independent results of the research staffs of the five oil companies.

"These groups, working independently, had developed processes which, though somewhat different in details of operation and in the results obtained, were in principle essentially similar. In the best interest of the petroleum industry as a whole, and in order that a major new source of high-octane aviation fuel should be made available for national defense without delay or waste of correlative experience, their efforts recently have been combined to expedite the commercial application of the process."

Science News Letter, November 25, 1939

PHYSIOLOGY

Window on Rabbit's Ear Aids Study of Dust in Silicosis

Microscopic Observation Reveals What Happens To Living Cells When Silica is Imbedded

MEDICAL scientists are now attacking the problem of silicosis, dread miner's disease, by attaching a small transparent "window" to the ears of rabbits, it was reported to the meeting of the Air Hygiene Foundation in Pittsburgh by Dr. Eliot R. Clark, professor of anatomy, and Darrow E. Haagensen of the University of Pennsylvania.

A tiny sterile microscope viewing window, designed by Dr. R. G. Williams, associate professor of anatomy at the University of Pennsylvania, was attached last April to a rabbit's ear. Inside is a space only 1/333 of an inch thick in which the tissue of the ear could grow normally.

Last June minute specks of silica ranging in size from one to seven microns (a micron is 1/25,000 of an inch) were placed on the tissue. A few particles up to 30 microns were also present. The cover was then placed over the microscope chamber and scientists daily have been photographing and drawing the tissue cells as they sought to live in the same environment with the silica.

While the important research must be continued much longer before final conclusions can be determined, it already appears that:

1. A relatively stationary grouping has developed among living cells called macrophages which have ingested, or taken in, the smaller particles of silica.

2. The silica laden cells tend to be very sluggish but seem to move slightly from day to day. They show grouping tendencies with occasional slow scattering and regrouping. Some of the larger particles from 15 microns and up in size appear to lie outside the cells and are not influenced by the tissue fluids.

3. Connective tissue has grown into the chamber and completely covered the observational area. As far as can be determined the lymphatic capillaries are normal as is the rich blood vessel plexus. Not even a mild inflammatory condition has appeared.

In another separate report Dr. Clark described the history of the use of observational "windows" placed over living tissues and showed that the tail of the tadpole, the bat's wing, and the web of the frog's foot have all been used at one time or another for research.

Science News Letter, November 25, 1939

BEHIND THE SCENES

Here originate the voices heard by visitors as they see the exhibits in the new Buhl Planetarium and Institute of Popular Science in Pittsburgh.

"Worst" Size of Particles

PROF. Philip Drinker of Harvard University, chairman of the Foundation's Preventive Engineering Committee, described studies seeking to learn what size of silica particles seem to have the most rapid effect in producing cell changes.

Ground flint, consisting of 99.7% silica, was carefully separated into four sizes of 3.30, 1.65, 1.04, and 0.62 microns. Sterile suspensions of these fractions were injected into ear veins of rabbits twice at three-month intervals and the animals were killed and autopsied periodically.

Examination of the liver sections indicated that the fine particles were taken up more rapidly than the larger ones. There appears to be no striking effects for the larger size particles while it seems, in these preliminary studies, that the smaller sizes produce the greatest changes.

The knowledge obtained will be useful to engineers in designing ventilation and filtering systems for mines and other places where silica dust is prevalent, and will also be of greatest use in the design of dust respirators.

Science News Letter, November 25, 1939

Four-leaf-clover plants are marketed by an Iowa grower.