ASTRONOMY

Moon To Blot Out Sun

Total eclipse will streak across Japan, Pacific and Alaska on February 4, ending the day before it begins. War will prevent scientific observation.

➤ THE MOON will blot out the sun on Thursday, Feb. 4, along what might be a bomber's route between Alaska and Japan. But it is a safe bet that this will be the one total solar eclipse of the century that no very serious astronomical expedition will be observing.

For one thing, most of the choice points in the band of temporary total darkness are at sea where there is no stable base for telescopes. The main difficulty is that there is a war on, and men are too busy blotting each other out to bother about the interference of the moon with the sun's light.

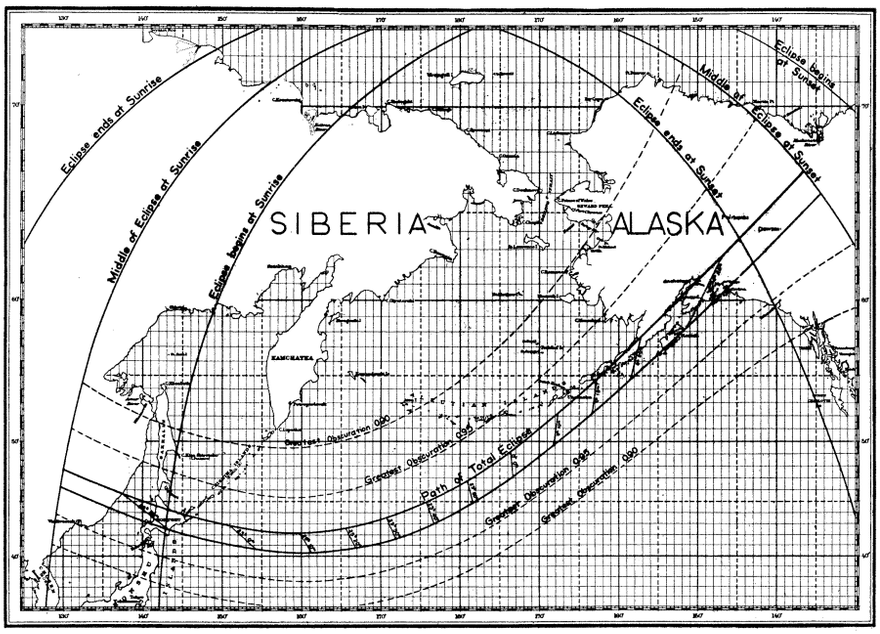
Astronomers in normal times might be tempted to take a run up to Anchorage, Alaska, where the totality lasts 48 seconds shortly before sunset that day. They might be interested in rechecking upon the Einstein gravitational effect that bends starlight passing by the sun. Or they might photograph the corona, the sun's halo. Just now many astronomers are busy with ballistics, navigation, making military telescopic cameras or other such important war jobs.

Soldiers, sailors and airmen will pause a few minutes in their fighting and work to see the glory of a total eclipse, the clouds and fog of the Alaskan winter permitting.

The moon's shadow will touch earth in Manchuria at sunrise on Feb. 5. The eclipse will end a day before it begins, by the calendar, because it crosses the international date line in its sweep across the Pacific. After crossing the Sea of Japan, passing across the Japanese island of Hokkaido, it travels swiftly across the ocean. After running south of the Andreanoff Islands, the shadow will go just south of Dutch Harbor, darken part of Kodiak Island and cross Alaska on its way to leave the earth in the northern part of the Canadian Yukon at sunset.

It is unfortunate that the Japs are so "civilized" that they will see no symbolism in an eclipse obscuring the rising sun.

The sun will be seen partially eclipsed throughout Alaska, along the west coast regions of Canada and the United States.



***TOTAL ECLIPSE**—This map shows the pathway through which the total eclipse will be visible on February 4, as prepared by the U. S. Naval Observatory for the Hydrographic Office.*

As the Chaldean astronomers first discovered, eclipses recur at intervals of 6,585 1/3 days, known as a saros. This figures back to Jan. 24, 1925, when a total sun's eclipse was seen by astronomers and public alike under good conditions in New York, southern New England, as well as farther west.

As consolation for missing the Feb. 4 eclipse, astronomers will have to look forward to the next eclipse to come within possible reach. On July 9, 1945, there will be a total solar eclipse beginning near Boise, Idaho, traveling northeastward through Montana, Saskatchewan, Manitoba, across Hudson's Bay to Greenland and on into Europe and Asia. Perhaps astronomers can conduct Victory expeditions to observe this astronomical event, transported by bombers that will be through with carrying out other missions.

Science News Letter, January 23, 1943

VETERINARY MEDICINE

New Vaccine Developed To Protect from Distemper

➤ DOG OWNERS can now have their pets protected against distemper by a new vaccine, adding another form of treatment to the immunization methods used against this widespread disease. The vaccine is prepared by passing live distemper virus through 50 to 60 ferrets by a method developed by Dr. R. G. Green, University of Minnesota bacteriologist. This deprives the virus of its disease-causing power. But a single injection is claimed to give a dog lifetime protection against distemper.

Often called the "scourge of dogdom," this flu-like disease is highly contagious, often fatal, and occurs in every section of the country in all seasons. Because it is so difficult to treat, veterinarians recommend immunization of puppies as the best protection.

Animals eight to ten weeks old can be given early immunity by only one injection of the new vaccine, compared to three or four injections required in previous methods of distemper control, according to Dr. Charles E. Fanslau, director of the veterinary division of Winthrop Chemical Company, distributors of the product for Fromm Laboratories.

Two other methods of immunizing dogs have been used successfully in recent years.

In one method, vaccine injections are followed by injections of living virus. Dogs, instead of ferrets, are used to produce the vaccine in this procedure, and

manufacturers are finding it difficult under present conditions to obtain enough animals.

The other method combines the administration of anti-canine-distemper serum with living virus. Whichever method is used, authorities warn that immunization must be undertaken only by a veterinarian.

Science News Letter, January 23, 1943

MEDICINE

New Hope for Polio

Mouse-adapted polio virus counteracts infantile paralysis-causing parent substance in monkeys. Research may reveal practical application.

➤ HOPE that a chemical inhibitor for treating infantile paralysis may some day be developed is offered by an editorial in the *Journal of the American Medical Association* (Jan. 16).

This possibility is suggested from research by Drs. C. W. Jungeblut and Murray Sanders, Columbia University bacteriologists. They passed the New Haven strain of polio virus through cotton rats, thus adapting it to white mice. By this time the virus had lost most of its original disease-producing potency in monkeys.

Among their observations was evidence that a strong antagonism existed between the mouse-adapted virus and the parent strain which caused paralysis in monkeys.

When they mixed a few drops of the mouse-adapted virus with the deadly form, it was found that monkeys survived at least a hundred minimum doses of virus that ordinarily would have caused paralysis.

Another series of experiments by the researchers showed that this living vaccine from mice also had value in protecting the monkeys from contracting polio or in reducing the paralytic symptoms. From three to five doses of the mouse-adapted virus were given by injection at daily intervals from one day to two weeks before inoculating the monkeys with simian infantile paralysis. Symptoms were greatly reduced and only 13 out of 26 monkeys developed recognizable paralysis. All 19 monkeys that did not get the treatment developed partial or complete paralysis.

The main problem now, the medical journal comments, is to develop a basic explanation of the observed antagonism between the mouse-adapted virus and its parent. Some believe the action is due to a noninfectious chemical inhibitor formed by the mouse-adapted virus.

Research work by Dr. Jungeblut, Dr. Sanders and associates is continuing. For, as the journal points out, such a basic discovery would perhaps be of major practical interest.

Science News Letter, January 23, 1943

CHEMISTRY

Structure Governs Use

Difference between springy rubber and hard plastic or tough fiber depends upon the way the molecules regiment themselves.

➤ THE DIFFERENCE between a springy rubber-like substance and a hard plastic or a tough fiber, either synthetic or natural, lies in the tendency for the molecules of these substances either to contract or to form crystals, Dr. H. Mark, professor of organic chemistry at the Brooklyn Polytechnic Institute, is telling chapters of Sigma Xi at various universities, speaking as a national lecturer for Sigma Xi.

The more crystallization in its structure the more the substance becomes a typical fiber, such as nylon, silk, cotton or rayon, Dr. Mark explained. If the mutual attraction between the chain-like molecules of a given material is low, then it will show mainly the properties of an elastomer such as rubber, Buna S., Neoprene, Hycar, butyl rubber, etc. This is also true if the molecules do not fit well into a regular three-dimensional lattice structure. In between these extremes, the substance will show the properties of a plastic, such as hard rubber, methacrylate (lucite), vinylite, polystyrene or ethyl cellulose.

Present experimental knowledge shows that all of these substances have about the same fundamental structure, but it is their ability to crystallize that gives them different properties.

Dr. Mark told his scientific audience that all types of what the chemist calls "high polymers," whether they be rubbers, plastics or fibers, have the same high order of polymerization, that is, their molecules are composed of about 2,000 or more atoms.

"Polymerization" is the name that the chemist gives to the process of making big molecules out of little ones. Either by natural processes or by the skill of the chemist's reactions, simpler materials are built up into more complex ones to form our most useful rubbers, plastics and fibers. These are molecules in which the atoms are visualized as being in a long chain.

"During the past 15 years," Dr. Mark said, "a new branch of organic chemistry has been started and gradually developed. This is the chemistry of the high polymers. The natural products belonging to this class of substances, for example, cellulose, starch, proteins, chitin, rubber, etc., have been known for a long time, but it was only recently that successful attempts were made to elucidate their molecular structure and to realize their common fundamental building principle. Synthetic products of resinous character built up from small molecules, such as formaldehyde, ethylene oxide, vinylchloride and styrene, have also been known for some time, but again their molecular structure and their fundamental relationship with the natural high polymers were not known until about 10 or 15 years ago."

Dr. Mark named the dozen investigators who had contributed most to the knowledge of the structure of these substances: Dr. W. T. Astbury, Leeds, England; the late Dr. W. H. Carothers, du Pont chemist whose work led to nylon and Neoprene; Dr. K. Freudenberg, Heidelberg, Germany; Dr. W. N. Haworth, Birmingham, England; Dr. H. Hibbert, Montreal, Canada; Dr. J. W. Hill, du Pont; Dr. P. Karrer, Zurich, Switzerland; Dr. E. O. Kraemer, Newark, Del.; Dr. C. S. Marvel, Urbana, Ill.; Dr. K. H. Meyer, Geneva, Switzerland; Dr. H. Staudinger, Freiburg, Germany; Dr. G. S. Whitby, Akron, Ohio.

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