SCIENCE NEWS

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OIL FROM COAL

ALTHOUGH American crude oil is now so cheap as to be causing acute economic distress in several oil fields, the supply is not inexhaustible and chemists are looking to the day when we shall have to make gasoline and lubricating oil out of coal, as they are already doing in Germany and other European countries.

At the meeting of the American Chemical Society in Buffalo, N. Y., a series of experiments on soft coals from both eastern and western United States fields was described by Professor H. K. Benson and his associates at the University of Washington. The process consisted of subjecting coal to pressures from 2,200 to 4,200 pounds per square inch, at temperatures from 200 to 450 degrees centigrade in the presence of water vapor. The oily mixtures obtained by this procedure compared favorably with the product of European coals treated in the same way, the report stated.

We commonly think of even soft coal as pretty hard stuff. Yet coal is a jelly—a colloid, to use the strictly scientific term. Evidence to this effect was adduced by Dr. Reinhardt Thiessen, of the U. S. Bureau of Mines. Using a new ultra-power lens on his microscope, Dr. Thiessen has seen the "micellae," or ultimate visible particles that go to make up coal, and he has found them to be similar in size and shape to the micellae of plants, which of course were the raw material of coal, ages ago. The colloid nature of coal has long been suspected, but until now definite proof has been lacking.

Gas for fuel, of high heating value, has been made experimentally by two Illinois chemists, Drs. C. S. Boruff and A. M. Buswell, using a most unpromising material—"beer slop" from distillery wastes produced by industrial alcohol factories. Dr. Buswell has built up a reputation for getting gas from all sorts of waste products, such as sewage and chopped-up cornstalks.

Calcium gluconate, a new chemical of considerable industrial importance and of possible value in medicine, can now be made by an electrical process, using glucose, crushed limestone and a small amount of a bromide. Hitherto the only method of production has been a fermentation process using shallow pans of glucose solution and a special kind of fungus. The new process was worked out by Dr. H. S. Isbill and his associates, of the U. S. Bureau of Standards.

Benzoate of soda, widely used to keep foods and beverages from fermenting and spoiling, is not proof against all kinds of micro-organic activity, Drs. D. Tarvin and A. M. Buswell, of the Illinois State Water Survey, have discovered. They offered a diet of this preservative to a mixed lot of bacteria deprived of free access to oxygen. The bacteria literally ate it up.

Even the strictest teetotaler has alcohol in him, researches by Dr. Alexander O. Gettler, Joseph B. Niederl and A. A. Benedetti-Pichler, of Washington Square College, New York City, have disclosed. They found minute but definite traces of alcohol in human brains and blood, in tissues of pigs, dogs and other animals. Singularly enough, the unclean swine had the least natural alcohol in him.

INCENDIARY FOREST FIRES

THE fact that a number of the recent destructive forest fires in western states are definitely known to have been started by pyromaniacs—fiends who deliberately set fire to timber—has made significant figures from the U. S. Forest Service in Washington, D. C., which show that 1,300 of the 8,400 conflagrations in national forests last year were of incendiary origin.

Up to the latter part of last month, more than half of the total number of this year's fires in these forests, 3,600 out of 6,322, were due to man's action, whether careless or on purpose. Lightning is held responsible for the remainder of the number.

The present season is turning out to be one of the worst fire years in the history of the Forest Service. A total area of 385,168 acres has been burned over in the national forests since January 1, the latest summary shows. Three hundred thousand of these acres are in western states, and of them, Idaho is at present suffering the greatest losses.

The severity of conditions this past summer is brought out in a comparison with 1930, only 137,000 acres being burned for the whole year. So far this year, Henry Wold, of the U. S. Forest Service, told *Science Service*, more money has been spent in national forests for fire control—$2,100,000 up to August 20—than was spent all last year, and the situation is worse than in 1929, which was considered an extremely bad fire season.

Reports from the field indicate, Mr. Wold stated, that the present fires are harder to suppress than those in 1910, the worst year on record for acres burned and lives lost. The fire-fighting organization is better now, however, than at that date.

Although the number of fires that actually get started is large, few of them actually become very destructive, as the result of watchfulness of rangers. While they are still infants, they are discovered and put out. So far this year, 87 per cent. of the fires in national forests have been extinguished before they burned over ten acres. If the forest areas are burned over only once they will grow back again; if they receive a double burning, however, replanting of the trees becomes necessary.

This effective fire control is exercised by three main units, Mr. Wold pointed out, of personnel in the national forests: lookouts, rangers and "smoke chasers." Assigned to particular areas, they operate in close conjunction with each other. From his vantage point atop the tower, the lookout spots the fire, made evident by the rising smoke. He immediately reports his discovery to

the ranger, or district chief who directs operations. The ranger delegates one of the men attached to his group to search for or "chase" the smoke.

This smoke chaser hoists a pack containing three days' rations to his back along with his pick, shovel and other fire-fighting apparatus and proceeds to move on to the location given by the lookout. It is the smoke chaser's duty to stay at the fire, once he has found it, until it has been put out, or to inform the ranger of conditions beyond his control.

Constant communication is maintained between the lookout and the ranger. If the smoke continues to rise unduly long or increases in volume, the ranger is notified and he dispatches reenforcements to the smoke spot without waiting to hear from the man there.

PILLS INSTEAD OF SPINACH

IF you have any youngsters of the spinach-refusing age, you may soon be able to offer them the stuff that spinach supplies in a form they may not like any better—a powder or a pill.

For carotene, a yellow coloring matter that is present in green leaves as well as in the yellow carrots for which it is named, seems to be identical with the long-sought basic material of vitamin A. By a new process, described before the American Chemical Society, it can be produced from carrots in highly concentrated crystalline form, at low cost, and comparatively rapidly. The discoverers of the new process are Drs. Henry N. Holmes and Henry M. Leicester, of Oberlin College.

If you dislike both eating spinach and swallowing pills, you can get your vitamin A or your carotene by taking a "shot in the arm," with a hypodermic needle, just as protection against a lot of infectious diseases is now commonly administered.

The discovery that the injections are possible was announced by Dr. R. G. Turner, of the Detroit College of Medicine and Surgery. He gave such injections to a lot of animals suffering from a lack of vitamin A, and compared their rate of recovery with a set of "controls" given vitamin A with their food in the ordinary manner. The injected animals recovered their health.

Although carrots have thus been shifted from their old job as a "beauty food" to a new one as a health food, chemists still come to the rescue of beauty in distress. Beauty parlors are beginning to use solid carbon dioxide, sold under the trade name of "dry ice," for post-massage rubdowns instead of the old familiar, but somewhat wet and messy, lumps of ice. Solid carbon dioxide evaporates into a dry gas instead of melting into water.

It must, however, be rubbed on lightly and skilfully, warned Dr. D. H. Killefer, of New York, for it is so cold that a too intimate contact will result, paradoxically enough, in a painful burn.

With the oil market in such a condition that prices have to be held up on the points of national guard bayonets, much interest is naturally being attracted by the sessions of the society's division of petroleum chemistry. A part of the discussion was devoted largely to recent advances in our knowledge of the physics and chemistry of things that go into motor fuels; for the stuff we call gasoline is not a single, simple compound like water or wood. And alcohol is a grand mixture of a lot of things—a sort of petroleum cocktail.

Since each of these intimately blended fractions has its own vaporization point, its own ignition point, and its own special properties all down the line, the jobs of carbureter, spark plug and other parts of the long-suffering auto engine will be made much easier by chemical researches that will give automotive engineers information on which to base better design.

CAUSE OF THE CHINA FLOODS

AS one of the largest rivers in another great flood brings watery death and destruction to the heart of the world's most thickly populated country, drowning thousands and sending thousands more even to the tops of the city walls for safety, people wonder why China has so many and such disastrous floods.

Irregular and abnormal rainfall descending on arid plains barren of vegetation that would stay the rush of the water to the sea is, in brief, the answer of authorities in geography of the U. S. Department of Commerce. Department of Commerce data show the extreme variability of these rains. Take, for example, the Hupei area at the beginning of the fabled Yangtze gorges. As far back as 1897, rainfall of 10.6 inches is recorded for May. For the same month in 1900 the rainfall was reduced to a meager 1.9 inches. In June of '97 it totaled 2.5 inches, then in July mounted to 16.6 inches, and by August and September fell back to 8 inches or less. July, 1924, holds the heavy precipitation record for that month with 19.8 inches of rain.

The rains in China are always greater in summer than winter and during a normal year at the city of Hankow, the focus of this year's disaster, there is a 40-foot difference in the river's level for these seasons.

Centuries of intense cultivation in China have stripped the land of vegetation. Everything raised must be edible. When the rains fall there is no spongy green carpet to absorb them, and they rush on to swell Yangtze and her tributaries. From out of the gorges, walled high on each side, comes this chief artery of vast China and as soon as the broad alluvial plains are reached the tremendous force of the caged torrent takes effect and the Yangtze spreads out over the country in one muddy, death-bringing blanket.

Attempts have been made by the weary Chinese peasant to build wooden dykes to reenforce the river's natural levees. He pays a tax for that purpose. But something usually happens to the tax and so for seven years, it is estimated, the Yangtze dykes have gone unrepaired. The river deposits material along its edges each time it overflows.

In consequence, the Yangtze has built itself up until in some sections its bed is actually higher than the surrounding plain. Masses of Chinese live in this flood-

plain below the river to take advantage of the rich, black soil. And when the monsoon speaks they answer —usually with their lives.

MALARIA IN PALESTINE

MALARIA, which scourges whole Arab village populations in certain marshy districts in Palestine, is being subjected to mass attack by a medical corps with headquarters at the Hebrew University in Jerusalem. The afflicted Arabs, far from being hostile toward their Jewish medical visitors, have been cooperating with them readily in the effort to rid themselves of their perennial ailment.

The first step of the Hebrew University doctors was to find a treatment that could be used effectively in mass treatment of the particular type of malaria prevailing in the district under operation. They found that by combining quinine with plasmochin, one of the newer synthetic quinine derivatives, greater effect on the malaria parasites could be obtained, with less ill effect on the patients. When they had adjusted the dose size by trials with small numbers of individual patients, they were ready for the mass attack.

Two communities of Arabs in marshy regions were selected, one consisting of a group of villages and camps, the other of a single village. Men, women and children, even babies less than two years old, got their daily two doses of quinine plus plasmochin through five days. About 75 per cent. of adults and 85 per cent. of all children received the treatment.

Blood examinations disclosed the presence of malaria germs in 28 per cent. of the total at the beginning of the period, and in only about 7 per cent. at its end—a reduction, therefore, of three fourths of the infection among those treated.

A discouraging feature of the work is the quickness with which the cured patients become re-infected. New cases of malaria appeared in less than three weeks among the treated persons. Furthermore, other studies have shown that the local Anopheles mosquito is often found more than eight miles away from the nearest breeding places. The final clearing of this malaria-afflicted region will, therefore, require a long and hard-fought campaign.

ITEMS

IF your baby has seemed to make no progress in something you have been trying vainly to teach him, do not be discouraged. Some day he may surprise you all of a sudden by just doing it. At the meeting of the American Psychological Association in Toronto on September 10, Dr. Mary Shirley, of the department of psychology of the University of Minnesota, told the psychologists that a child learns many things by leaps and bounds, although it may develop its skill in these things in a more gradual manner. She described a two-years' experiment with twenty Minneapolis babies. Her results were at variance with the generally accepted theories that a child's development is continuous rather than in fits and starts. Dr. Shirley believes it can be both, in fact, but that it is necessary to distinguish between the ability to do something new, and the skill in doing it. Many new behavior items in children seemed to emerge full-fledged, rather than bit by bit.

NEGRO infants develop somewhat more slowly than do white babies, it is indicated by a study of infants of both races made in the city of Tallahassee, Florida, by Myrtle B. McGraw, of Columbia University. This finding contradicts the popular notion that the Negro develops more rapidly in infancy and early childhood but attains his maximum development earlier than does the white child. The study is reported in a current issue of *Genetic Psychology Monographs*. The babies tested were selected at random from the infant population of Tallahassee by the somewhat humorous method of going about from house to house "watching for diapers on the line, or any other known insignia of an infant in the home," and by making "pick-ups" in the local ten-cent store.

CASES of skin poisoning among woodworkers, similar in many respects to the effects of poison ivy or poison oak, have been investigated by the U. S. Public Health Service, which has just reported its findings. The trouble has been due to a hardwood imported from Brazil. In its native land, the wood is known as "embuia"; in America it is given the trade name of Brazilian walnut, though it is not a true walnut but a relative of the laurel. It is highly prized as a material for fine woodwork in Brazil. "Patch tests" given by applying sawdust from the wood to selected skin areas on human volunteers definitely determined its guilt. Not all persons are susceptible, however, and susceptible persons often acquire immunity. During the war, Brazilian walnut was imported to some extent for use in gunstocks, but at that time no trouble was reported.

A NEW tool of importance in the control of agricultural production of the future, may be in the use of x-rays or similar short-wave vibrations, Dr. W. W. Garner, plant physiologist of the U. S. Department of Agriculture, believes. Experimentation in this field is so new that some of the most striking effects have not been followed far enough to reveal their ultimate results. Wild corn plants appear to have been changed from annuals to perennials at Cornell University by treating the seeds with x-rays. And in accordance with experiments in various other places, the evidence seems to be that under suitable conditions, x-rays do bring about a mutation. Dr. Garner may therefore be able to take some sort of hand in plant evolution. The importance this could have on crop production can not be overestimated, he said. However, the future will show to what extent this new tool can be effectively applied in crop improvement. Work along these lines upon plants is being done at the Universities of Missouri and California, while at the University of Texas, the effect of x-rays on the progeny of certain flies has been studied.