

GENERAL SCIENCE

Sugar in Blood Protects Against Poison of Alcohol

Spring Meeting of National Academy of Sciences Reviews Topics From Atoms to Mountain Peaks

CHAMPION "Old Soaks," in the days when the West was wild, used to gulp down a lot of olive oil before settling down to an evening of serious drinking. They might have done better had they raided the candy counter instead, it is indicated by recent physiological researches on the effects of alcohol and what to do about them, reported by Drs. Howard W. Haggard and Leon A. Greenberg of Yale University, before the National Academy of Sciences at Washington, D. C.

The intoxicating effect of alcohol on the brain is powerfully counteracted by the amount of sugar in the blood, the two Yale researchers found. The concentration of alcohol needed to kill a rat with one-tenth of one per cent. of sugar in its blood is more than 20 per cent. higher than the concentration needed to kill when the blood sugar has been reduced to seven hundredths of one per cent. But if the blood sugar is raised to two tenths of one per cent., the alcohol needed to kill must be increased by 60 per cent.

There is a limit to the protective action of sugar, however. Drs. Haggard and Greenberg artificially raised the rats' blood sugar to concentrations impossible to attain in any natural manner, but found that these did not increase the protective action.

The two physiologists stated: "Our investigation has been made chiefly on rats, but we have evidence that men react similarly."

The Blood's Scrap Iron

Scrap iron, which has suddenly moved from the junkpile to the page one news of a war-worried world, is important also in the upkeep of the blood that flows in our arteries and veins. Scientists attending the meeting of the National Academy of Sciences heard the story of our internal scrap iron from Prof. G. H. Whipple of the University of Rochester.

When red blood cells wear out, said Prof. Whipple, they break down into three kinds of "scrap": iron, a pigment called hemin, and a protein molecule

called globin. The iron is carefully stored for future use. The hemin is thrown away—discharged as bile pigment into the intestine. The big protein blocks of globin are probably used again in the building of new hemoglobin for the new blood, but we do not understand the mechanism of this at all well as yet.

The liver and the red marrow of our bones are the chief manufacturing plants of new red blood cells, continued Prof. Whipple: "We may imagine that the liver produces the building blocks or chemical aggregates and the bone marrow acts as the 'assembly line' from which roll the finished red cells packed with hemoglobin."

From experiments on new blood formation in dogs, Prof. Whipple has found

that best of all foodstuffs for the purpose are animal "giblets," especially liver, kidney, pancreas, and stomach (tripe, to the trade). Green vegetables occupy an intermediate position. Some fruits are good, others of little value. Grains and dairy products, despite their high usefulness in other respects, are poor in the factors which cause new hemoglobin production in anemia.

"Hurry-up" Water

"Heavy" water, that is, water containing double-weight atoms of hydrogen, or deuterium, instead of ordinary light-weight hydrogen, might well be rechristened "hurry-up" water, from its physiological effects. These were described by Dr. Henry Gray Barbour of Yale Medical School.

Substitute "heavy" water for half the natural water in a mouse's body, and the mouse dies, Dr. Barbour said. The animal can, however, survive the substitution of one-fifth of its bodily water content with "heavy" water, he said, though only at the price of rather severe physiological disturbances.

In general, these effects are like those produced by strong stimulation of those



STONE AGE CITY

No longer can Stone Age men be regarded one and all as benighted primitives. Evidence that they rose to the proud estate of city folks has been unearthed in a thirteenth layer of ruins at "the world's oldest city," Tepe Gawra, in Mesopotamia. Prof. A. E. Speiser, unearthing these city buildings over 6000 years old, reports to Prof. Millar Burrows of Yale that people still in the Stone Age built an acropolis, with awe-inspiring temples around a court, and dwellings on the remaining side of the enclosure. He calls these ruins the earliest known example of monumental architecture. The expedition is a joint project of the American Schools of Oriental Research, University of Pennsylvania and Dropsie College.

nerves known as the sympathetic nervous system. The rate of physiological processes is speeded up by 20 per cent. or more, and the body temperature usually rises. The hair stands on end, the eyes pop out—in general, the mouse gives every appearance of having been “pepped up” too much.

The whole complex of effects can be reversed, and the mouse quieted into a state of apparent normalcy by the administration of the drug ergotamine, which is specifically depressant to the sympathetic nervous system.

Heights Once Abysses

Where now the Appalachian mountain system raises its tree-clad peaks and ridges, there was once a tremendous abyssal ocean trough.

Evidence in support of this thesis was presented by Dr. Rudolf Ruedemann of the New York State Museum.

Great masses of rocks in the Appalachian region now contain as their principal fossils the skeletons of one-celled animals laid down hundreds of millions of years ago. Yet the same species are alive today, found only in ocean depths of 12,000 feet or more.

There is no reason to suppose that these extremely conservative species have changed their ways in all that time, so it is only logical to suppose that the present mountains were once submerged in the sea to several times their present heights above sea level.

The Fatter the Hotter

Popular impression that fat folks are warmer than thin ones received quantitative scientific backing in a report submitted by Drs. F. G. Benedict and R. C. Lee, of the Nutrition Laboratory, in Boston, of the Carnegie Institution of Washington.

Drs. Benedict and Lee worked with geese and mice rather than with men, but presumably their findings should hold good in a general way for our own species. The fatter the goose the more body heat it gave off, they found. The amount of heat produced per pound of weight was about the same for fat geese as for thin ones, so that the total amount of heat given off was approximately proportional to the size of the bird.

With mice it was much the same story. The two physiologists used three sizes of mice: an ordinary white mouse weighing about two-thirds of an ounce, a giant fat mouse weighing two ounces, and a midget mouse weighing only a trifle over a quarter of an ounce. The fat mouse proved the most effective small animal furnace of the three.

Spacing of Atoms

From interstellar immensities of space, where distances are measured in millions of light-years, to the infinitesimally minute distances between atomic nuclei in molecules, is the scientific leap that has been made at the Mount Wilson Observatory of the Carnegie Institution of Washington. Dr. Harold D. Babcock, physicist, told the Academy about it.

The distance apart of the nuclei of oxygen atoms has been inferred from the distances apart of the bright lines caused by glowing oxygen in a spectrograph. They are of the order of a hundredth of a millionth of a centimeter. A centimeter is less than half an inch.

If the internuclear distance varies by as little as a millionth of a millionth of a centimeter, the instrument can detect the change. It might be likened to the astronomer's ability to detect the “perturbations” of a planet millions of miles away, when it swings a fraction of a second of arc off its predicted course.

Automotive Crystals

Crystals that move under their own power, giving a curious illusion of being “alive” were demonstrated in motion pictures by Prof. R. W. Wood of the Johns Hopkins University.

The crystals are of a relatively little studied substance, protocatechuic acid.

The phenomenon of these moving crystals was first noticed in 1888 by a chemist named Otto Lehman, and then apparently quite lost sight of.

Under certain conditions, the crystals develop in the form of branched rods like the claws of a lobster. The joints straighten out by a progressive motion of the sharp angle of bend, which in one or two seconds runs along the crystal to the tip, the bent rod becoming straight.

Large clusters of these crystals sometimes form, and there is constant movement of the “colony” as the bent rods straighten out and the finger-like tips come together and fuse.

Sleepers' Brain Waves

Brain waves, the rapidly fluctuating electrical potentials that can be detected by delicate electrical apparatus through skull and scalp, can be used to tell something of the mental state of a person while asleep. Experiments in this field were reported by Prof. E. Newton Harvey of Princeton University, and Dr. Alfred L. Loomis and Garrett A. Hobart III of the Loomis Laboratory at Tuxedo Park, N. Y.

Persons whose brain waves are predominantly of the “alpha” type (ten per second) pass through four stages as sleep becomes deeper and deeper: (1) more



GIANT HOISTING CRANE

The large structure at the center will lift 270 tons. It is one of the largest of its kind and was used to place huge parts in the hydro-electric turbine equipment at Wheeler Dam, part of the TVA project.

and more marked interruption of the alpha rhythm, (2) its complete disappearance, (3) large random waves, (4) random waves plus bursts of 14-per-second waves.

One subject who fell asleep while trying to carry out a set of instructions as he lay on the couch was awakened by the slamming of a door. Just before he became evidently awake his normal "alpha" brain-rhythms reappeared on the record. For at least this type of person, the experimenters stated, they have become able easily to distinguish the states of sleep.

Breathing While Reading

Did you ever try to talk or sing with your head inside a bucket?

That is what volunteers did in the psychological laboratory of Prof. Walter R. Miles of Yale University.

The subjects' heads were not exactly in a bucket, but in a roomy metal helmet with a closely-fitting but comfortable thin rubber collar around the neck, so that their breathing rates could be measured.

Contrary to what might be expected, the persons tested breathed more rapidly when they were resting than when they were reading aloud or singing. The less frequent breathing during such activities, however, tended to be deeper, and there was a larger storage of reserve air. The reserve is restored to normal level when the resting phase is resumed.

Science News Letter, May 1, 1937

PHOTOGRAPHY-NUTRITION

Obtain Rare Photograph Of Vitamin B₁ Crystals

See Front Cover

DID you ever see a vitamin? Of course, they don't really look like the alphabet letters in soup, but did you picture them in your mind as anything like the one shown on the cover of this week's SCIENCE NEWS LETTER?

In that rare photograph is shown vitamin B₁, the one found in whole cereals, green vegetables, fruit, milk and yeast, lack of which causes nervous and intestinal malfunctions, loss of appetite and weight.

The picture was taken by Professors W. A. Hynes and Leo Yanowski, of Fordham University's chemistry department. It was taken with a two-minute exposure by reflected light at a magnification of 20 diameters.

Science News Letter, May 1, 1937

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Chimpanzee Is New Ally In Attack on Drug Problem

Philosophical Society Hears Reports Also on Why Chinese Are Calm; New Findings on Heredity

DRUG addiction is not limited to human beings. Sub-human animals can become "dope fiends," too, Drs. Robert M. Yerkes and S. D. Spragg of Yale University reported before the meeting of the American Philosophical Society at Philadelphia.

Drs. Yerkes and Spragg first trained a number of chimpanzees to submit, wholly voluntarily, to hypodermic injections and a number of physical manipulations. Measurements of physical and psychological reactions in the undrugged, pre-addiction stage were then made.

After this, the apes were given injections of morphine, and its effects on their bodily and mental reactions checked against those of their normal state.

One of the animals became a real addict. It would seek the drug injection before it was offered, and if given the choice between food and the needle, would choose the latter.

"It is believed," Dr. Yerkes stated, "that this is the first instance to be reported in which a pronounced desire for morphine, indicated by striving for the injection, has been convincingly demonstrated in an infrahuman animal."

Placid Races

Chinese calm, the placidity of the women of India, is partly a matter of lower life fires, of a slower burning of food into energy, Dr. Francis G. Benedict of the Carnegie Institution of Washington reported.

Studies on representative members of various races, quite literally "ranged through the world from China to Peru," have been made by physiologists trained in the study technique developed in Dr. Benedict's laboratories in Boston. A collation of their results shows that metabolism, or production of body-energy, is to a large extent a matter of race.

Oriental races in general, it was found, have a metabolism rate lower than that of Caucasians in the United States. The South Indian women of Madras have a very much lower rate—17 per cent. below the Caucasian prediction standards

—and this is further depressed about ten per cent. during deep sleep.

A striking exception to the generally low metabolism rate in the Orient was found in 24 men of the Miao race in Szechuan, in interior China. These individuals showed a metabolism rate 16 per cent. higher than the Caucasian prediction standards. Yet their pulse rate was decidedly slow—55 beats per minute as compared with an average of 75 for Caucasians.

High metabolism rates prevail for American Indians of the Maya and Chilean regions, other investigators found.

Predestination in Noses

Babies' noses are merely comic to most persons, but to Dr. Charles B. Davenport, formerly director of the Carnegie Institution's Department of Genetics, they already bear signs of the ultimate fate of the infant's face. He reported to the meeting his measurements of many hundreds of infantile noses, and their subsequent developments.

Noses are pretty much predestined to the shapes they will finally have, even before we are born, Dr. Davenport indicated. Like everything else about us, their fate is ruled by hereditary units, the genes.

Where the gene complex of two noses is the same, as in identical twins, the result is practical identity of the nose form. Differences in genes, by family or race, will show up in characteristic family or race noses.

In some infants the eventual shape of the nose is foreshadowed pretty plainly at birth. In others, however, there are differences in rate of growth of different parts that bring about very marked changes as the child grows up.

Riddle in Heredity

Like does not always beget like, Prof. George H. Shull, veteran Princeton University geneticist, has found in his breeding experiments with the widely distributed little wild plant known as shepherd's purse. He reported a genetical riddle to the Philosophical Society.

A yellow-green plant appeared among