

MINING

U. S. Has First Year Without Mine Disaster

DIRECTOR John W. Finch of the U. S. Bureau of Mines rejoices in his annual report that "not a single major mine disaster occurred in the United States in the fiscal year ending June 30, 1939. This is the first year entirely free from mine disasters since accident statistics have been recorded." This record is all the more remarkable because increased use of electrical equipment and mechanized mining introduces hazards unknown in the first part of this century.

Science News Letter, December 16, 1939

CHEMISTRY

New Family of Chemicals Parade at New York Show

AT THE Chemical Show in New York where America's chemical engineering industries, so important in our daily life, show their giant machines and their new products:

That new family of chemicals, the nitroparaffins, were on parade at the "chemistry catalyzes commerce" exhibit assembled by the American Chemical Society's *Industrial and Engineering Chemistry* journal. These 17 organic chemicals and the numerous compounds that may be synthesized from them may be used as solvents for many of the most important substances used in industry today such as nitrocellulose, vinyl, alkyd and other synthetic resins, fats and dyestuffs. Mixed with alcohol they dissolve cellulose acetate and cellulose mixed esters, substances you use daily, base for safety photographic film, sheeting, etc. Producer: Commercial Solvents Corporation. Long names are attached to these chemical children of research. For example: there is a yellow liquid nitroparaffin known as 2-amino-2-ethyl-1,3-propanediol.

Any new use for castor oil to divert it from the use that you think of when you hear the name is news. Castor oil is being used to make paint, replacing the tung oil largely imported from China and now difficult to get on account of the Japanese invasion. As pressed from the castor bean, the oil won't dry properly. So it is necessary to dehydroxylate it, snatch out some hydrogen and oxygen (water, if you must know) atoms from its molecule, which makes it a drying, odorless, non-yellowing, oil comparable with tung oil. It is a 9-11 octa-

decadieneic acid, if you talk chemistry; Dehydrol, if you talk paint manufacture. Producer: Sherwin-Williams Co.

As a partner to the dehydrated castor oil, there is phenol resin, one of the most familiar synthetic plastics made from carbolic acid (phenol) and formaldehyde, modified into a pale, extra hard resin for making quick drying, water resistant varnishes, enamels and undercoats. Manufacturer: American Cyanamid and Chemical Co.

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MEDICINE

Ulcer-Preventing Factor Sought in Chick Studies

SEARCH for a stomach-ulcer-preventing substance in human foods, to be made in studies of chicks, will be speeded with the aid of a \$1,000 research fellowship donated by Eli Lilly and Company, to Stanford University School of Medicine.

Announcement of the gift and the award of the fellowship to Dr. Garnett Cheney was made by President Ray Lyman Wilbur of Stanford.

Certain human foods, such as butter-milk, whole milk and eggs, contain factors that will prevent the formation of stomach ulcers in chicks, experiments now under way have already disclosed. Gastric juice in chicks is similar to that in man, and by experiments with chicks Dr. Cheney hopes to be able to discover what other foods contain an ulcer preventing factor that may be useful for man.

Because of a possible relation between the chick ulcer preventing factor and vitamin K, Dr. Cheney will also investigate the effects on chicks of deficiency of this vitamin, which has proved valuable in checking the dangerous bleeding tendency in obstructive jaundice in human patients.

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RADIO

KDKA's New Transmitter Has 718-Foot Antenna

See Front Cover

WESTINGHOUSE station KDKA, which 19 years ago put on the air the nation's first regularly scheduled radio program, has a new 50,000-watt transmitting station at Pittsburgh. The 718-foot steel antenna tower, shown on the cover of SCIENCE NEWS LETTER this week, is claimed to be the world's tallest structure made by electric welding.

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IN SCIENCE

ENGINEERING

Topheavy Destroyers Will Be Steadied by Weighting

TOPHEAVINESS in 12 American destroyers, subject of much recent discussion, can be corrected by adding 40 or 50 tons of lead to the keel of each ship, rearranging stores, and removing some of the deck furnishings, Navy engineers state. Total cost for work on the entire group of 12 destroyers is estimated at between \$600,000 and \$1,000,000.

Weighting the keels may reduce speed by about half a knot. This, however, is not regarded as serious, since the ships, designed for 37-knot speed, actually made 39 knots on trials.

The destroyers of this group are among the most formidably armed craft of their class in the world. On a designed displacement of 1570 tons, they carry twelve 21-inch torpedo tubes, five 5-inch guns and a number of lighter anti-aircraft pieces. The 5-inch guns in all recently built American destroyers can also be trained for high-angle fire against aircraft.

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CHEMISTRY—BOTANY

Plant-Healing Acid Isolated In Pure Form

WOUNDS in plants are caused to heal by an acid which has been isolated in crystalline form by Drs. James English, Jr., James Bonner and A. J. Haagen-Smit of the California Institute of Technology, and for which they propose the name "traumatic acid." (*Science*, Oct. 6)

The substance has the chemical formula $C_{12}H_{22}O_4$, and is identical with the organic acid, 1-decene-1, 10-dicarboxylic acid. The three experimenters, using a solution of this acid synthetically prepared, induced rapid formation of healing tissue on the cut surfaces of potato tubers.

The discovery of the chemical nature of the wound hormone is announced briefly in *Science*, with the statement that a more detailed report will be published later.

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E FIELDS

ENGINEERING

Locomotive At Fair Is Outstanding Achievement

THE GIANT, 608,170-pound locomotive "American Railroads," which millions saw at the New York World's Fair, was the outstanding development of railroading for 1939, according to a report submitted to the meeting of the American Society of Mechanical Engineers by its subcommittee.

"American Railroads," while it stayed in one place, covered thousands of miles on rollers to thrill World's Fair crowds. Designed to haul 1,200-ton trains at speeds up to 100 miles per hour, it was the cooperative undertaking of the Baldwin, American and Lima Locomotive companies.

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MEDICINE

Meningitis Invades Body Through the Blood Stream

CHICK EMBRYOS, too young by a week or more to crack their shells and emerge as downy chicks, have been giving medical scientists at Vanderbilt University Medical School, Nashville, important new information about dangerous meningitis.

When meningitis germs, called meningococci, are injected into the chick embryos, they get typical meningitis like that seen in human patients, Dr. G. John Buddingh and Miss Alice D. Polk report to the *Journal of Experimental Medicine*.

The meningitis germs enter through the nose and travel to the brain membranes by way of the blood, but do not go directly to the brain from the middle ear, cranial sinuses nor olfactory nerve sheathes, Dr. Buddingh and Miss Polk found from examining the chick embryos that had meningitis.

Scientists have previously thought that when patients got meningitis following middle ear or mastoid or sinus disease, the germs traveled directly from ear or sinus to brain, following nerve paths, instead of detouring via the blood stream.

The germs apparently do not live for

long in the blood, but may be protected during the time they are in the blood by certain of the body's germ-fighters called phagocytes, the chick embryo studies suggested. These germ-fighters engulf the germs, but the meningitis germs apparently can survive and even multiply into more germs within the phagocytes.

Both antiserum and antitoxin, used to help human patients ill with meningitis, protected the chick embryos against the disease, but the antiserum was more efficient.

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MEDICINE

Phosphorus in Possible Sulfanilamide Substitutes

ACHEMICAL compound that may prove as good a remedy against infectious diseases as sulfanilamide, with less toxic effects, is announced by the U. S. Public Health Service.

The compound, prepared by Drs. Hugo Bauer and Sanford M. Rosenthal, at the National Institute of Health, contains phosphorus instead of sulfur and is different in other ways from sulfanilamide. Three such compounds have been prepared, of which one, bis (4-dimethylaminophenyl) phosphinous acid, checked streptococcus infections in mice and had a low toxicity.

No human trials of these chemicals have been made yet, nor will they be, Dr. Rosenthal said, before more extensive laboratory investigations.

The object of the research, in which compounds with arsenic substituting for the sulfur of sulfanilamide were also made, is to find chemicals which either are better than sulfanilamide or are effective against germ infections which sulfanilamide does not check.

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GENERAL SCIENCE

Survey Is To Be Made Of Industrial Research

ANATION-WIDE survey of research in industry will be started immediately, Dr. Ross G. Harrison, chairman of the National Research Council, announced.

Raymond Stevens, vice-president of Arthur D. Little, Inc., Boston, consulting chemical laboratories, will direct the survey.

Funds for the important survey will be made available by the National Resources Planning Board.

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CHEMISTRY

Dust May Be Fuel for the Engine of the Future

DUST may be the fuel of the future for internal combustion engines, thus completing a cycle of development. For coal dust was a fuel used early in the development of what is now the diesel engine.

Coal dust is highly explosive, witness disastrous mine explosions. So are other kinds of dusts. Glucose, made from corn, would be adequate fuel for dust engines. Experimentation in this field is on the program for the new United States Department of Agriculture Laboratory at Peoria, Ill.

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METALLURGY

Silver Linings Predicted For Beer Cans of Future

SILVER is commonly considered a precious metal useful for coins, tableware, jewelry and, symbolically, as a lining for clouds. It is more in a class with gold than iron.

The white metal has been climbing out of the luxury ranks and looking for new jobs to do. It is shining up to industry. A research program undertaken by American silver producers has suggested unsuspected opportunities.

The beer can of the future may have a silver lining. An internal coating five millionths of an inch thick, which is enough, can be placed on twenty cans for a penny.

As a coating there is chance that silver can compete with tin to some extent. Several large companies are testing silver coatings to metals, plastics and glass. Various methods of application are being tried: Plating, electroforming, chemical reduction and vaporization.

There is hope that silver can be used to fight fungi that ruin or damage crops. Research has not progressed far, but a suspension of silver in bentonite, a kind of clay, may stick to the plants satisfactorily and do the fungus killing job.

More conventional are the uses of silver in electrical apparatus, particularly contacts, and in alloys with silicon, tin and lead. Lead-silver alloy may become important in airplane engine bearings, storage batteries and for soldering cans.

War-caused changes in metal prices has placed silver in a better economic position: Silver costs \$5 per pound avoirdupois, tin is 55 cents a pound, and mercury, a rival as a fungicide, is \$1.84.

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