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### NEW COAL CLEANING PROCESS MAY REVOLUTIONIZE FUEL PRACTICE

(By Science Service)

Washington, July -- A process for cleaning coal that may make available great quantities of low grade coals and material now considered as waste at the mines has been the subject of laboratory studies of the U. S. Bureau of Mines, the results of which can now be announced.

The method, known as the Trent Process, consists of agitating together powdered coal, water and oil. This produces a partly de-ashed plastic fuel, called an amalgam. The oil picks out and joins with the coal particles, and excludes the water and ash that remain suspended in the water. Then the amalgam of oil and coal can be freed from mechanically held water by working in much the same way as butter is worked.

Bureau of Mines officials confine themselves to telling the results of the investigation of the physical phenomena of the new process which was developed by Walter E. Trent during and shortly after the war, but the commercial possibilities loom up large as a result of the findings.

"The field for investigation and development is large", declared O. P. Hood, chief mechanical engineer of the Bureau of Mines, who was in charge of the tests. "Real benefits are physically possible by treating coal in this manner".

Coke, the basis of many industrial processes, can be made from non-coking coal by the Trent process. By using a heavy oil to make the amalgam and distilling to dryness, coke will result. But if it is desired to obtain usable powdered coal from the waste coal, an oil that can be distilled at a temperature below the distilling temperature of the coal is used in making the amalgam, and the oil is recovered and may be used to make more amalgam. And if the distillation is continued only until a heavy pitch is obtained, a sticky mass that can be made into briquets and used like lump coal is the result.

"The distillation of an amalgam of coal and oil gives quantities often more favorable than the sum of the separate distillations of the coal and oil", explains Mr. Hood. "This occurs because the distillates obtained as the result of distilling oil mixed with a finely powdered material are similar to those obtained by distilling under pressure".

The report made by G. St. J. Perrott and S. P. Kinney, engineers of the Bureau of Mines, shows that the amalgam can be used for a gas-making fuel, and that gas-house tar emulsions can be dehydrated by mixing with powdered coal, and that the amalgam can be retorted for further gas making.

"Graphite ore can be separated from its gangue, and coke can be separated from fuel dust by using the Trent process", says the report. "Clean coal



in anthracite sludge will make an amalgam if oil is added."

The new oil-coal fuel can be burned in several ways. It may be shoveled or forced through pipes by pressure, and it can be stored under water if desired.

PELLAGRA, POVERTY DISEASE,  
MENACES SOUTHERN STATES

(By Science Service)

Washington, July -- A loss of 5000 human lives in the southern states this year is conservatively estimated by Dr. Joseph Goldberger, dietary disease expert of the U. S. Public Health Service, as the result of an epidemic of pellagra that is now affecting thousands of the "poor whites" of the South because of the "hard times" that the cotton, textile, lumber, mining, agricultural and other industries are experiencing.

Fragmentary reports show conclusively that pellagra, caused by faulty, unbalanced diet, has increased 250 per cent. over last year, and it is estimated that at least 75,000 cases are developing and have occurred among the low-paid workers of the south and their families. Many are unemployed or have had their wages cut one-half or more. In one agricultural cotton state there were 1817 cases of pellagra this May in comparison with 677 cases during May of last year.

Lack of information and slowness of obtaining reports in the districts affected are hampering the relief measures that the Public Health Service and the local and state authorities are launching. In Mississippi the State Board of Health, under Dr. W. S. Leathers, is organizing a campaign to eradicate the disease and the local Red Cross is aiding. The state and national authorities lack emergency appropriations that may be used for relief measures in combating this form of starvation, and they are forced to rely on non-official relief.

The ammunition in the fight against pellagra is food. No quarantines must be established nor are other precautionary measures called for, as in the case of an epidemic of a contagious disease. Pellagra is not "catching". Although it often attacks many in the same community it is largely an economic disease and the result of an ill-balanced diet.

"The three M's, 'meat', meal and molasses, are commonly the cause of pellagra", explains Dr. Goldberger. "In the southern states when times are hard fat meat, cornmeal and molasses are the principal foods of many people. If they continue to live on this diet for any length of time they are very likely to become weak and nervous, have indigestion and break out with an eruption that at first looks very much like sunburn."

"Under proper treatment and with careful nursing only a small percentage of pellagra victims die, but, nevertheless the actual number of deaths is deplorably large. Food is the medicine used in pellagra treatment. Fresh lean meat, milk, cheese, green vegetables, and eggs eaten frequently are both the sure cure and the prevention".

Pellagra and poverty go hand in hand. The worst epidemic of this disease occurred in 1915 just after the outbreak of the European War in "Buy a Bale" days when cotton could not be sold and business in the south was at a standstill. In 1917, when rise in food prices began to affect the tables of the south, there was another aggravation. But with increase in wages during the war pellagra decreased until in 1919-20 there was the smallest amount of this disease since it was recognized in this country.

Last year Dr. Goldberger predicted the present outbreak when it was evident that industrial depression was approaching, and only the drop that has occurred in food prices prevented the worst outbreak in the history of the South.

"Next year, if conditions should remain as they are or if food becomes more expensive, as some believe it will, we may expect a still greater number of cases of pellagra in the South", Dr. Goldberger states. "Small savings acquired during the war years are now being spent and exhausted."



Investigations that the Public Health Service has made during the previous epidemics show that pellagra is prevalent where the family income is extremely low, and that as the income decreases the rate of the disease per thousand of population becomes greater.

When pellagra became wide-spread in the south in 1908 and 1909 and was recognized, many thought that it was a communicable disease, but Public Health Service tests conducted by Dr. Goldberger proved conclusively that it is due to diet alone.

"No germ that can properly be considered its cause has ever been found. Attempts to give persons pellagra by inoculations of blood or saliva and other body discharges from severe cases of pellagra have failed completely. On the other hand, when 11 convicts were fed on an unbalanced diet composed mainly of biscuit, corn bread, grits, rice, gravy and sirup, with only a few vegetables and no milk, meat or fruit, at least six developed the disease", Dr. Goldberger says.

In nearly all the southern states pellagra is one of the foremost causes of deaths. In 1916 it ranked fourth in Mississippi, third in Alabama, second in South Carolina, and that year the disease had only average intensity.

America is not the only country that has this food disease. Wherever people are unable to get the right variety of food, there pellagra is likely to be found. Armenian refugees in Egypt in 1916 were attacked by it, and the British used the methods of the U. S. Public Health Service in eradicating it. Another serious outbreak occurred among Turkish prisoners of war in a British camp in Egypt and this was also conquered.

Although a large part of Europe existed on an ill-balanced diet and suffered other dietary diseases during the war, it did not have epidemics of pellagra, probably because of the coarse vegetables that are common food there. During the famine in China, starvation usually killed before pellagra developed, while those who received relief were given well-balanced food.

While the doctors know that proper food will cure pellagra, they are unable to tell just what factor in an unbalanced diet is the cause. They know that the lack of vitamin C, such as occurs in potatoes, is the cause of scurvy, and that beri-beri is due to lack of vitamin B, but research has not yet revealed what is lacking in the meat, meal and molasses diet.

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#### "SHOOT" THE DOG IN JAPAN TO PREVENT RABIES

(By Science Service)

The Japanese are inoculating dogs instead of people to prevent rabies which is now wide-spread in that country. The bacteriologist Umeno and his co-workers at the Kitasato Institute for Infectious Diseases have perfected a method of prophylactic inoculation that can be given the dogs in one or two shots. In all 31,000 dogs have been treated and in not a single instance has any one of them been found suffering from rabies. Instead of the usual methods of killing mad and stray dogs, the Japanese medical experts are advocating inoculation of all the dogs of Japan.

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#### ENGLISH TRY RUBBER AS PAVING MATERIAL

(By Science Service)

Rubber is being experimented with as a street paving material by an English company. Wooden paving blocks with plates of expanded metal imbedded in slabs of rubber about one-half inch thick have been laid on a busy street and subjected to fast, heavy traffic.

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(Editors: This is another of a series of prophetic interviews that Science Service has been able to secure from leaders in science)

### THE NEXT GREAT STEP AHEAD

#### 10. In Weights and Measures - The Metric System.

An interview with Senator E. F. Ladd of North Dakota.

(By Science Service)

The United States will be forced eventually to adopt the international metric system of weights and measures, and why not do it at the end of a warning period of ten years? Senator E. F. Ladd, of North Dakota, the only chemist and college president in the Congress of the United States has answered that question by introducing a bill into the Senate providing that in a decade this country shall use the metric system in commercial transactions where weights and measures are involved.

"Let Congress carry out the only duty given it by the Constitution which it has failed to exercise, 'to fix the standards of weights and measures'," urges Dr. Ladd.

Congress is being urged to sign the death warrant of the internationally ostracised inch, pound, bushel and other members of the unrelated family of English measures by several million voters, six state legislatures, and over 100 recognized national organizations, as well as many manufacturing firms that have found a change to the metric system a paying proposition.

North Dakota, Illinois, California, Tennessee, and Utah are the states that have petitioned Congress, while down at the Department of Commerce in Washington there are stacks of 103,000 petitions from associations, firms and individuals calling for the use of the metric system.

Metric legislation has that well-known and compelling economic urge that brings about many new things. Dr. Ladd, U. S. Senator, remembers his days in the chemical laboratory when he worked with the simple metric system of weights and measures. State Food Commissioner Ladd, U. S. Senator, has seen the losses of time and money caused by the commercial use of our heterogeneous English system of weights and measures.

"Firms like the General Electric Company, the Crane Company, the Otis Elevator Company, the Fisk Rubber Company, the Baldwin Locomotive Works, the Truscon Steel Company, the Babbitt Soap Company, and the Curtiss Engineering Corporation say that metric weights and measures will save time and energy for this country", he points out. "And such industries as the Waltham Watch Company, the De Laval Separator Company and the Goodyear Tire and Rubber Company are already manufacturing entirely on the metric basis. The Automatic Electric Company of Chicago, employing 3000, are getting ready to pension the English system and hire the metric at a great saving in salary."

"But neither my bill nor the similar bill introduced by Representative Britten in the House will compel the use of the metric system in manufacturing, nor will they interfere with production", Dr. Ladd emphasizes.

"Metric legislation is important from the standpoint of our foreign commerce and relations", Dr. Ladd says. "Practically the whole world is using the metric system with the exception of Great Britain and America. And even in Great Britain there is a strong urge for the repudiation of the English system of weights and measures. For instance, the Associated British Chambers of Commerce resolved that the English Empire should adopt the metric system".

Japan, he points out, is the latest nation to turn metric, and at the end of ten years her trade and commerce will be conducted on that basis. And the Honolulu Chamber of Commerce evidently sees that the Pacific trade of the future will be done on the decimal metric basis and has urged Congress to adopt the metric system promptly. America, to sell in South American markets and to compete with metric Germany, will either have to use a dual system of manufacturing or turn metric.



(Editors: This is another batch of short daily features or fillers)

DO YOU KNOW THAT-

A severe eruption of the volcano of Popocatepetl in Mexico occurred early in April. This is a recrudescence of the activity which began in the spring of 1920, after 200 years of quietude.

About fifteen million tons of coal is burned in pulverized or "atomized" form in this country annually. The British and Canadian governments have recently published extensive reports on the use of this type of fuel in the United States.

Few organs or parts of the human body are inaccessible to examination by X-rays. The most remarkable advance in this line was the discovery that insoluble opaque salts can be administered to patients in such quantity as to fill the gullet, stomach and intestines, so that these hollow organs may be studied with the rays. The "opaque meal" shows their size, shape and position, and also reveals their contractile movements.

One of the curious things about the redbud, or Judas tree, is that it bears flowers on the old wood. Blossoms are found in abundance on twigs that are five or six years old.

DO YOU KNOW THAT-

In Hawaii it has been found that weeds can be kept down in sugar plantations by covering the fields with paper, which is easily penetrated by the sharp sugar-cane shoots. Deficient sunshine prevents the weeds from starting.

Automatic records of atmospheric pollution are kept in England by means of an air filter which at the end of every fifteen minutes draws a known volume of air through a piece of fine blotting paper. The darkness of the circle of deposit left on the paper indicates the amount of suspended matter in the air.

About 3 per cent. of the fires that occur in the United States are due to lightning.

Experiments to redetermine the velocity of light, one of the most fundamental quantities of science, will be made at Mount Wilson Observatory by Prof. A. A. Michelson of the University of Chicago. The present value determined by Foucault is uncertain to 1 part in 10,000.

DO YOU KNOW THAT-

The reservoir built by Pontius Pilate 2000 years ago, 13 miles south of Jerusalem, has been enlarged to hold 5,000,000 gallons of water. Before this engineering work, the Holy City was dependent upon local rainfall for its water. Some of the cisterns in which the rain was collected had not been cleaned for 100 years or more.

Trucks run by steam engines instead of gasoline engines, as is usual in America, are gaining favor in England.

The war aided in stopping the progress and diffusion of yellow fever by preventing travellers from entering epidemic areas and carrying out the disease.

Only seven weeks were required to throw up 240,000 cubic yards of earth in building an emergency levee on the Mississippi River.



DO YOU KNOW THAT-

Although rice is the staple diet of the population of Ceylon, it is nearly all imported. Malarial mosquitoes breed so freely in the rice fields that laborers cannot work there.

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A large part of the toluol used in this country during the war in the production of the explosive T.N.T. was recovered from city gas supplies. At the close of hostilities 21 government-owned toluol plants were in operation at city gas works.

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Automobile highways which cross the Sierra Nevada Mountains of California are usually closed to traffic as late as June on account of the slow melting of the deep snow which covers the higher levels. In order to accelerate the melting of the snow and thus to expedite the opening of the highways the experiment was made this spring of scattering black soil and ashes on snow which covered the highways. As a result of the increased absorption of solar heat the snow melted rapidly, and the roads were opened several weeks earlier than would otherwise have obtained.

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The rush of air in front of an avalanche or landslide is sometimes almost as destructive as the avalanche itself. Persons have had their clothing torn to shreds by an "avalanche wind".

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DO YOU KNOW THAT-

The New York Agricultural Experiment Station has found that the standards for market milk prevailing in the State do not apply to milk used for cheese-making, as poor market milk made cheese of more uniform quality than did a better grade of market milk.

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Railroad engineers in the future when making reconnaissance surveys in unknown countries will find the airplane a great saving in time and money. An aerial survey of a proposed Philippine railway showed the possibilities of the method.

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Investigations have shown that certain kinds of malaria bearing mosquitoes can fly over four miles.

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The development of listening apparatus, such as the geophone, for detecting sounds transmitted through the earth reached such a point during the late war that mining operations could be conducted only with the greatest danger to those concerned. In fact, mining nearly ceased along the front, for this reason, before trench warfare was abandoned.

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DO YOU KNOW THAT-

Denmark is building windmills to produce electric power, owing to the high cost of fuel.

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Bamboo is being used as reinforcing material for reinforced concrete piles made in China for bridge foundations.

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Phonograph records are used in many Catholic colleges, seminaries, convents and churches for teaching the Gregorian chants. This style of music is notably difficult for the reason that it can be taught by oral methods alone. The talking machine solves the problem.

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One of the leading American universities has just established a course in ship construction and marine transportation.

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