PHYSICS—CHEMISTRY

Views Rubber With X-Rays

The question whether raw rubber, apparently the most formless of substances, really has a crystalline structure appears to have been recently settled by actually seeing the crystal pattern produced on a luminous screen, according to Prof. George L. Clark, of the Massachusetts Institute of Techonology. Dr. Clark, in a report to the American Chemical Society, gives the credit for this achievement to Dr. Ernst Hauser, of the Metallbank of Frankfurt, Germany.

"Dr. Hauser and an assistant imprisoned themselves in total darkness for five hours," said Dr. Clark, "in order to make their eyes sensitive enough to see the faint pattern of spots produced on a glowing screen of calcium tungstate by X-rays which had passed through a sample of the rubber."

The effect, which is not the same as the familiar use of X-rays to reveal the bones of the body, flaws in metal, etc., was described by Dr. Clark as follows: "When a beam of X-rays pass through any material composed of crystals, such as salt or ice, a definite pattern is produced, and the design of the pattern depends on the arrangement of the atoms in the crystal. Noncrystalline substances, like glass, give no such patterns. Many materials and even rubber, have been studied in this way, and their patterns are more or less well known, but practically only from photographs. In the case of rubber it was especially important to see the pattern directly with the eye, in order to be sure that the crystal structure was not changed, or even, possibly, produced in the rubber by the action of the X-rays.

"Dr. Hauser and his helper not only subjected their own eyes to a long and tedious sensitizing process, but they used an X-ray tube of extraordinary power, which consumed 130 milliamperes of current at a potential of seventy thousand volts."

"When they turned on the X-rays after their long imprisonment," said Dr. Clark, "the hitherto unseen pattern flashed out instantly, faint but clear, against the pale greenish glow of the screen."

Dr. Hauser, beside being a noted scientist, is a great amateur automobile race-driver, and has won so many races in Germany that his rivals have tried to get him officially classified as a professional.

His work on rubber led Dr. Hauser into the wilds of the African jungle, where in a rudely built hut he set up the delicate heliostat necessary in taking microscopic motion pictures of the dissection of rubber latex globules, another of his hobbies. The "micromanipulator" with which the dissecting is done consists of a delicate system of tiny needles, which are made by Dr. Hauser's wife according to a secret process in which she is the greatest living expert.

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MEDICINE

Contortionist Cancer Cells

Some of the magic that seems to surround the cause of cancer may be dissipated by observations reported by Prof. Waro Nakahara of the Government Institute for Infectious Diseases at Tokyo.

In the case of a cancer-like chicken disease, called Rous chicken sarcoma, it is well-known that the liquid portion of a mixture of its cells will produce the disease even after it has been passed through a Berkefeld filter, a piece of porcelain so fine that even bacteria can not get through its pores. This has caused medical research men to conclude that the cause of Rous sarcoma is what they called a "filter-passer," some sort of organism that was much smaller than the sort of bacteria that are large enough to be seen in high-powered microscopes. This conclusion was based on the assumption that because the cells of the cancer-like chicken disease were larger than bacteria they also could not get through the porcelain filter.

But now Prof. Nakahara finds that the cells of chicken sarcoma are contortionists. Even though larger than bacteria they can pass through smaller spaces. Their soft, jelly-like cells "stream" through the pores of the filter. The cells capable of performing this feat were found to be about 2.5 micra or one ten-thousandth of an inch in their longest dimension.

With these Japanese experiments subtantiated, it will be no longer necessary to assume a race of submicrobes as the cause of this cancer-like disease. For the disease resulting from inoculation of the filtrate can be explained as an actual transplantation of sarcoma cells.

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Ventilation in the soil has been found to affect the growth and quality of plants.

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ASTRONOMY

Jupiter Changes Aspect

Remarkable changes on the surface of Jupiter, as seen through the telescope, have occurred since June 1, declares E. C. Slipher, of the Lowell Observatory, prominent planetary observer. These have taken place principally in the planet's southern hemisphere, almost all of which has been affected, chiefly the broad belts which normally surround the planet, parallel to the equator, something like the zones on a terrestrial globe.

"The south tropical belt, which was broad and prominent in 1925 and earlier, has almost disappeared during the last two months," says Mr. Slipher, "and now that part of the planet is covered by a broad bright belt which is slightly brighter than the equatorial bright belt."

Another change has affected the "Great Red Spot." This first appeared in 1878 when it was about 25,000 miles long and 8,700 miles wide. At first it had a distinct reddish color, but this later faded out. According to Mr. Slipher, it now appears to show considerable color again, being decidedly pink, instead of the neutral gray that it has been in recent years.

"It is of interest to note," he says, "that in 1919 a change swept over the same region of Jupiter producing sensibly the same changes that have occurred in the present disturbance, and later the dark belts reappeared in much the same form and position that they formerly possessed."

Jupiter can now be seen as a brilliant star in the southern evening sky.

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PHYSICS

Closest To Nothing

A new approach to absolute nothing, a vacuum so nearly complete that only enough free gas is left in it to cause a pressure of one billionth of a millimeter of mercury, or approximately one fifty-billionth of a pound per square inch, was reported by a woman scientist of Vienna, Mme. Anna Schiermann. The usual procedure in obtaining high vacuums is to introduce specially prepared carbon, which absorbs the remnants of the gases not removed by the powerful air pumps. For this carbon Mme. Schiermann substituted tungsten filaments, which proved much more efficient.

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