

shaft is better than hypoid gearing to obtain the floor leveling.

Without going into the intricate mechanical characteristics of the new hypoid gears it should be pointed out that they are new only in the sense that they are finding wider use in motor cars to transfer the power from the engine, through the propeller or drive shaft, to the rear wheel axles. In technical design, they are a compromise between a spur- and a worm-type gear.

Another factor which brings them to the forefront of motor car news this year is that they are one way to solve the level rear floor problem because they make it possible to bring the drive shaft into the rear end at a lower level.

A third point, and the one which offers the greatest possibility for discussion, is that they go definitely into the field of extreme lubrication pressure—and there you have a problem which has made the hairs of the petroleum engineers turn considerably more gray.

The clearances in hypoid gears, it should be explained, are somewhat less than those in the older-style gears and their size is materially reduced. The result is that pressure on the grease to be used in lubricating them is much greater than ever before.

Soap Gives Strength

No simple refined mineral motor oil or grease has the strength needed to withstand, for long, the extreme pressures encountered but research has discovered that by adding minute traces of suitable chemicals the strength can be increased 200 per cent and more. Chlorine and sulphur compounds and certain types of lead soaps are among the materials added to motor oils to gain strength.

In tests on extreme pressure lubricants at the National Bureau of Standards in Washington, some of the oils have withstood a load capacity of 250,000 pounds to the square inch and with the equipment used were impossible to break down. The conditions of the tests, however, did not duplicate the higher temperatures which are encountered inside the rear end gears and which can bring about chemical changes in the lubricant used. And it is chemical change which may bring corrosion problems, the bugaboo which keeps automotive engineers awake nights.

At first a difficult development problem, the matter of lubricating the hypoid gears is being ironed out. But the goal of being able to drive into any gasoline service station and giving the simple order, "grease the rear end," is not yet quite possible. Check with the manufac-

turer of your new car to see what brand of extreme pressure lubricant he recommends, and see that you get it.

As an alternative method of making the rear seat floor level without going to hypoid gearing, some manufacturers are using two-piece propeller shafts with three joints in them.

Whether this method is preferable to hypoid gearing is a question which can better be answered a year from now. But the dual systems indicate that there is a difference of opinion on the matter at the present time.

Overdrive, which came into use on the lower priced models of 1936, is here to stay, apparently. The automatic units which decrease engine revolution at 35, 40 or 50 miles per hour speeds received wide customer acceptance last year.

The 1937 cars in the same price class of 1936 will be larger but this has been achieved without increased weight. Refinements in carburetors, manifolds and other places enable the manufacturers rightly to emphasize greater economy of operation.

It may be an exception but it may be a trend that one make of car this year features dual carburetors to gain better distribution of the gasoline to the cylinders. In the same category is the use of superchargers in another production line of cars.

In electrical equipment, both the generator output and the battery capacity have been increased. This trend continues from previous years and began with the use of automobile radios with their extra drain on the battery.

Improved cooling of the engine is generally achieved. Some cars have lowered the speed of their water pump but circulate more water which may be more than 2,600 gallons an hour, at engine speeds of a mile a minute.

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GEOGRAPHY

Icebreaker Discovers New Island in Arctic

A HITHERTO unknown island was discovered in the icy Arctic Ocean by scientists aboard the icebreaker *Sadko*, Prof. R. Samoilovich, head of the expedition, reported. The new land is over a mile long, lying low in a large expanse of shallow water. Its position was determined as north latitude 81 degrees 12 minutes and east longitude 72 degrees 20 minutes. It is east of Franz Joseph Land.

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ORNITHOLOGY

Birds Fly North and South But Which Way Is Home?

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ARE the birds flying home now, when they go south in autumn? Or is home where the nest is built in the north in spring? There are two opposing theories as to where birds are really at home.

One theory has it that the ancestral home of the birds must be the northern one. According to this view, birds used to swarm over the whole Northern Hemisphere, and as the climate offered them a year-round food supply and suitable breeding conditions, they did not roam, as so many do now. They were like birds in the tropics today, for most tropical birds do not migrate.

But gradually an Ice Age crept down from the Arctic, bringing glacial cold and driving the birds farther and farther south until they were safe in the tropics. When the ice sheet retreated, the birds tried each spring to return to their ancestral homes in the north, but they could stay only a brief time and then winter would freeze up the home land again. So in time migration became a habit.

The other theory, suggesting a southern home for the birds, is simpler in some ways. It assumes that the birds all had their ancestral homes in the tropics. But that led to over-population and all the worries of congestion and food shortage and struggle against neighbors—just the same with birds as with humans.

So, like human immigrants, various groups of birds took to their wings and moved to breeding grounds where competition was less keen. When they flew so far north that they encountered ice sheets, or that winter cold repelled them, the birds retreated south again. In time, the migration became a habit, just as the other theory presupposes.

As yet, neither theory is supported by positive biological data. One fact we can be sure of. And that is that birds began migrating to find their two main requirements—breeding grounds and food.

The spring flight carries migrating birds to their breeding ground. The autumn flight carries them to a safe food supply. But which way is home to the birds we don't know, and I am sure the birds don't know now, either.

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