

SCIENCE NEWS

Science Service, Washington, D. C.

ARTIFICIAL RUBBER

COPIES of the two new patents taken out in Germany and England for making rubber artificially have been received by the U. S. Department of Commerce. The sensational announcement made a few months ago by Dr. von Weinberg, of the German dye trust, at the annual convention of the German Union of Chemical Industries, that synthetic rubber would "soon appear on the world markets as a commercial commodity, equal to natural rubber and cheaper in cost" aroused the curiosity of American chemists and tire makers, but the text of these patents will not satisfy them since they relate merely to the improvement of the final stages in the process of the conversion of well-known chemicals into caoutchouc and do not disclose any cheaper source of the raw material.

The only apparent novelty in the new process is in the methods of carrying out the combination of chemicals. In one patent they are suspended in water thickened with something like soap, starch or egg albumen at 150 degrees Fahrenheit, while a stream of oxygen gas is passed into the emulsion. According to the other patent dried isoprene is mixed with metallic sodium in glycerine in the atmosphere of carbon dioxide, and agitated until rubber results.

If the method of oxidizing an emulsion results in artificial rubber having the peculiar colloid structure of the latex of the rubber tree the product may possess the elasticity that has hitherto been lacking in the laboratory products. The materials mentioned, isoprene and related hydrocarbons, can be made from various known sources, such as petroleum, potatoes, tar, coal, corn, etc., but no process so far published will turn them into rubber as cheaply as it can be grown on plantations. If the great German chemical combine, the Interessengemeinschaft Farbenindustrie, is able to accomplish this it is most likely done in connection with their plants for the production of synthetic petroleum by the hydrogenation of coal.

The Soviet Government offered a first prize of \$50,000 and second prize of \$25,000 for five pounds of synthetic rubber with the recipe delivered at Moscow before January 1, 1928, but no announcement of the awards has yet been made. Another prize of \$25,000 was offered some time ago through the London *Financier* for a method of making rubber cheaper than sixty cents a pound but no claimant appeared for the prize.

SEPARATION OF THE VITAMIN "BIOS"

"Bios," a substance that promotes growth in yeast as vitamins do in animals, has been demonstrated to be really two substances, and one of these two "bioses" has been prepared in pure crystalline form in the laboratory of Professor W. Lash Miller, of the University of Toronto. It proves to be a form of a seldom-studied but long-known chemical compound, inositol.

In 1901, long before vitamins were discovered, a Belgian chemist named Wildiers found that yeast needed for growth small quantities of some unknown substance which he could not isolate. He gave to this unknown material the name "bios," which is the Greek word for "life." After the discovery of vitamins, scientists began to take interest in this vitamin-like stuff needed by yeast, but it still defied separation and chemical analysis.

Then various researchers in Professor Miller's laboratory began a systematic attack on the problem. One of them discovered that if a bios solution were shaken up with fine charcoal some of the bios vanished into the charcoal and what was left could not help yeast to grow. The part that was left could also be cleared out of the solution by other chemical means. This indicated that there was not one bios, but two; accordingly the names Bios I and Bios II came into use.

The latest advance has been to purify Bios I into crystal form. Crystals are the chemist's test for purity; a mixture will not crystallize. The crystals obtained have been analyzed and shown to contain the same proportions of carbon, hydrogen and oxygen as common glucose, but the chemical arrangement is much more complex.

Bios I, or inositol as it has now been proved to be, is abundant in young, vigorously growing plant shoots. The German investigators who first studied inositol obtained their material from bean sprouts. The Canadian scientists who purified Bios I and established its chemical identity bought up large quantities of tea siftings for their raw material.

DEVELOPMENT OF THE AIRSHIP

REMARKABLE demonstrations of the airship will be made before the end of this year, Gilbert Betancourt, airship engineer of Detroit, predicted on June 29 to the aeronautic division of the American Society of Mechanical Engineers meeting in Detroit.

He said, "Two British airships and one German, all larger and better than any heretofore built, are to be completed and launched for demonstration flights all over the civilized world within the present year; and a naval contract for two American Zeppelins of great size is soon to be signed and construction will be started before the end of the year. A real issue before the country at the present time is whether this nation shall strive for the lead in rigid-airship development and construction, or continue trailing behind the three airship-wise European nations."

"The development of the rigid airship started in Germany some thirty years ago," Mr. Betancourt said, "and as yet there is but one such craft in this country, the *Los Angeles*, and this was built in Germany. Both Great Britain, Germany and Italy are some three to five years ahead of us in airship building since the war.

The reasons are obvious. As a German invention, the rigid airship was energetically developed into an efficient and safe craft which was used by the Germans during the war. England was near enough to the development of this new machine to give it serious study; but America was too far away to realize the possibilities of this form of aircraft. One good rigid airship was built in this country some five years ago; since then attempts have been made to interest the government in building more, but the people of the country at large do not know yet what the airship can do, or its possible use in our transportation system. Too many people in this country form a mental picture of an airplane when airships are spoken of, and yet these two crafts are as different from each other as a kite and a balloon.

"No doubt the world-wide demonstration of the three new European rigid airships will aid materially in clarifying the practical uses of airships. But it is certainly not to our credit to lag so far behind Europe in the development of airships.

"Another serious handicap is the cost of manufacturing this type of aircraft. Either Germany or England can build a rigid airship for about half as much as we can at present, because this craft is still a largely hand-made product, and as yet machinery production methods have not been used. Our salvation will lie in expediting the development so that we can build our ships in groups of five or more from the same design, and of the same size, in order to be able to employ mass production methods and machinery. Our only ship, the *Los Angeles*, already some four years old, is small for demonstration work and though it is still doing wonderfully in the skilled hands of our little airship navy, it is so constantly employed in the training personnel that it cannot be sent over the country to show people the possibilities of rigid airships.

"With these obstacles, the handful of the airship-wise and the airship engineers of the country has turned to academic problems. New experiments, unsupported by full-size tests and demonstrations have given rise to the discussion of academic problems while neglecting the opportunity for concerted effort to secure support to build full-size ships for demonstration purposes."

A NEW GEARLESS AUTOMOBILE

A NEW transmission for automobiles that eliminates shifting of gears and automatically changes speeds was described to the Society of Automotive Engineers meeting in Québec on June 28 by its inventor, D. Sensaud de Lavaud, a French engineer.

Automobiles run on the streets of Paris fitted with this new transmission have convinced M. de Lavaud that his device is not only sound technically but can be applied commercially to motor vehicles. Development of the transmission has required seven years.

Because with ordinary gear shift cars, the driver never operates continuously at the most efficient relation between speed of engine and wheels, M. de Lavaud claimed that the automatic transmission will increase the average speed possible and effect a fuel saving of more

than 20 per cent. in general and some 40 per cent. in the dense traffic areas of cities.

A long transmission shaft is driven directly from the engine and rotates an inclined "inertia hub," which changes the rotation of the shaft into reciprocating motion. Connecting the inertia hub with the drive of the rear axle are rods which, by acting on roller ratchets, translate the back and forth thrusts into rotary motion applied by the axles to the wheels. The trick of the transmission consists in the variation of the inclination of the inertia hub with the engine torque and road resistance which automatically varies the throw of the connecting rods, consequently the rotation of the wheels and the speed of the car. This automatic transmission is combined with a gearless differential and a planetary reverse-gear located on the rear axle.

Advantages of his automatic transmission over gear transmission are listed by M. de Lavaud as follows: Ordinary down grades can be negotiated, even with full throttle, without noticeably changing the speed of the engine. It is impossible on level stretches or on up-grades to accelerate the engine beyond normal speed for the transmission. Stalled engines are impossible. The power of the automobile is controlled entirely by the throttle. Acceleration, particularly to usual speeds, is much better than with gear transmission. The car coasts freely downhill.

ITEMS

WHERE corn is not a dependable silage crop, it has been found desirable to use sunflowers in its place, and so successful has experimentation along these lines been that it is now advocated that sunflowers be grown in crop rotation schemes. A mixed silage of corn and sunflowers makes a more palatable and nutritious silage than sunflowers alone, and this has caused the planting of the two together. With the effective feature that sunflowers are very good in controlling weeds, the plant is slowly becoming an agricultural necessity.

THE severe nausea which is the lot of most patients after major operations may be due to chemical changes in the blood, according to K. Reuterskiöld and Dr. Edmund Andrews, of the University of Illinois Medical School. These investigators have analyzed the blood from a number of such patients and have found striking changes in the proportions of calcium and potassium in the blood. They hope to prove that these changes are the primary cause of the sickness that follows operations for no other changes sufficient to cause illness were found.

A STEADY improvement in American cows, measured in terms of increased production, has taken place during the last eight years, members of the American Dairy Science Association were told. The production of the average cow has increased 1,333 pounds of milk and 48 pounds butterfat, Joseph B. Parker, dairy husbandman of the U. S. Department of Agriculture, declared. The average cow is now producing 4,500 pounds of milk. Examination of more than 100,000 yearly records showed that in any breed the larger cow is the better producer.