of the good material, and the question naturally has arisen how to get it out.

Unfortunately distillation, the stock-in-trade process of the oil refiner, does not separate good oil from bad, although it does separate light from heavy. Recent researches show that propane, a normal constituent of liquefied natural gas, can be made to turn the trick. This remarkable substance, cheaply available, looks like gasoline but has a boiling-point of 48 degrees below zero Fahrenheit. It has the ability to dissolve out, or extract, the Pennsylvania type of ingredient, but not the asphalt, paraffin wax and other undesirable components which mar the cheaper lubricants.

Lubricants extracted with propane have the pleasing habit of constancy in viscosity during the process of warming up of a motor. They are thin enough to permit the starter to turn over a cold motor—and at the same time remain sufficiently viscous in a hot motor for proper lubrication.

The new refining method opens wide new resources for manufacture of really good motor oil, since Texas, Oklahoma and California oils, previously thought unsuitable, are available as raw materials. Entirely new and peculiar refining apparatus must be devised, however, to take care of the propane in view of its extremely low boiling point. The whole process will have to be conducted under pressure.

Science News Letter, January 27, 1934

GENETICS

Broody and Non-Broody Hens Produced By Breeding

BROODINESS in hens, described in old-fashioned rural terms as "always wantin' t' set," can be increased or diminshed by selective breeding, it has been shown by experiments reported by Dr. Frank A. Hays of Massachusetts State College.

Dr. Hays bred two lines of Rhode Island Reds for the opposite tendencies in hen-maternalism, and carried on his experiment for nine years. The broodiness of the line encouraged in this tendency was little less than double that of the non-broody line during the time of the experiment. The annual egg-laying records among the non-broody hens were, as might have been expected, significantly higher than those of their broody relatives.

Science News Letter, January 27, 1934

ASTRONOMY

200-Inch Telescope Mirror To be Poured of Special Glass

THE DISC of the great 200-inch mirror of the new Mt. Wilson Observatory telescope now being built will be made of a superior sort of pyrex glass and it will be poured at Corning, N. Y., in about a month.

Early plans called for a mirror of fused quartz, but now a superior pyrex glass, which has a small volume change with temperature, has been developed for the special purpose of the 200-inch mirror. When a few years hence the new giant telescope is placed in operation on a southern California mountain peak, it will be the world's largest, doubling in one gigantic step the diameter of the world's present largest, the 100-inch on Mt. Wilson, Calif.

At the Corning Glass Works, when the step takes place, the glass will be taken from the furnace at 1500 degrees Centigrade, trucked to the mold and poured at about a thousand degrees. It will be allowed to cool to below 500 degrees and kept until the temperature is uniform throughout. For an ordinary disc 30 inches thick, 24 days would be enough to equalize temperature, but the thick mold which will hold the glass will require a longer time, probably over four months, before the cooling process can begin. This subsequent stage will take about the same time.

Dr. J. A. Anderson of the Mt. Wilson Observatory told how the problems involved in the annealing of glass were solved by American scientists when our European sources of optical glass were shut off during the World War. The staff at the Geophysical Laboratory of the Carnegie Institution of Washington was especially effective. Their work has made the production of the enormous disc feasible.

The oven for the large reflector has already been used to make the 120-inch test plane required for the larger concave mirror. Dr. F. G. Pease, who watched the pouring, said the result was most successful. Preliminary tests for strain showed it to be superior to the excellent 60-inch mirror now used on Mt. Wilson. It was perfectly clear and almost free of bubbles.

The test plane will have the same type of construction as the big mirror. A hexagonal system of ribs will give rigidity without bulk. Nineteen points of support will be provided in these ribs. The supporting levers will be attached in ball bearings so that frictional and elastic distortions will be minimized. The holders will work so that the mirrors can hang upside down.

Science News Letter, January 27, 1934

PHYSICS

Heavy Hydrogen Born In Neutron-Proton Smash

AN ATOM of heavy weight hydrogen is born with an exhibition of gamma ray fireworks when a neutron smashes into a proton.

This is the latest drama of the atomic world of the minutely small now being explored by physicists. D. E. Lea of famous Cavendish Laboratory, Cambridge University, working with the aid of Dr. J. Chadwick, discoverer of the neutron, reports his experiments and interpretations to *Nature*.

The actors:

PROTON—The kernel, heart or nucleus of an ordinary hydrogen atom.

ELECTRON—The famous and ubiquitous unit of negative electricity and, at one and the same time, a fundamental building block of all atoms and matter.

NEUTRON—An electrically neutral particle, probably consisting of a close combination of proton and electron, discovered in England in 1931.

HEAVYWEIGHT HYDROGEN—A variety of hydrogen that is twice the weight of ordinary hydrogen, discovered in America in 1932. Variously called hydrogen isotope mass two, deuterium, and (in England) diplogen.

The drama:

Neutrons given off from the elements, polonium and beryllium, were allowed to smash into paraffin, and the scientists were surprised to find that some gamma radiation, waves such as given off from radioactive substances, was shot backwards. They explain that unusual happening by supposing that in some of the collisions between neutron and proton (contained in the hydrogen of the paraffin), these particles