BOTANY

Goldenrod Rubber Found Only in Leaves

GOLDENROD rubber is found only in leaves. Stems and roots of all species of goldenrod contain none of it. Hence, if this country is ever compelled to resort to native plants as sources of rubber, goldenrods with plenty of leaves and relatively little stems would be the kinds to cultivate.

These are among the findings of Loren G. Polhamus of the U. S. Department of Agriculture, based on analyses of 24 species of goldenrod. His results are published in the *Journal of Agricultural Research*.

The desirable goldenrod should not only have plenty of leaves, but a high rubber content in the leaf tissue, Mr. Polhamus says. There is a great variability in rubber content among species, and even within a single species different samples will show differences of a hundred per cent. or more.

The highest individual score was made by the leaves of a goldenrod species known botanically as *Solidago altissima*. The best sample showed 6.34 per cent. of rubber in its dried leaves, and all samples of this species have a mean of 3.45 per cent. This particular kind of goldenrod is very widely distributed, occurring from New England through Michigan to Kansas and in most states south of this line.

Science News Letter, September 23, 1933

INDUSTRIAL PHYSIOLOGY

Machines To Fit Men Urged for Better Results

DO NOT FORCE the workman who runs your machine to stoop and peer and assume unnatural positions at his work. Design the machine to fit the man, make his work easier and more natural, and it will pay better dividends, both economically and socially.

So advised Dr. G. H. Miles, director of the National Institute of Industrial Psychology, speaking before the Leicester meeting of the British Association for the Advancement of Science.

Dr. Miles summarized the limitations now imposed on much industrial machinery under six heads:

"Fatigue, which may be caused by: badly arranged controls or working positions; unduly heavy muscular effort; harmful posture, etc.

"Rhythm of machine operations which do not fit in with rhythm of worker.

"Working or observation points being badly placed.

"Attention being distracted by moving parts.

"Attention being distributed in cases where concentration is essential to efficiency.

"Frustration of effort owing to bad design, in setting up, stripping and clearing machines."

There is a penalty exacted by the machines themselves if they are badly designed with relation to their human attendants. Dr. Miles pointed it out in his conclusion:

"Human effort can and does overcome many of the defects of machine design, but at a great loss of efficiency. The quality of work often suffers, and the wholly unnecessary strain is detrimental to human well-being. For the highest efficiency the machines should be designed to fit the human being. In cases where there are insuperable mechanical or process limitations, the workers should be specially selected to suit the peculiarities of the machine or process."

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PSYCHOLOGY

Students "Think Out Loud" In New Type of Examination

A NOVEL type of examination in which the subject is not required to write anything, or even to give direct answers to questions, was described to the meeting of the American Psychological Association by Ralph K. White of the niversity of Chicago.

In this type of quiz, which students are reported to find very enjoyable, the individual is presented with a problem he has selected as seeming interesting and is requested just to think aloud. These musings are taken down in shorthand. This record serves as a fairly reliable index to his aptitude for certain types of intellectual work, Mr. White has found.

The problems selected are matters of dispute among scientists—theories decidedly open to argument on either side. The person examined is not expected to settle the question: he is rated on the type of reasoning he displays.

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IN SCIEN

MEDICINE

Pollen Proteins Cause of Hay Fever

BLAME for hay fever may be pinned on the proteins in the sneeze-producing pollens, rather than on their sugary or starch constituents. This was indicated by a paper presented before the meeting of the American Chemical Society in Chicago by Dr. Marjorie B. Moore of the Abbott Laboratories and Dr. Leon Unger of Northwestern University Medical School.

There has been some division of opinion in scientific circles over the ultimate cause of hay fever. Some investigators have held that it is due to pollen proteins, while others have been of the opinion that certain sugar- or starch-like bodies, called polysaccharides, are to blame.

Drs. Moore and Unger exposed hay-fever-causing pollens to the action of pepsin, which digested away most of the protein in them, leaving the polysaccharides unchanged. The pollens thus treated lost much of their mischief-raising power.

The case against the pollen proteins is thereby strengthened and the polysaccharides exonerated of the suspicions which had been raised against them.

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ASTRONOMY

Fourth of Stars May Be Doubles

ONE STAR in every four may be a double, with two suns swinging about a common center of gravity between them. Older estimates, which set the ratio of double stars at one in eighteen, have received a new shaking by the discovery of 2,350 hitherto unknown doubles in the southern sky, during a five-year survey by University of Michigan astronomers working at the Lamont-Hussey Observatory at Bloemfontein, South Africa, under the leadership of Dr. R. A. Rossiter. Dr. Rossiter's results have just been published by the Royal Astronomical Society.

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CE FIELDS

PALEONTOLOGY

Huge Dinosaur Footprints Found Along Texas Creek

SOMETHING with feet even bigger than Primo Carnera's ambled along the wet shore of a river or lake in what is now Texas, somewhat over a hundred million years ago, and left footprints that were subsequently buried and hardened into stone. There were, in fact, three of these Somethings, presumably dinosaurs, for three different sizes of tracks were discovered along about 200 feet of the rocky bottom of Hondo Creek by Claud Mangum, an employee of the Humble Pipe Line Company, near where the pipe line crosses the creek.

All the tracks are three-toed. The biggest of them measures 16 inches wide, from toe-tip to toe-tip, and is 16 inches long, from the tip of the middle toe to the heel. There is a second set of tracks 14 by 14 inches, and a third only 10 by 10. The longest pace measures six feet, the shortest four feet. The depth of the prints varies from one to five inches.

A brief description of the Hondo Creek fossil footprints, with photographs, has been sent to the *Journal of Geology* by Sam H. Houston, Jr., of Houston, Texas, and will be published in the forthcoming issue.

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ECOLOGY

Leafy Succulents Solve Problem Set by Desert

See Front Cover

DESERT plants have a particularly hard problem to solve, set by that old Sphinx, the desert itself, and if they fail to solve it the penalty is the same as that exacted in the old Greek myth—they must die. They must spread a sufficient chlorophyll surface to the sun to enable the indispensable food-making processes to go on; yet they must deny the imperious demands of that water-greedy fiend, the dry desert wind. They must store enough of food and water to tide them over the droughty periods, and enable them to go through the energy-taking process of flower-formation and seed-bearing.

Leafy succulents of the crassula family have found one quite successful answer to this exacting problem. They spread their leaves in a low, compact rosette right at the surface of the soil or rock on which they grow. By filling up every chink in the circle thus marked out, they waste no scrap of sunlight. At the same time, by keeping close to the ground, they avoid much of the thirsty wind's attack. Their leaves, moreover, are severely economical in outline, with no lobes or incisions which would increase the evaporating surface. The whole plant is protected within a thick cuticle and covered with a waxy bloom —armor against water loss. The leaves are thickened, and within them the reserve of water and foodstuffs is stored against the season of need. All round, these little plants must be counted as having met and mastered the challenge of the desert.

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PSYCHOLOGY

Stutterers Likely to Be Tall, Flat-Chested Men

STUTTERERS are nearly all of the tall, thin, flat-chested build known to psychiatrists as the asthenic type, it appears from a study of the bodily form of stutterers reported.

Forty-one stuttering men, ranging in age from 15 to 30, were given anthropological measurements and personality evaluations at the University of Iowa by Dr. Lee Edward Travis and two associates. A surprising proportion, 75.6 per cent., were found to be of the tall, thin build. Less than 10 per cent. were of the athletic type, that is, tall with broad shoulders, full chest and prominent muscles. Not one was of the short, fat, broad-faced type known as the pyknic build. A large proportion were of a self-centered introverted personality.

But this does not mean that the person's build determines whether or not he will stutter, the investigators point out. Rather they conclude that the stuttering, the physical type, and the personality type are all constitutionally determined. The reason that all persons of the asthenic build do not develop a stutter is because other contributing hereditary and environmental factors are not present in all such individuals.

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COSMOLOGY

Universe Described As Born Literally In Single Flash

VISIONING the universe, with all its uncountable stars and galaxies of stars, as born literally in a flash, Abbé Georges Lemaitre, brilliant young mathematical physicist of Louvain University, suggested a high rate of cosmic evolution during its first stages of development, with a later slowing down of the rate as the galaxies formed themselves. "An astronomic instant" was the Abbé's phrase. He spoke at a symposium on the expanding universe at the recent meeting of the British Association for the Advancement of Science.

Prof. Willem de Sitter of the University of Leiden, whose cosmic theory Abbé Lemaitre reconciled with that of Einstein, sees the universe as capable of contraction as cataclysmically rapid as is its present apparent rate of expansion. But he advanced mathematical reasons for not believing that it will vanish, whirlpool fashion, into the single astronomical point in space and instant in time whence it was born.

Sir Arthur Eddington, noted Cambridge physicist and author, gave a new estimate of the cosmic rate of expansion, based on the "uncertainty principle" of Heisenberg. The galaxies, he said, are scattering apart at a rate which doubles their distance from us and from each other in about 1,300,000,000 years.

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PSYCHOLOGY

Work Is Easier In Morning Hours

IS THERE a daily rhythm in work efficiency? A new approach to this question was reported to the American Psychological Association.

It is useless to measure work output at different hours of the day, unless some measure is also made of the amount of energy put into the task, Dr. G. L. Freeman of Northwestern University reported. This he has attempted to do by requiring subjects to do the same amount of work at different hours of the day and measuring the energy expended.

It is least in the morning and rises to a maximum in the late afternoon. The energy used during rest, however, was greatest in the early morning and least right after lunch.

Science News Letter, September 23, 1933