OIL CARE IS NEEDED

Different Type Motors Require Varying Kinds.

ENGINES ARE CLASSIFIED

Thickness of Lubricant to Be Used Is Determined by Cooling and Distributing System, as Tem-

perature Is Important.

A scientific analysis of the lubricating systems of all standard makes of motor vehicles, in connection with exhaustive tests with different oils in each, demonstrated that practically every lubricating system in use today could be included in the following 16

I. Full splash

Splash, with circulating pump, Pump over and splash.

. Force feed and splash.

5. Pump over. Separate force feed.

Force feed.

8. Full-force feed. 9. Knight slide valve motor. 10. Oil fed with fuel.

Tests have shown conclusively that no one grade of oil, however high its quality, can be suitable for all types of motors and lubricating systems, be-cause of the wide variance in the meth-ods employed of feeding the lubricant to the various working parts of the The reason for having chosen a fixed

The reason for having chosen a fixed number of lubricating systems for internal combustion motors is because the details of these lubricating systems exert such a material effect upon the flow of oil to the moving parts; hence, it is necessary to specify definitely a certain grade and thickness of oil as best suited to meet the mechanical and thermal conditions of each particular motor and system.

For the proper and efficient lubrication of internal combustion engines in general there are two chief factors which determine the character of the lubricating oil necessary for use.

(a) Type of cooling system—water or air. This largely determines the operating temperature of the oil passing through the bearings.

(b) Type of lubricating system—method of applying oil to the moving parts.

The above lubricating systems may

The above lubricating systems may be divided into two general groups— 'circulating' systems and "all-loss"

In "circulating" systems the original oil filled into the crank case or sump of the motor is used over and over again, being circulated to the moving surfaces in contact by the moving

When the oil has been in use in when the oil has been in use in a motor employing these systems, during several hundred miles' running, it is necessary to drain the crank case and thoroughly rinse out all used oil. In the "all-loss" systems oil is filled up to a fixed level in the crank case of the motor. The lubrication of all parts is then made continuous by splash and by feeding oil from an auxiliary and by feeding oil from an auxiliary. and by feeding oil from an auxiliary source into crank case, either through the main bearings or to a constant level distribution trough at an adjustarate corresponding to the rate of

oil consumption. In "all-loss" systems all oil fed into the crank case from the auxiliary source is consumed at or about the same rate as the feed. Because of the constant addition of fresh oil, it is unnecessary to drain and wash out the crank case of a motor employing the "all-loss" systems as frequently as is the case with the "circulating" systems. "all-loss" systems all oil fed into

The "all-loss" systems are much less colproof than are the "circulating" stems. There is always a possibility th the former of feeding an excess oil into the crank case, causing a pid carbon deposit in the cylinders, of feeding too little cil, causing unduly rapid wear of parts.
Oil fed with fuel consists of mixing

approximately one pint of oil with each five gallons of fuel. In rare instances oil is fed from a drip cup into the inlet manifold and carried to the cylinders by the explosive charge.

LIGHT-DIMMER WORKS WELL

Series-Parallel Wiring Permits Saving of Current.

"The ordinances which many cities are now enforcing in regard to auto-mobile head lights make dimmers necessary on all cars." says A. C. Stevens, manager of the Portland branch of the Winton Motorcar Company. "There are several ways of dimming

"There are several ways of dimming the bright head lights to comply with these ordinances. The better method and the one in use on all of the better cars, is what is called the seriesparallel system. By this method of wiring, the same bulbs are used for wiring, the same bulbs are used for the height and dimmed lights. When the bright and dimmed lights.

wiring, the same bulbs are used for the bright and dimmed lights. When hurning bright the lamps are connected so that they operate on the full voltage of the battery. But when dimmed, the connection is so that the lamps are only half voltage.

"This practice reduces the current consumption to a minimum. When the lights are dimmed, about three-fourths of the current is saved. Such economy does away with storage battery trouble and consequent repair bills. This saving of current commends the series-parallel dimming arrangement to all motorear owners.

"In some cases two bulbs are used in each head lamp, one large bulb and one small one. The large bulb is used for country driving and in places where a bright light is necessary. The small one is used in cities to give dim light."

PARMERS HARD TO SATISFY

Countrymen Demand Reliability In-

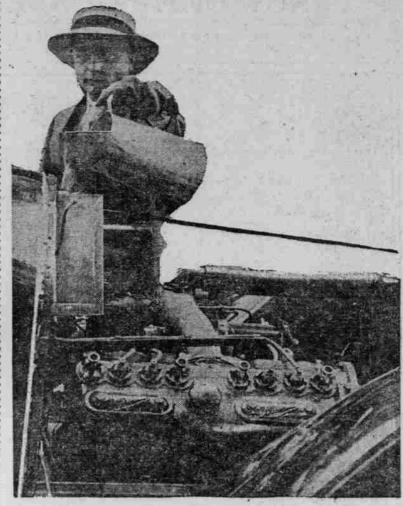
stead of Appearance in Cars.

When the farmer buys a motor car "When the farmer buys a motor car he has 'to be shown,' says a sales executive of Dodge Brothers, Detroit." He doesn't take anything on say so. And he particularly searches for the hidden quality. The average city man is strong for looks and design but only in rare cases is he possessed of much knowledge of mechanics and then, too, he is schooled in the proposition that even if something goes wrong with his car it is only a step to a sarage.

"But the countryman adopts an entirely different attitude when he buys a car. He is usually motor wise. He has been operating his farm machinery

by gaseline engine and is familiar with the principle and operation of motors. He has before him at all times the thought that he must have a car that will take him there and back.' In other words, he will not take chances on a car that may strand him 10 miles from home and three or four from help. 'He is a close reader of motor car advertising literature. In most cases when he plans buying a car he has been giving the subject thought for a year or so and reading up on it. He keeps the saleshan on his toes with his questions and he demands absolute frankness."

MITCHELL EIGHT RUNS 17.7 MILES ON GALLON OF GASOLINE UNDER ORDINARY CONDITIONS



H. S. RODEBAUGH, SALES MANAGER OF MITCHELL COMPANY, POURING IN FUEL SUPPLY.

Just to prove that it doesn't require a mint of money to run an eight-cylinder car, the officials of the Mitchell, Lewis & Staver Company recently staged a gasoline economy test in Portland that was remarkable in more ways than one.

Quite unlike gasoline tests in days gone by, H. S. Rodebaugh, who was at the wheel, and Ray Albee, advertising manager, insisted that the motor should be running all during the test and that it should not be shut off once for coasting down hills. Furthermore, a brand new car that not yet had been loosened up to economical fuel consumption was used and the car was started forth with its stock equipment complete in every detail, including tires.

Not only that, but the course was picked out at random, without any well-laid plan. After traveling for exactly 17.7 miles over the Powell Valley and Section Line roads at a speed maintained by the average motortist, the measured gallon of gasoline was exhausted and a new record was established. Mr. Rodebaugh declares that the owner will set like results from the Mitchell Eight and challenges anyone to pick a weakness in his manner of making the test.

GREAT OREGON HIGHWAY DESCRIBED IN BOOKLET

Portland Automobile Club Publishes Story of Wonders of Columbia River Gorge, Made Accessible to Tourists by America's Greatest Scenic Road.

(From booklet on Oregon's scenic highways.

published by Portland Automobile Club.)

THE Columbia River Highway cannot be told of in the terms that describe other roads. It is feet readiness to enjoy that portion of "America's greatest highway." the most wonderful scenic treasure house of inexample of the country is inlead Sca Bed.

Explanation is due that the Columbia.

ilton and Table mountains and other points done by the Great Artist in his favorite tinting of buffs and browns

Hatcheries Are World's Largest

Hatcheries Are World's Largest.

Table Mountain is said to have been the north pier of the Bridge of the Gods. The highway circles the south pier of this ancient bridge that geologists say was fact as much as myth and the islands between and the sunken forests are said to be the broken fragments of the span that fell when convulsions shook the once active volcanoes, Hood, Adams and St. Helens.

Flowers of Spring, of Summer or Autumn are siways blooming and with the tender tints of evergraens soften rugsed outlines.

At Bonnevillie there must be a stop

At Bonneville there must be a stop o see the fish hatcheries, the largest the world where every year millions f tiny salmon and trout are propagated to repopulate much-fished waters, which supply an annual output of about \$6,500,000.

It is on the grade just west of Tan-ner Creek that the petrified logs are found. Some were oak and some were fir, and each kind may be told by its

found. Some were oak and some were fir, and each kind may be told by its coloring and grain.

Near this point is discernible the old Government trail made 50 years ago, which winds steeply along the mountain slopes.

Moffett Creek bridge, named for one of the early settlers on the Upper Columbia, must have particular consideration. One of its spans stretches across 170 feet with a 17-foot rise and it is 75 feet above the dashing stream; the noted bridge by General Chittenden in Yeslowstone National Fark has a span of only 150 feet.

Looking across the river near Warrendale is Beacon Rock, famed by Indian legend. It was long considered insurmountable. Covering at its base but 17 acres it stands above the river, a lonely spire, 500 feet high.

On the Washington side the bulky symmints will seem to have followed you. St. Peter's Dome, Cathedral Rock and the other seven towering monoliths burst upon the entranced gaze. At Horsetall Falls, with the noise of angry water drowning out lesser sound you may look back upon the dome bidding you a majestic farewell—and then pass through Oneonta tunnel which marks the beginning of a new series of enchantments.

Gorge Leads to Great Falls Oneonta Gorge is a knife blade cut in the mountain. The stream is cold and clear. The walls are high and they lean toward each other at the

It is in this vicinity that talus, dropped with the passing of centuries from the columnar basait far above, conceais the subterranean stream that sends forth its cold air blasts out of crevices. At the edge of the Columbia this streaments

sends forth its cold air blasts out of crevices. At the edge of the Columbia this stream emerges.

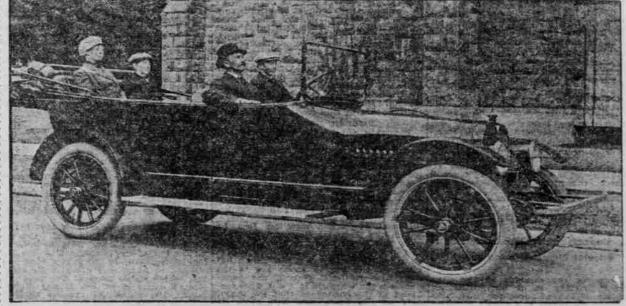
You will notice also the walls of dry masonty constructed by old-world Italians. There are about two miles of such walls along the Columbia River Highway and there are also viaducts that have but one "foot" adapted to the slope without disturbing it.

Now comes Multinomah Fells, unquestionably the queen of all American cataracts. The stream rises out of Larch Mountain. famous viewpoint of the Cascades, to which a trail is being built. It has many falls along its picturesque course and the climax of its dashings is the smashing leap it makes for union with the Columbia. There are, in fact, two falls. The first has a perpendicular of 600 feet and the waters pound into a circular basin with cannon-like reverberations, course swiftly under a slenderly arched bridge only to drop again almost 70 feet nearly to the level of the Columbia. An excellent trail leads to the bridge, and around and under the falls.

Wahkeens Falls has its setting in Benson Park, recently presented to the City of Portland. Cloud-high above you and to the south is a mountain 3000 feet high and from its base leaps the stream, full born, and cold as liquid ice.

The columbia flow flower states the property of the remainder of the run. In the bold of in the terms that the semainder of the run. In the bold of in the terms that the semainder of the run. In the bold of in the terms that the semainder of the run. In the semainder of the run of of the

TRIP TO CALIFORNIA IS MADE WITHOUT PUNCTURE OR MECHANICAL EXPENSE.



CHARLES BERTRAM, OF BAKER, OR., AND HIS FAMILY, IN LIGHT HUDSON SIX. Charles Bertram, of Baker, Or., visited C. L. Boss & Co. last week on his return trip from Southern California. On August 10 he left Baker for a vacation on a tour through California in the light six Hudson automobile. The trip from Baker to San Diego, over 2200 miles, was made without a puncture. Mr. Bertram and his family traveled about 4000 miles on the trip without an expense mechanically on the car. They believe that this is the best way to see the country from the standpoint of pleasure, sport and

The party stopped at all known points of interest, passed a week at San Francisco, put in a little time at Los Angeles, visited a nephaw in Orange County, California, and re-turned by way of the Pacific Highway. This was Mr. Bertram's first experience with an automobile. He never had driven a car before he bought the light six Hudson and had driven the car less than 400 miles before starting the trip.

No "Skimping" Anywhere in the Chandler Light Six, \$1295

HANDLER reputation doesn't rest on the fact that this was the first light-weight six selling for less than \$2000. It doesn't rest on the fact that the Chandler pioneered the light-six field when all the rest of the industry was insisting that sixes had to be high-priced and heavy. Chandler reputa-tion rests primarily on the marvelous Chandler motor, Chandler comfort and economy and the fact that the Chandler has never been "skimped" either in quality of materials or character of equipment. Each part of the Chandler is as good as every other part, and the character of the whole car is reflected in its equipment. Now study this equipment. Note it carefully, item by item. Realize that each feature is first choice of its kind. Any two or three of the following equipment features found on the Chandler would make a "talking point" for the average car.

All of them are on the Chandler:

Gray & Davis Electric Generator. Rayfield Double-jet Carburetor.

Three silent chains, enclosed and running in bath of oil, for driving motor shafts.

Cast aluminum motor base extending from frame to frame; giving rigidity to engine mounting; providing pedestals for magneto, generator and pumps; and doing away with necessity for a dirty, rattly sheet-metal drip pan.

Imported Annular Ball Bearings. Silent Worm-bevel Rear Axle. Genuine Mayo Mercedes Type Radiator. Stewart Vacuum Gasoline Feed. Firestone Demountable Rims.

Bosch Magneto, admittedly the best ignition. Golde Patent One-Man Top, covered with Gray & Davis Electric Starting Motor. Golde Patent One-Man Top, covered with Genuine Hand-buffed Leather Upholstery. Warner Magnetic Speedometer. Instantly Adjustable Tire-carrier at rear of

tonneau, without straps. Auxiliary seats in tonneau that, with one movement of the hand, are folded away into the back of the front seats entirely out of sight. The greatest improvement in seven-

passenger construction All miscellaneous items of general equipment. And above all the

Marvelous Chandler Motor powerful, quiet, economical and beautifully finished—a motor to be proud of.



Dulmage, Manley Auto Co. 46 North Twentieth.

Phones, Marshall 1699, A 1299

CHANDLER MOTOR CAR COMPANY, Manufacturers, CLEVELAND, OHIO

MONTESANO, Wash. Oct. 1.—(Special.)—The State Highway Commissioners have written Engineer George D. Robertson that a decision has been reached, and the \$25.612 appropriated for the Olympic Highway extension from Quinault Lake will be used to the Queeta River at the junction with the Clearwater.

The work is to have written for maintenance on earth roads becomes very apparent, and the \$25.00 in gold. Astor cup races held at New York years archive for maintenance on earth roads becomes very apparent, and the \$25.00 in gold. The winning driver received a Bosch prize of \$500 in gold. The second car a Bosch prize of \$500 in gold and the driver of the third car and grub the 25-mile stretch to allow, but not when it is dry and sicky. The earth should move freely along the sides of the slab. If the roadway is extremely full of ruts and holes, it is best to drag once when the soil is moist and mellow, but not when it is dry and the driver of the third car and grub the 25-mile steed.

The winning driver received a Bosch prize of \$500 in gold. The second car a Bosch prize of \$500 in gold. In addition to the above prizes, there will be an additional bonus of \$100 for each place. Providing the winner made it is best to drag once when the soil is moist and mellow, but not when it is dry and the first of \$200 in gold. In addition to the above prizes, there will be an additional bonus of \$100 for each place.

sessors this year returned only 21,713 automobiles in the entire state. While the larger proportion of 1915 deliveries were made after March 1, the date of assessments, it is evident that cars which were not discovered by the Assessors nevertheless bear licenses, the general tax being easier to dodge than the license fee. Last year the Assessors found only 15,223 automobiles.

The first \$70,600 collected has been placed into the general fund to meet all expenses of the administration of the act for the bionnium. The remaining \$125,785,80 has been placed in the permanent highway fund, to be used by the counties on maintenance work, in the proportion in which they raise permanent highway fund to the remarkable increase in number of automobiles, the net earnings may reach \$500,000.

In the fiscal year ending May 31, under the old law, 22,224 licenses were issued at the fint rate of \$2 each, giving the state only \$64,645, all of which went into the general fund.

Washington Highway Engineer Points Out Methods.

PROPER SHAPING

State Bulletin Illustrates Way to Keep Surface Smooth in Spite of Rains and Tells of General Road Problems.

clear and grub the 25-mile stretch to the Queeta River at the junction with the Charwater.

The work is to be done by day labor instead of contract, and will be started this Winter.

All the sides of the slab. If the road-way is extremely full of ruts and holes, it is best to drag once when the surface is slushy. Clay and water, when puddled in an intimate mixture, becomes tough and impervious to water, and will gradually get hard if compact in this condition.

Payement Made of Earth.

"It has been shown that this puddled earth, when compressed and dried, becomes extremely hard. On these facts rest the value of dragging the road. When road dragging is properly done, it produces a smooth surface, filling up the ruts, holes and hollow places. As a small amount of material is always nushed to the center of the road the

Automobiles Not Reported to Tax Assessmors Are Found When License Is Taken Out for Them.

OLYMPIA. Wash., Oct. 2.—(Special.)—During less than three months under the new Washington motor code 40.052 licenses have been issued, 4601 to motorcycles and 25,491 to automobiles of various classes, for which \$196,385.50 has been turned into the state treasury.

That the new law is having the efthe material of which earch roads are composed, running water will soon ilcenses is indicated by the fact that while 35,419 automobile licenses aiready have been issued, County Assessors this year returned only 21,713 automobiles in the entire state. While the larger proportion of 1915 deliveries the larger proportion of 1915 deliveries.

various links of the present route were constructed by the counties, and in some cases extended between coun-

in some cases extended between county seats as the population increased," says W. R. Roy. State Highway Commissioner of Washington.

"The most important section to the earlier settlers, from the standpoint of through travel from Puget Sound to Portland, was the road from Olympia to Cowlitz River Landing, in Lewis County. From the latter point passengers traveled down the Cowlitz in canoes to the Columbia, thence by steamer to Portland. There was a trail constructed by the army from Olympia to Stellaccom and thence to Fort Bellingham, near the present city of Bellingham.

BOSCH FIRM AWARDS PRIZES

First Three Drivers in Astor Cup Race Get Cash Honors.

In keeping with its usual practice, the Bosch Magneto Company offered a number of Bosch prizes for distribu-

will be an additional bonus of \$100 for each place, providing the winner made a better average than the best time made in an American long distance contest, i. e., an average of 101.86 miles an hour; provided the second driver made a better average than the best time made by a second place car in an American long distance contest, an average of 100.58 miles an hour, and provided the third driver made a better average than the best time made by the third place car in an American long distance contest, an average of \$7.78 miles an hour.

Stretchless Inside Tires

82 North Broadway Phone, Broadway 1643

One, on an average, will reinforce three old tires and if they do not do what we claim, you can have your money back at any time for the asking.

Removes Carbon, Intensifies Fuel, Promotes Perfect Combustion

MOTOR VIGOR SAVES GASOLINE, DIL, REPAIRS and ROAD TROUBLE, INCREASES MILEAGE, DECREASES EXPENSE. Sold on a Money-Back Guarantee Price, 50c Per Package.

MOTOR VIGOR CO. North Broadway, Near Burnside

PORTLAND, OREGON.