covered with whitewashed crushed stone 15 times as well as he can see one paved with asphalt, aviation lighting engineers of the General Electric Co. report. To light both fields equally well, 15 times as much light is required for the asphalt as for the rock.

Many surfaces have been tested and given a reflection factor. The stone reflects 75 per cent. of the light it receives and the asphalt reflects five. For Portland cement the figure is 30 per cent.; for crushed stone, 25; crushed slag, gravel and clay soil, 20; sandy soil, 10 to 12; cinders, five to 10; black soil, five to eight; and asphalt, five.

*Aviation*

*Science News-Letter, April 19, 1930*

### Vitamin Overdoses

That there can be too much of a good thing has been demonstrated

anew by a New York biochemist, R. F. Light, who spoke before the meeting of the American Chemical Society. He fed to experimental animals heavy overdoses of vitamin D, the substance that prevents rickets. In this overdosage it carried its preventive activities too far, making it impossible for the animals to reproduce their species after the second generation.

Other studies in vitamin overdosing were carried out by Mr. Light in collaboration with G. E. Miller and C. N. Frey. In these it was found, among other things, that too much vitamin D produces a condition resembling pellagra, which could be delayed, though not prevented, by the administration of vitamin G, the pellagra preventive vitamin.

*Nutrition*

*Science News-Letter, April 19, 1930*

### Electric Eye

An electric eye, sensitive to color changes too minute for the human eye to detect, now watches chemical analyses, allowing the weary scientist to relax from the strained attention he once had to bestow on a tube of fluid in order to catch the fleeting hue that told him what was going on in its world of invisible ions and molecules.

Many chemical analyses depend on color changes to tell of their progress. The old familiar blue-litmus test was a crude example. The modern method consists of putting a tube or cell of the fluid to be watched between a light and a photoelectric cell. The latter is a tube or bulb lined with potassium or some other metal, and it is so constructed as to give off a minute electric current when light strikes it at a sufficient intensity.

The color in the fluid to be tested may be too dense at first for the light to strike through and reach the photoelectric cell. But as the reaction proceeds the color fades. At just the critical point the light strikes through, touches the sensitive lining of the photoelectric cell, and the resulting current notifies the waiting chemist by ringing a bell, lighting a lamp, or in some other way. Or it may merely be used to cause an electric pen to make a line on a sheet of recording paper, thus registering the result of the experiment while the chemist is fast asleep at home or taking a bridge lesson from his wife, instead of burning the midnight oil in his laboratory.

*Physical Chemistry*

*Science News-Letter, April 19, 1930*