



OIL SEARCH—Field geologists in their search for petroleum deposits are shown taking measurements in the Big Horns, Wyo.

Although these new petroleum-users were developed solely to help win the war, they find peacetime applications. Some believe that the smoke-generator may help protect crops by keeping orchards and fields from freezing when a cold wave suddenly begins to nip young buds. If you are "roughing it" for several days and run out of fuel for your stove, that postwar steak can still be done to a turn. Just make some "canned heat" similar to the gel gas by adding a little of the special powder to your motor gasoline.

Lower-cost cars for a given performance and increased mileage are expected to result from 100-octane gasoline. As much as 35 to 40 miles to the gallon will be possible—say three or four years after the war—when engines are built to get the most out of the new gas. With a slight modification of the engine head, existing cars could take reasonable advantage of gasoline approaching 100 octane, say petroleum officials.

Owners of new cars after the war may not appreciate improvements which have been made in high quality oils, but those who buy used cars will find that the engine runs more smoothly and lasts longer. Oils which resist oxidation, and are not as likely to cause piston rings to stick or to let varnish deposits form, have been obtained by adding as little as one to 2% of a metallic derivative of phenolic structure.

Lubricants have been developed from petroleum which more effectively keep

moisture out of delicate engine parts, thus protecting against deterioration billions of dollars worth of material shipped to all parts of the world. Some types of greases, which look as black and sticky as asphalt, not only prevent rust but tend to displace slight bits of moisture.

About 95% of the toluol, the second "T" in TNT, came during the last war as a coke byproduct. The first tank car of synthetic nitration-grade toluol was made in America just 16 months before the war broke upon us. Today most of the toluol used in our shells, bombs and torpedoes is made synthetically from petroleum. Toluol will probably be greatly used as a solvent for paints and dyes in the plastics industry after the war.

Raincoats which drape nicely about the figure and storm suits which keep out the cold and wet will probably be made after the war of synthetic rubber. Large quantities of synthetic rubber are now being made from butadiene (from petroleum) and styrene (from coal tar) to keep our tanks and jeeps rubber-shod. When peace returns this research may lead to more attractive shower curtains, and washable, long-wearing rubber sheets for baby cribs.

Petroleum Products

The various substances found in petroleum have different boiling points so that the various components may be separated by fractional distillation, or heating. Products from petroleum range from gases, for illumination, heat and synthetic rubber; light oil, which is used for gasoline and kerosene; medium oil, from which metallurgical and Diesel fuels are made; heavy oil, from which come insecticide sprays, paraffin wax and lubricating oils; to residues, which give us wood preservatives, tar for paving streets and airports, coke and emulsifiers.

Newer distillation units pass the petroleum vapors into a "bubble tower," divided into a number of sections. Substances such as heavy oils with higher boiling points condense in the lower sections and flow down through the tower. The hot gases from the furnace bubble through these liquid products, and the gasoline fraction passes out at the top of the column and is condensed separately. Other fractions are withdrawn at different levels. A variety of products may be made by separating and purifying these various fractions.

Catalytic cracking is often used to break down petroleum molecules and rearrange them chemically so as to produce more of certain desirable constitu-

ents. "Cat cracker" chemicals come in three sizes: lumps, granules and a powder fine enough to be handled as a fluid.

The "cat crackers" do not turn out 100-octane gasoline as a finished product, but produce the base stock for aviation fuel. When 100-octane gas is taken out, however, less remains for the numerous byproducts made from petroleum.

A number of these "cat crackers" have been built during the war. The production of 100-octane gas is now ten times as great as in 1942.

The octane number of gasoline is measured by the tendency of the fuel not to knock in use. One of the pure hydrocarbon components of petroleum, iso-octane, was discovered earlier to be free of knocks in the highest compression motor it was then possible to build. Another component, normal heptane, was found to knock under almost any circumstances. A fuel-rating scale was thus made with heptane as zero and pure iso-octane representing 100. Gasoline falling between these extremes is rated as if it had a certain percentage of iso-octane, the rest being the knock-creating heptane.

Much of the 100-octane gas today is made by taking iso-octane mixed with tetraethyl lead (which incidentally has an octane number greater than a hundred) and blending it with gas which is rated below 100.

Geologists agree that there are still huge quantities of undiscovered oil beneath our land. We will even end the war with more known oil reserves than before Pearl Harbor because new fields have been found. Engineers have already demonstrated that we can derive synthetic crude oil at reasonable cost from the great reserves of natural gas and the tremendous deposits of oil shale, of tar sands, and of coal and lignite. Oil which can be derived from these sources is believed by many to be enough to supply our needs at the present rate of consumption for more than a thousand years to come.

Science News Letter, July 14, 1945

DENTISTRY

More Than 200,000,000 Teeth Need Pulling

► AMERICANS over age three need 238,500,000 teeth pulled and 632,000,000 fillings made in their teeth, the subcommittee on health of the Senate Committee on Education and Labor has been informed. (turn page)

Do You Know?

In one summer, a single *fireweed* plant will produce 80,000 seeds.

Bodies of some postwar *cars* may be made of plywood.

The *muscle fibers* of man are approximately .001 inch in diameter.

The *cowbird* perches on cattle to feed upon insect parasites.

Leaf-cutter ants cultivate for food a certain fungus on balls of leaf tissue.

Some incubator-hatched *turkeys* never learn to eat without help; force-feeding is sometimes necessary.

The *bat* usually has a single young one at a time, and the mother carries it about on her aerial journeys.

The saw on a *sawfish*, which may be five feet long, is a weapon of defense, as with it dangerous sidewise strokes can be made.

Alcohol, made from molasses, sugarcane and surplus sugar in Brazil, is mixed with gasoline and sold for motor fuel.

There are no *sulfa drugs* or even sulfonamides of any description in nature as far as is known; they are products of synthesis.

Many reports of the amount of *ozone* present in the air are inaccurate, due to the difficulty of knowing that it is ozone being tested, and not some other oxidizing matter.

Fresh-cut *saplings*, stood for about six hours in a tub containing a solution of chromated zinc chloride, zinc chloride, or copper sulfate, rot much more slowly in the ground when used as fence posts.



WYOMING

A Summer to remember

The 900-acre Paton Ranch will give you trout-fishing in a mountain stream in the foothills of the Big Horn mountains, daily horseback rides along picturesque canyon trails and excellent food—most of which is grown on the ranch.

The region abounds in geological and historical interest—dinosaur bones, marine fossils and implements used by the Indians many years ago.

Write for illustrated, descriptive folder

PATON RANCH, SHELL, WYOMING

These and other estimated figures of the accumulated dental needs of the population were discussed at committee hearings on dental research and dental care bills. Chairman of the sub-committee on health is Sen. Claude Pepper of Florida.

Dental neglect among children aged six to 18 is such that, according to the estimates, only about 5,650,000 of the annual crop of 22,500,000 decayed teeth are filled.

The population over age three also has

an accumulated need for 39,500,000 crowns and bridges, 20,000,000 partial dentures (false teeth), 20,000,000 dental disease treatments and 125,000,000 prophylactic treatments.

Since 1940, one-third of the civilian dentists have gone into the armed services, the committee was further informed. Indicating the variation in availability of dental care, California in 1940 had one dentist for every 1,279 people while South Carolina had one dentist for every 5,263 people.

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AERONAUTICS

Planes To Be Tripled

► AIR-MINDED America will have ample aircraft in the near future for passenger travel, air express and mail. Nearly three times as many planes, with nearly six times the seating capacity, will be available for commercial uses as there were before the war when 409 new planes, now on order or on option, are ready for use. All 19 American airlines are increasing their facilities.

These 19 airlines of the United States expect to have 975 planes in their post-war fleets, it is revealed by the Air Transport Association of America. The planes will seat 36,180 passengers. They will provide greater speed, comfort and service than air passengers have ever experienced before. The additional planes will be new, not converted surplus military transports. It has been found, the association states, that the cost of conversion of military transport planes is greater than the cost of new equipment.

The giant of the new planes under order is a 320,000-pound craft, powered with six 5,000-horsepower engines, seating 204 passengers, and with a cruising speed of 340 miles an hour which will enable it to travel from New York to London in nine hours. A new Mars-type 165,000-pound flying boat, four-engined, carrying 106 passengers, will be able to cruise at over 200 miles an hour with a payload of 28,000 pounds for more than 3,000 miles.

Other new planes will have seating capacities ranging from 128 down to 14 passengers. Some will have cruising speeds up to 325 miles per hour. Several will weigh 100,000 pounds or over.

The new planes for overnight trips will have different combinations of state-rooms, berths and reclining chairs. They will have separate rest rooms for men and women. Wherever necessary all

planes will have pressurized cabins to maintain low-altitude conditions at "over-the-weather" heights, together with air-conditioning, thermostatic temperature control, and individual ventilation. Windows will be larger and better arranged for observation. Electric stoves and refrigeration will permit the serving of satisfying meals.

Many scientific war developments that gave American war planes advantages over those of the enemies will be incorporated into the new civilian commercial aircraft. Among these are radar and electronic devices which permit landing under practically zero ceiling and visibility, and avoid risk of collision by enabling pilots to see other planes even in the thickest weather.

Among the new instruments is the Sperry "Gyrosyn" compass, which is a gyro synchronized with a magnetic compass, giving much greater accuracy in navigation. Also there is a far-advanced, radio-aided system of airway traffic control, which will be vital when planes are landing and taking off six a minute at the larger airports.

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NEW "PICK-UP" CANE

Permits Disabled Persons To Pick Up Small Articles Without Painful Stooping.

NO OTHER CANE LIKE IT

The Mason "Pick-Up" is a light double purpose cane with concealed patented pick up mechanism that enables the user by simple finger pressure and without any stooping to easily pick up papers, pencils, cards, coins, etc. Proper balance and rubber grip tip insures safer walking. Use a beautifully finished Mason "Pick-Up" Cane yourself or as a perfect gift for a disabled service man or friend. Write today for FREE CIRCULAR and 5 DAYS TRIAL OFFER.



W. H. MASON

Box 27,

Leesburgh, Ohio