

Do You Know?

Heavy fires sometimes injure *shade trees* seriously by "cooking" growing tissues.

The American *sweetgum*, in the fall, may have colors from yellow through gorgeous red and crimson to dark purple.

Overall production of *building materials* during the first half of the present year exceeded the record-breaking production of last year.

American cheese, nonfat dry milk, peanut butter, canned tomatoes, tomato juice and concentrated orange juice are a few of the *foods* distributed under the National School Lunch act of Congress.

Foresters are selecting seed for growing *trees* with the same care that farmers select seed for their crops; there are strains of trees that produce better wood than do other strains of the same kind of tree.

Pinkish tan-colored fresh and frozen *shrimp*, now on the market, are not spoiled common shrimp but are a species known as grooved or brown or Brazilian shrimp, which is now being taken in unusual quantities from the Gulf of Mexico.



MICROMAX CONTROL

Adds a Helper To The Research Team

In a research or control lab, such as is shown above, the man-hours required for temperature regulation of a furnace can be all but eliminated by the same kind of Micromax Program Control which industry uses on its giant furnaces.

For information, write Leeds & Northrup Co., 4977 Stenton Ave., Philadelphia 44, Pa.



JrL Ad N-33-240(1a)

AERONAUTICS

Radio Navigation System

► AIRCRAFT TODAY, with the newly designed Bendix radio navigation system, can tell exact position automatically while in flight, it was revealed in Cleveland at the National Air Races which include the Bendix long-distance event with a take-off from Long Beach, Calif.

A "fix" can be read by the pilot on a meter at any time and any place during flight as easily as the automobile speedometer is read, according to Howard K. Morgan of the Bendix Radio Division. Also new electronic devices used in Ground Controlled Approach apparatus aid landing with precision and safety, regardless of weather.

For higher speed aircraft, both in landing and in flight, the accent is on better and more reliable radio instrumentation and communication. Very high frequency (VHF) waves are replacing the low and medium frequencies long used. The advantage is static-free communication, which means that a pilot can understand communications from the ground while in storm areas, the time when he needs to hear best. Airports operated by the U. S.

Civil Aeronautics Administration are being rapidly equipped with VHF apparatus. So also are the radio ranges which guide pilots along the air routes.

The new VHF Omni-Directional Ranges already installed by the CAA throughout the country provide facilities never before available in radio ranges. The design of the Bendix NA-3 Navigational System makes these available to the pilot with great convenience and reliability. The frequency range used eliminates not only the atmospheric static but also what is known as precipitation static caused by rain, snow or dust.

More communication channels are available in the Very High Frequency band than in the lower frequency band. There is less interference between channels since the transmissions do not extend beyond "line of sight" distances. The Omni-Directional Range is not limited to two or four courses, but will supply accurate information on any course to the station the pilot may select. This accounts for its name, Omni-Directional.

Science News Letter, October 2, 1948

CHEMISTRY

Oil Recovery Progressing

► BITUMINOUS SANDS of Alberta, a great untapped source of fuel oil and gasoline, are gradually yielding to research scientists trying to find an economical process for the extraction of their petroleum. The research is being undertaken both by the Canadian government and the Research Council of Alberta, located at the provincial university, Edmonton, Canada.

The so-called Athabasca tar sands are in a 10,000-square-mile area north of Edmonton. Estimates vary on their petroleum content but it has been placed as high as 250,000,000,000 barrels. There is no question regarding the possibilities of extracting oil from them; the problem is to find a way at a low enough cost.

A government-sponsored separation plant is being erected at Bitumount on the Athabasca river. It contains a hot water separation unit designed on the results of researches of the Alberta Council. The recovery of oil by the hot water separation process is from 80% to 90% from good grades of sand. Water-flooding of the sands in place is a promising method of oil recovery.

Work has continued during the past year on applicability of water-flooding to the bituminous sands, an annual report of the council, just issued, states. Measurements of the viscosity of the bituminous sand oil and of the viscosity-temperature relationship show that the viscosity de-

creases very rapidly as the temperature rises above 32 degrees Fahrenheit to about 100 degrees. It decreases slowly above 150 degrees.

It can be said with considerable definiteness, the council asserts, that the viscosity of the bituminous sand oil at formation temperature is too great for water-flooding, and that a successful application of this method of oil recovery will involve the heating of the sand beds, in place, to temperatures above 100 degrees.

Water under practicable pressures will flow through bituminous sand at 36 degrees Fahrenheit, and will displace oil. The flow of oil is small, however. At 150 degrees, on the other hand, the flow is usefully great and half the oil is displaced before the ratio of water to oil in the flow becomes unduly high.

Science News Letter, October 2, 1948

RADIO-ASTRONOMY

Meteors Enable Us To Hear Distant Programs at Night

► MILLIONS of tiny meteors entering the earth's atmosphere may be responsible for our ability to receive radio broadcasts from long distances during the night, states Dr. A. G. McNish of the National Bureau of Standards.

Radio waves, which travel in straight

lines, must be reflected back to the earth if they are to be heard at any great distance. Tiny electrified particles in the ionosphere bounce the short waves back to earth.

The ions that compose this reflecting layer are produced mainly by the action of the ultraviolet in sunlight which splits electrons off the atoms and molecules high up in the rarefied air. Some of the electrical particles may also be produced by impact of tiny corpuscles shot off from the sun, some by cosmic rays and some by meteors.

The lower portion of the ionosphere is rich with free electrons during the day due to the action of sunlight, Dr. McNish pointed out at a General Electric Science Forum. Directly after sunset most of the electrons are gone because they become recombined with molecules.

"Yet—and herein lies the mystery—a

sufficient number of electrons persist at this lower height all through the night to reflect radio waves," Dr. McNish said.

"Judging from the rate of electron-decay just after sunset, one would not expect to find any significant number beyond midnight."

Meteors may be the agency responsible for reflecting the radio waves at night. Astronomers estimate that more than a thousand billion of these particles, smaller than grains of sand, enter the earth's atmosphere during a 24-hour period. Travelling at speeds up to 200,000 miles per hour, they would smash violently into atoms and molecules of the upper air. These meteors would tear some of the electrons from these particles to which they belong and thus maintain the radio roof throughout the night.

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explanation of how such factors aggravate or may even precipitate an arthritic process."

These studies were made on a group of 25 patients, of whom 21 had some form of arthritis. Tests showed that skin temperatures were fairly normal while joint temperatures were definitely elevated in cases of degenerative joint disease, chronic gout, and infectious arthritis.

This method is therefore of use in following the course of joint diseases and in evaluation of the effects on the joint temperature of such treatment as rest, exercise, physical therapy, drugs and X-rays.

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PSYCHOLOGY

Brain Operation Found To Reduce Intelligence

➤ REDUCTION of intelligence has been noted following a certain brain operation now sometimes used for epilepsy, it was reported to the American Psychological Association in Boston by Dr. Robert B. Malmo, of McGill University, Montreal, Canada, and the Allan Memorial Institute of Psychiatry.

The operation is one called gyrectomy

ENGINEERING

More Mileage Per Gallon

➤ TOMORROW'S AUTO engine is going to give 25% more miles per gallon and you will be filling up at the gasoline pump on such high-compression fuels as triptane, toluene, benzene and trimethylpentane as well as superleaded "gas."

The American Chemical Society was told in St. Louis by leading petroleum chemists that new fuels for more efficient engines can be ready by the time the automotive engineers can build, test and produce them commercially.

Since 1930 the efficiency of fuel utilization in passenger cars has increased by more than 30%, John M. Campbell and Dr. Lloyd L. Withrow of the General Motors Research Laboratories, Detroit, told the chemists. In addition to this improvement, high-compression ratio engines combined with high-octane gasoline of early-war aviation grade could push the efficiency 45% further.

Today's auto engine wastes 75% to 80% of the gasoline's energy and a gain of only 1% would save one to two millions of gallons of gasoline daily in the United States.

Present commercial gasolines sold at filling stations range between 70 to 90 octane and engines of newer passenger cars have compression ratios of about 7-to-1.

Sizable saving would occur with 8-to-1 engines and gasoline in the 96 to 98 octane range, a grade that the petroleum industry could produce to the extent of about 20% of its total gasoline volume.

Push the compression ratio up to 12 and 15-to-1, and new fuels chemically tailored by the newer methods of refining will be needed.

Experimental engines using these new fuels have been built and given road tests, several research groups reported.

The higher the compression ratio the better the antiknock quality of the fuel needed, R. W. Scott, G. S. Tobias and

P. L. Haines of the Standard Oil Development Co., Elizabeth, N. J., concluded.

Any upgrading of the fuel quality of auto engines should be established sufficiently ahead of the engine production so that the refiner can develop his methods of production. This was suggested by W. C. Offutt, J. E. Taylor and G. B. Swartz, Jr., of Gulf Research and Development Co., Pittsburgh.

Superfuel of 100 octane for the new engines of the immediate future can be made by adding a teaspoonful of tetraethyl lead to gasoline, Dr. H. A. Beatty and Dr. W. G. Lovell of the Ethyl Corporation, Detroit, told the chemists.

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MEDICINE

Temperature of Joints Taken with New Method

➤ THE TEMPERATURE OF JOINTS crippled by disease has been obtained by the use of a technique applied for the first time to man, the American Congress of Physical Medicine was told in Washington.

A needle from which the syringe is removed is inserted into the anesthetized joint. Then tiny temperature measuring units are threaded over this needle and are inserted two to three inches into the inner recesses of the joint.

This means that for the first time doctors will know what effect any treatment being used has on the crippled joint, Drs. Joseph L. Hollander and Steven M. Horvath, of the School of Medicine and Hospital of the University of Pennsylvania, pointed out.

"It appears significant," they reported, "that cold, pain, fear and even smoking produce an identical effect, i.e., the apparent constriction of the skin vessels and dilation of the vessels within the joints. Perhaps this observation may lead to an



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