

THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

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BRITISH RUBBER MONOPOLY STIRS AMERICAN SCIENTISTS

Scientists see a challenge to American ingenuity in conditions revealed by a meeting at Washington of leading raw rubber consumers to protest against restrictions placed by the British on rubber exports from the Malay Straits. America, which uses about three-quarters of the world's rubber, should establish sources independent of the British monopoly, it is urged.

British planters now virtually control ninety percent of the world's raw rubber. Should war cut us off from this source or some destructive insect wipe out the plantations of the East Indies, untold suffering would result in this country. Should we become involved in war ourselves, we might be seriously hampered for lack of rubber as we were in the last war.

In the Philippines there are a million acres of potential rubber plantation land on which Para rubber could be raised on the same system used by the British and Dutch in the East Indies. Philippine land laws which restrict holdings to no more than 2,500 acres stand in the way, and American manufacturers have been afraid to start plantations in the Philippines because of the uncertainty of their political future. The British and Dutch have built up the plantation rubber industry with cheap and plentiful coolie labor. In South America, the original home of the raw rubber trade, the supply comes from the rubber trees which grow wild and there, too, the relative scarcity and high price of labor prevents the cultivation of these trees in competition with the coolie labor used by the Dutch and British in the Far East.

In Central America, the rubber is obtained from a different tree, Castilla, but this tree cannot be tapped repeatedly as can the South American tree, Hevea, which the English and Dutch have brought under cultivation in the Far East.

Agricultural experts here, however, think that there is a possibility of raising rubber from this Central American tree under the typical American system of extensive farming with little labor, in much the same manner that the turpentine and resin industry is carried on in our Southern states. They say that the trees could be planted, left to themselves and then tapped to destruction, or the trees cut down and all the rubber milk extracted and the wood then used for paper or other purposes. The land is available and experiments should be carried on to determine whether such a system offers a solution to rubber raising in this hemisphere in competition with the cheap coolie labor of Asia.

Not only may this be done, but great supplies of low grade rubber, although lacking the elastic properties of the material obtained from the South and Central American trees, can be obtained from a number of plants of this country and Mexico. This rubber, mixed with the more elastic product, forms a product of greater strength than the pure South American or Central American rubber.

Guayule, a Mexican plant, has been utilized to furnish this class of rubber and scientists of the Carnegie Institution of Washington, who have been experimenting with rubber-producing plants in our Southwest since the World War, called attention to the necessity of our having a home-grown supply. They have also found that the desert milkweed, offers possibilities of development into a practical source. The stems of this milkweed, which grows in scattered clumps in the Southwest, carry from two to six and one-half per cent of rubber. This is too low a yield to justify the growing of the plant on a commercial scale, but the nature of the plant indicates that this percentage can be materially increased by well known methods of breeding and selection.

The fiber of this desert milkweed makes good paper. The paper yield is about thirty per cent of the total weight of the dry plant. By using both the rubber and the fiber they point out, it may become an economically important plant, not only helping to furnish a home-grown rubber supply, but also putting to use vast extents of land now lying idle in our western states.

Brazil up to 1910 had a monopoly on the world's raw rubber, obtained from the wild trees, and maintained by restrictions against the export of the seed of rubber plants. In 1876, however, an English scientist smuggled a shipload of seed to England. From botanical gardens there, seeds were sent to Ceylon and the foundation of the plantation rubber industry of the Far East was laid. Rubber trees were scientifically bred and trained, like cows, to give greater quantities of milk.

It was the growth of the automobile industry, in America, however, which created the tremendous demand that enabled this infant industry to outstrip the wild rubber of South America, and made the center of the world's rubber industry bounce to the other side of the globe. But the supply grew faster than the demand, and in order to keep up profits, the British imposed an export tax last November to limit production. The demand is still growing, however, and threatens to again overtake the supply, while the British restrictive measure, it is estimated, will at present cost add \$200,000,000 to the bills of automobile owners and other rubber consumers. Further advances may send prices still higher.

READING REFERENCE- Geer, William C. The Reign of Rubber. New York, The Century Company, 1922. \$3.00. Slosson, Edwin E. Creative Chemistry, Chap. VII. The Race for Rubber. New York. The Century Company. 1920. Firestone, Harvey S. America Should Produce Its Own Rubber. Akron, Ohio, 1923.

SCIENTIFIC PLAN TO DECENTRALIZE NEW YORK

A scientific plan for the future development of New York City, more thorough and comprehensive than anything of the kind ever before attempted, and including all the territory within 50 miles of Battery Park, is being begun by a committee of experts appointed for that purpose by the Russell Sage Foundation. The committee is known as the "Committee on the Plan of New York and its Environs".

All suburban territory will be divided into six sections and one expert will make a particular study of its problems and of their relation to the whole plan. The survey will include consideration of every phase of city life with special reference to housing, transportation, zoning, and recreation.

The ultimate object is the decentralization of New York to the greatest practicable extent, possibly through the creation of self-contained suburbs or "satellite towns" whose inhabitants will find opportunities for work, education, religious observance and recreation without going to the center of the city. A preliminary report will be made October 1.

Dr. Edwin E. Slosson

CHATS ON SCIENCE

THE SILKWORM'S RIVAL

Man has entered into active competition with the silkworm and although the worm has the advantage of several million generations of previous practice in the art of silk making, man is rapidly catching up. The output of artificial silk has increased five-fold during the last twenty years while the output of natural silk has only gained fifty per cent. More than a third of what seems silk to the eye comes from the factory instead of the cocoon. Some forty million foreign feet are now encased in synthetic silk stockings made in America.

Artificial silk is not silk and should never be sold as such. But if it is, it is not so much because the salesman desires to deceive as it is because the public is unwilling to credit the chemist with the creation of something new or to believe that he can make anything so good as is made by a worm. Of late this unnatural prejudice in favor of nature is being overcome and the new synthetic fibers are being marketed by their manufacturers as they should be under synthetic names. Some of the trade names are viscose, lustron, fibersilk, lustre-fibre, Givet silk, Soie de Paris, Glanzstoff, artiseta, lustracellose. There are a lot of others but I omit to mention them because I can't remember them.

There are four different modes of manufacture but the raw material is essentially the same, cellulose. This is the substance of wood, paper and cotton, so it is cheap and abundant enough but the difficulty is to dissolve it so it can be squirted out of the tiny holes in the spinnerette to form the fibers. Water will not dissolve paper pulp of course, nor will any ordinary solvent except strong acids and alkalies.

The first person to solve the problem was a Frenchman, Count de Chardonnet, who in 1884 deposited with the French Academy of Sciences a sealed document. Three years later this was opened and found to contain a method of making artificial fiber by treating cellulose with nitric acid. The resulting compound, which is a mild form of gun-cotton, can be dissolved in alcohol and ether, like the common colloid that we use to cover our skinned knuckles. But the nitric acid had to be thoroughly eliminated from the yarn, otherwise it was too inflammable.

Another process, invented by the French and worked by the German, got the cellulose into fluid form by dissolving it in a solution of copper and ammonium salts.

In the making of viscose a third method is employed. Wood pulp, such as is used in paper making, is treated with strong soda lye and then with carbon disulfide. This brings the cellulose into solution as an orange liquid. This is forced through minute holes in a platinum nozzle into dilute acid which hardens each fine stream into solid fiber and the sulfide is then removed.

During the war another form of soluble cellulose found extensive employment

as "scac" or dope for airplane wings. This is the acetate, made by dissolving cotton or wood pulp in the concentrated acid of vinegar, acetic. Lustron is made by this process.

These various kinds of artificial fibers differ from one another and all of them differ from natural silk. And in this difference lies their value. For fabrics can be woven out of natural and artificial silk and with cotton or wool in any desired combination. The fabric at first may look white and uniform but if it is dipped in baths of various dyes each thread will attach a particular tint and a complicated design brought out in color.

The artificial fibers and the coal-tar dyes make a brilliant combination and through the aid of this alliance our world has become more colorful and cheerful. Sweaters and hose, neckties and underwear, have blossomed out in varied hue like the flowers that bloom in the spring. The knitting machine has taken a new spurt and is now running a race with the loom. Our ladies may now wear synthetic lace that is shadowed by no thought of toilsome fingers and bent shoulders. They may wear synthetic furs without the sacrifice of wild life.

Man is no longer dependent upon what he can pick up in the plant or animal kingdoms for the new fiber can be made any form desired, flat or round, smooth or rough, thick or thin, and of any length. A single filament may be run out thousands of yards without knot or break.

The man-made fiber is not so strong as the worm-made silk, especially when wet, but this has not interfered with its popularity so much as the fact that it is lacking in scroop. The scroop, as the sound of the word suggests, is the audible evidence of the presence of silk. What is the use of owning a silk petticoat if nobody can hear it as you pass by? But science is overcoming even this obstacle.

READING REFERENCE- Slosson, Edwin E. Creative Chemistry. Chap. VI. Cellulose. New York. The Century Company, 1920.

MT. WILSON ASTRONOMERS DENY REPORTED STAR FLARE-UP

Reported observations from Paris of an extraordinary increase in brightness of the star Beta Ceti are not confirmed by the astronomers at the Mt. Wilson Observatory, which is the best equipped institution in the world for spectroscopic study.

There has been no certain increase in brightness and definitely none whatever in the spectrum of the star, according to Dr. W. S. Adams, acting director. The latter statement is of especial importance as sudden increases in brightness of stars are accompanied with marked changes in the spectrum.

Dr. Adams thinks the star may have been confused with one of its near neighbors in the constellation of the Whale, Mira Ceti. This is a variable star and was known to the ancients as the "wonder star". It fluctuates in brightness over a period of 331 days and is now at its brightest, being somewhat fainter than the Pole Star. There is no evidence at the Mt. Wilson Observatory, Dr. Adams stated, for such an outburst of brilliancy on the part of Beta Ceti as was heralded all over the world on the authority of Camille Flammarion, the celebrated French astronomer. Even if the star had increased in brightness enough to raise it from the

second to the first magnitude, it would not imply, as the Paris dispatches stated, that its heat had been raised ten or fifteen times, for this means only two and a half times its former brightness.

Variable stars and new stars, that is, stars which increase suddenly in brightness, are familiar to all students of astronomy. Several "novae", as these "new" stars are termed, have been observed in modern times. The most recent was the one known as Nova Aquilae III, which became a notable object in the skies during the summer of 1918.

Known for centuries as a quiet unobtrusive little star, visible only through telescopes of fair power, this star suddenly went on a rampage and in the space of a day blazed up to a brightness only exceeded among the stars by that of Sirius, the brightest of all and the most striking object in the midwinter southern sky. After a few days of this brilliant performance the star lost its peppand by October had again faded from the sight of the unaided eye.

Another notable example was Alpha Persei, which about 20 years ago suddenly increased from the brightness of a dim star to one of the first magnitude and like the others of its kind slowly faded again into insignificance. A star in the constellation of the Swan which had been so faint as to be barely visible through a high power telescope also jumped into the spotlight by a similar performance in 1920, although it never achieved more than the second magnitude of brightness.

The cause of these "novae" is a matter of dispute among astronomers but the best opinion is that because of their lack of permanence they are due to effects merely on the surface of the orb. There is an immense amount of heat thrown off and the diameter of the star becomes enormously increased due to the uprushing at inconceivable speed of vast masses of incandescent gas.

READING REFERENCE- Hale, George E. The study of stellar evolution. Chicago. University of Chicago Press, 1908. Lewis, Isabel M. Astronomy for Young Folks. New York. Duffield & Company. 1922.

STARS UNFAVORABLE TO DRIFTING CONTINENTS

The stars do not favor the theory that North and South America were formerly in contact with Europe and Africa and have gradually drifted apart during the last few million years, leaving a rift behind that has been named the Atlantic Ocean, Dr. Harlow Shapley, director of the Harvard College Observatory told the American Philosophical Society recently.

Scientists have been interested during the past year in this hypothesis insistently advocated by Prof. Alfred Wegener of Hamburg.

"The known facts and the most probable conclusions of astronomy are not favorable to the new theory", said Dr. Shapley. "Observations on the variation in longitude and latitude do not make such a theory necessary. The attraction of the moon does not appear sufficient to account for the drifting continents, with the resulting birth of the great mountain ranges of North and South America. The astronomical theory of the origin of the moon does not make it necessary to believe that at one time all the land on the surface of the parent earth was combined in a

super-continent."

The theory accounts for a great many facts concerning the distribution of animal life at the present time, and as well for the distribution and arrangement of geological formations, Dr. Shapley admitted. But many other facts of biology and geology are not satisfactorily interpreted by the theory, or at least they do not demand such a revolutionary hypothesis for their explanation.

He explained: "In its present form the theory holds that during all those long geological periods when fishes, insects, and reptiles were the predominant animal forms, South America fitted into the indentation on the west coast of Africa. At the same time the Atlantic shoreline of Canada and the United States closely fitted the western margin of Europe. Some fifty or more million years ago the great rift is believed to have formed, and the Americas began their western drifting, crumpling up the bed of the eastern part of the Pacific Ocean and thus forming the Andes and mountains of western North America, which date from about that time.

"Astronomical records show that during the last forty years Greenland may have drifted west by about three-quarters of a mile. The early observations are not very definite, however; and there is no positive evidence from accurate modern observations that the American continent is now drifting westward."

RADIO FANS ADVISED TO COPY INSECT ANTENNAE

Solomon advised the sluggard to "consider the ant"; but the modern radio fan is advised to consider the gall midge and other forms of insect life by E. Porter Felt, state entomologist, who lectured in Albany, N. Y. recently on the marked resemblance between the antennae or "feelers" of some insects and the radio receiving sets. He said he had made a successful set patterned after the antennae of the gall midge, a minute fly.

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The solenoid or loop antennae/as are used in indoor receiving sets find almost an exact counterpart in the construction of the antennae of these little insects, and while Dr. Felt did not assert that the insect world is able to listen in on all the radio programs and that the radio orator addresses an invisible audience of bugs, he suggested that these antennae were designed to catch faint vibrations of the air, though not of the ether, and that the same principle serves equally well in both cases.

These receiving sets from Nature's own laboratory are carried wholly by the male insects, Dr. Felt stated; and their probably purpose is to enable them to hear the plaintive love calls of the female from great distances. While this seems obvious in the case of the mosquito, that of the gall midge seems less so for although the male carries the most complete model of a receiving set that is known in the insect world the female makes no noise that is audible to human ears. Whether she has a portable radio sending outfit Dr. Felt did not state.

Nature has, however, evolved a remarkable parallel to the man-made receiving set, he said. To begin with, the antennae of these midges are unusually long so as apparently to take advantage of height. They are looped about with filaments after the nature of a solenoid and the loops are greatly projected in one direction following the well-known principle of directive receiving. Another system of looping approximating the construction of the "bed spring aerial" has also been noted.

Dr. Felt said he had made an indoor aerial after plans suggested by the gall midges and although the first attempt was crude and not an accurate duplication of nature, messages could be picked up from nearby stations with a comparatively simple receiving outfit and that on more than one type of wiring.

READING REFERENCE- Signal Corps, U. S. Army. The principles Underlying Radio Communication. Radio Communication Pamphlet No. 40. Washington, Government Printing Office 1922. Marx, Harry J. and Van Muffling, Adrian. Radio Reception. New York. G. P. Putnam's Sons, 1922. Fabre, J. H. Social Life in the insect world. New York. Century Co. 1912.

INFLUENZA INCREASES NATION'S DEATH RATE

The current epidemic of influenza and pneumonia has been largely responsible for an increase of 9 per cent in the death rate for January over that of a year ago, according to the monthly statement of the Metropolitan Life Insurance Company. The rate was 10.5 per 1000 which is higher than for any January since 1919 when the country was in the later phases of the great epidemic of influenza. Deaths from automobile accidents are the highest of record for January.

The relatively high mortality of the month was due largely to the increased death toll of influenza and pneumonia, together with higher rates for important organic diseases such as heart disease, cerebral hemorrhage and Bright's disease. The present influenza outbreak, like prior ones, has been indirectly responsible for higher mortality from these organic diseases.

Unusual prevalence of influenza was first observed in several Southern states - more particularly, the Carolinas, Georgia and Tennessee. It now appears to have passed its peak in these states, but is developing not only in a number of adjacent sections (Maryland, District of Columbia, Kentucky and Louisiana) but in other parts of the country, for example, Maine, Connecticut, New York, New Jersey, Ohio, Illinois, Michigan, Wisconsin, Nebraska, Kansas and Texas - and, to a lesser extent, in Wyoming, New Mexico, Oregon and California. Pronounced increases in the number of cases and deaths have been recorded in cities located near the southern border like Baltimore, Washington and Cincinnati. Chicago, Columbus and Detroit in the Middle West are reporting many cases. In New York City, the influenza and pneumonia mortality rate has likewise risen.

Very decided increases as compared with January, 1922, have also been recorded in the death rates for measles, whooping cough, tuberculosis, accidents - and more particularly, automobile accidents. The month's death rate for the last was 10.8 per 100,000, the report states.

"This marks, not only a pronounced rise over last year's January rate, which was 9.0; but stands as the highest January figure ever recorded for this type of accident. It is discouraging indeed to announce that bad as the automobile accident situation has been in recent years, present indications are that it is growing worse. The automobile fatality situation is the foremost public safety problem of the present day."

TINY CREATURES' CHANCE OF OLD AGE BETTER THAN MAN'S

If man wants to eliminate the nuisance of old age he might do worse than study the ways of the lowliest forms of animal life, according to Dr. Raymond Pearl and Carl Doering of Johns Hopkins University who have recently published a comparative life table for man, flies, and a certain sort of minute animalcule known as *Proales Decipiens* which never suffers long from senility.

This is not just because this microscopic animal never lives to be more than two weeks old, for old age is something irrespective of the length of life. A man is old at 70 years, a cat at 10, a rat at 3, and a *Proales* at 10 days. The study was taken to see how many individuals of 1,000 of each species, at the age in youth when the death rate was the lowest, survived to extreme old age and the rate at which they died along the way.

The theoretically possible and perhaps perfect arrangement would be one in which all the individuals would live to a healthy and vigorous old age and then when they had come to the end of the journey all die simultaneously, so that a man might expect to live to the old age, for example, of 120 years with good health and vigor and then like the wonderful "one hoss shay" of Oliver Wendell Holmes' poem, just go to pieces all at once and pass off without long illness or suffering.

This achievement seems to have been approached more closely by the animalcules than by man, according to the paper of Dr. Pearl recently published. For example, of an average lot of 1,000 male Americans starting at 12 years of age, when they have lived just half of the average span of life there will be 68.5 per cent surviving. Of a similar crowd of 1,000 *Proales* who have also lived half of their span of life there will be 93 per cent surviving. In other words, the animalcules have a lower death rate in youth and middle life and a higher one in old age than has man. A youthful *Proales* has a much better chance to live to be old than has the average American boy.

Whether this is due to a more uniform environment on the part of the minute animalcules or to the fact of more uniform heredity due to mono-sexual reproduction or parthenogenesis is a problem for scientists. But when it comes to avoiding old age, *Proales* has the better of it over man.

READING REFERENCE- Conklin, E. G. Heredity and environment. Princeton University Press. 1919.

JERSEY SKULL MERE CHICKEN COMPARED TO JAVA APE-MAN

Dr. Ales Hrdlicka, anthropologist, of the Smithsonian Institution, gallantly came to the rescue of the prehistoric lady whose skull has just been reported found in the English Channel island of Jersey, where the Jersey cow originated. This female is probably much younger than cable dispatches from England would indicate, he declared.

It is not surprising that a cave-woman skull should have been found in Jersey, said Dr. Hrdlicka, who is well acquainted with the island and its remains of ancient man. About fifteen years ago, he said, the teeth of a primitive man belonging to the Neanderthal period were found and prehistoric implements and other remains are plentiful there. The age of such remains can, however, be only roughly determined from the sediment in which they are found. He thinks it unlikely that the female

skull found near the Jersey village of St. Owen is anywhere near so old as the Java ape-man remains known as *Pithecanthropus erectus*, or even the Piltdown jaw found in England. Although man in western Europe dates from very early times, going back from 50,000 to 150,000 years, none of the low-browed skulls of early man is nearly so close an approach to the apes as the Java skull which has been estimated to be 500,000 years old.

DENY APE-MAN LIVED ON AMERICAN CONTINENTS

The reported finding in Patagonia of a fossil skull alleged to be that of an ape-man who lived there about a million years ago is scouted by leading anthropologists as highly improbable. The Americas were not inhabited by human beings until comparatively recent times and the first men here were close relatives to Indians now living, the consensus of opinion based on scientific evidence indicates.

No early men, corresponding to the primitive cave-man types of Western Europe, have ever been found on either of the two American continents. The first discoverers of America reached this continent at a much later date and represent a much more highly advanced human type than these cave-dwellers.

Reports of findings of prehistoric remains alleged to be of great antiquity have been frequent, but have all proved either much younger than claimed or not the remains of man at all but merely peculiar rock formations roughly resembling the shapes of heads and other human remains.

READING REFERENCE- Osborn, Henry Fairfield. *Men of the Old Stone Age, their environment, life, and art.* New York. Charles Scribner's Sons. 1915.
Mason, O. T. *Woman's Share in Primitive Culture.* New York. D. Appleton & Co. 1894.
Hrdlicka, Dr. Ales. *The most ancient skeletal remains of man.* Washington. Government Printing Office 1916.
Lull, R. S. and others. *The evolution of the earth and its inhabitants.* New Haven. Yale University Press, 1918.

FRANCE MAY GET GERMAN NITRATE SECRET

France will eventually be independent of Germany for nitrates in time of peace, and will be self-sustained in this respect in war time as the result of a Convention with the Badische Anilin und Soda Fabrik. The Convention gives to the French possession of the secret of the Haber process used by the great German chemical company for the production of ammonia from the nitrogen of the air.

It is admitted that the German interests gave their approval only under pressure from the French although it is denied that any threats to actually steal the secret by force were made. According to the Convention, German engineers will help install at the French plant to be constructed at Toulouse the process which was in use at the great works at Oppau which were recently blown up by an explosion. French engineers have already been able to inspect the German factories where the method is used.

The estimated cost of the projected plant at Toulouse is approximately \$5,000,000. It will supply 36,000 tons of nitrates a year which, although hardly more than a third of the total French consumption, will make the country much more nearly self-sustaining than it has been hitherto. With the secret in possession

of the French the process may be developed in other localities than Toulouse.

The secret process concerns just what substance was used as a "catalyser" to effect the chemical union of the free nitrogen from the air with the hydrogen which is mixed with it under pressure. A "catalyser" is in chemical industry what a man who is "the life of the party" is in a social gathering. He may not do much himself but he brings interesting folks together and starts something. No one knows just how a "catalyser" works, but when two unfriendly substances are brought together in its presence under the right conditions it causes them to unite. The Badische company had discovered such a go-between for nitrogen and hydrogen which enabled them to bring them into chemical combination more cheaply than by most other methods.

Much opposition to the sale of this secret to "the hereditary enemy" has developed in Germany but it has yet been ineffective. The Socialists charge the capitalists with selling out their country but the chemical interests assert that the Convention was authorized by the Germany government as long ago as 1919. There is little doubt that it will prove one of the great trophies of France from the war.

READING REFERENCE- Crowell, Benedict. America's Munitions 1917-1918. Washington. Government Printing Office 1919. Report on the Fixation and Utilization of Nitrogen. War Department, Washington. Government Printing Office.

TABLOID BOOK REVIEW

ORGANIC SYNTHESSES. 2 Vols. James Bryant Conant, Hans Thacher Clarke, Roger Adams, Oliver Kamm, editorial board. New York, John Wiley & Sons, Inc. Vol. 1, 1921; Vol. 2, 1922.

The chemist is continually making new organic combinations or more efficiently duplicating those which nature has evolved through her often uneconomical processes. Organic Syntheses is an annual publication of the satisfactory methods for the preparation of organic chemicals. It is necessarily non-popular but reports important achievements.

An Egyptian mummy of about 1000 B.C. showed evidence of Pott's disease which is of tuberculous origin.

No protective serum or vaccine has yet been devised for tuberculosis, scarlet fever, or measles.

As a rule, sea breezes do not penetrate more than nine miles inland.

The Brazilian Congress of Coal and Other National Fuels has recommended the use of alcohol-driven vehicles by the government and advises promoting the use of fuel alcohol.

On the Hudson Bay trail in Canada the feet of trappers wore smooth a vein of gold in the rock years before it was discovered to be gold.

Before the days of vaccination at least one-third of all persons took small-pox and this disease was the cause of about one-tenth of all deaths.
