

transmitted. Just before the present European war broke out, plans were under way for ships' newspapers printed by facsimile from shore transmitters.

Nineteen radio stations throughout the country are now sending home "radio newspapers" during the early morning hours into more than 5,000 homes which now have low-cost facsimile receivers. In one Midwestern city, home correspondence courses for farmers are being made available.

Great newspaper syndicates are daily transmitting pictures across the oceans and the continent and bringing news photos to the front pages simultaneously with the written stories about them.

The fact that facsimile can be sent by telegraph or telephone wire, or by radio, gives it an enormous range of usefulness. Straight printed messages in six-point type can be transmitted at the rate of 300 words per minute. This is four times as fast as teletype, says Mr. Finch.

*Science News Letter, November 25, 1939*

#### CHEMISTRY

### 1938 Nobel Prize Given For Research on Vitamins

THE NOBEL PRIZE in chemistry for 1938, withheld last year, has now been awarded to Prof. Richard Kuhn, of the Kaiser Wilhelm Institute of Berlin, for his researches on vitamins and carotenoids. His investigations were made on the relation between carotene, the yellow coloring matter of butter and of vegetables such as carrots, and vitamin A.

*Science News Letter, November 25, 1939*

The population of the world is believed to have more than doubled since 1800.

Government scientists have produced a new non-crystallizing rosin, which may prove valuable in manufacture of paint and varnish.

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WORKING EXHIBIT

*In this diorama at the Buhl Museum, showing the observatory in Denmark of Tycho Brahe, the little men respond to the visitor's button pushing by going through the motions of making astronomical calculations in the way they were done before the days of telescopes. (See facing page)*

#### CHEMISTRY—AERONAUTICS

## Combine Research To Produce Vast Amount of Super Gas

### Anti-Knock Fuel Can Be Made Directly From Paraffin And Olefins, Using Sulfuric Acid as a Catalyst

DISCLOSURE of new methods for producing vast quantities of 100-octane, super-aviation gasolines by the use of widely available sulfuric acid as a chemical catalyst, was reported to the meeting of the American Petroleum Institute in Chicago in a joint announcement of five leading oil companies.

Super fuels for aircraft—having anti-knock ratings of 100-octane—have rapidly increased in use. Some 7,000,000 gallons were used in 1937. By 1938 the amount had risen to 20,000,000 gallons and 1939 and 1940 use is anticipated to be much greater.

The assurance of a larger quantity of this vital and precious fuel for airplanes, at a reasonable price, comes with

the new announcement of large scale operations by the Anglo-Iranian Oil Company, Humble Oil and Refining Company, Shell Development Company, Standard Oil Development Company, and the Texas Company.

What has made possible the operation of the six refining plants by these companies, says the report, is the discovery that an 85-octane gasoline (which with the addition of a small amount of tetraethyl lead becomes 100-octane fuel) can be made directly from paraffin and olefins, using sulfuric acid as a catalyst. Sulfuric acid is widely available and its use represents a major advance on a commercial scale, says the report.

The new development combines the

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 indus-

try 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

**M**EDICAL 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. Haagenen 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*

### "Worst" Size of Particles

**P**ROF. 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*



#### 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.

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