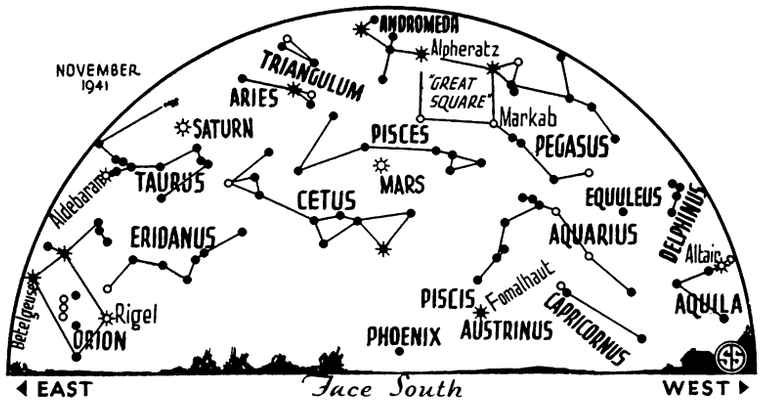

program is laid out for these moons. At 11:48 p. m., E. S. T., on the 22nd, satellite III, which is called Ganymede, will be eclipsed as Jupiter's shadow engulfs it. At 1:16 a.m., II, Europa, will disappear in a similar way. At 2:38 a.m., I, known as Io, will be out of sight when it starts a transit in front of the planet. This will leave only satellite IV, Callisto, visible until 3:54 a.m., when Ganymede will emerge from behind Jupiter. At 4:42 a. m., Europa will return to view, followed six minutes later by the reappearance of Io, after which all four moons will again be visible. Io will then be seen on the western side of the planet, the others to the east.

And also in the evening sky is Saturn, whose rings are probably the most interesting sight of all to most observatory visitors. Now they are very well seen. These rings consist of a vast swarm of tiny moons. In addition, Saturn has nine other moons, two short of Jupiter's total of 11. But the Saturnian moons are not as easy to see, and they are not eclipsed nor occulted.

Our own moon, also, is taking part in an occultation this month. On Nov. 6, two days past full, it will pass in front of the bright star Aldebaran, in Taurus. As seen from Washington, the star will be hidden at 6:02 a. m., E. S. T., and will reappear at 7:03 a. m. Farther west, it will happen earlier, long before dawn. At a selected point in northern California, for which calculations have been made, the star will hide at 2:07 a.m., P. S. T., and will reappear at 2:51 a. m., P. S. T. This is one of a series of occultations of this star occurring this year.

Celestial Time Table for November

Saturday, Nov. 1, 9:35 a.m., Moon passes Mars. **Monday, Nov. 3,** 9:00 p.m., Full moon. **Wednesday, Nov. 5,** 1:50 a.m., Moon passes Saturn; Noon, Moon farthest, distance 252,500 miles. **Thursday, Nov. 6,** Early morning, Moon occults Aldebaran. **Friday, Nov. 7,** 2:57 a.m., Moon passes Jupiter. **Tuesday, Nov. 11,** 10:00 p.m., Mercury farthest west of sun; 11:53 p.m., Moon at last quarter. **Sunday, Nov. 16,** Early morning, Meteors of Leonid shower visible. **Monday, Nov. 17,** Noon, Moon passes Mercury; 2:00 p.m., Saturn opposite sun and nearest earth with distance of 756,300,000 miles. **Tuesday, Nov. 18,** 7:04 p.m., New moon; 9:00 p.m., Moon nearest, 221,700 miles distant. **Saturday, Nov. 22,** 5:23 a.m., Moon passes Venus; Midnight, Venus farthest east of sun. **Tuesday, Nov. 25,** 12:52 p.m., Moon in first quarter. **Friday, Nov. 28,** 5:10 p.m., Moon passes Mars.

Eastern standard time throughout.

Science News Letter, October 25, 1941

INVENTION

Plane That Lifts Its Tail Brings Patent To German

AN AIRPLANE that lifts its tail like a bird when it sits down on land or water is among 858 inventions granted U. S. Patents recently.

The plane, of truly revolutionary design, is the invention of Claude Dornier, famous German airplane designer, who was awarded U. S. Patent 2,257,940.

The whole rear is carried on a hinge in such a way that it can be lifted to a high angle. This rear end also carries the entire power plant, the usual vertical fin and rudder, the horizontal tail planes and elevators, and a pusher propeller situated at the tip of the tail.

This new design with the engine inside the fusilage and propeller in the rear, with no projections or obstructions permits a far higher degree of streamlining than is possible with a flying boat of the usual type, which has an elevated wing and motors in the wing. In landing or starting, the whole tail including engine and propeller is lifted clear of the waves. Another feature of the design is that it provides a step on the under surface of the fusilage when the tail is lifted, which step completely disappears when the tail is lowered for normal flying, and thus avoids the formation of undesirable eddy currents.

Science News Letter, October 25, 1941

Bacterial War on Beetle

A NEW method of germ warfare against the Japanese beetle, which has so ravished our fruits, vegetables, trees and flowers, is the invention of Samson R. Dutky of Moorestown, N. J., Patent 2,258,319, who has assigned his patent rights to the U. S. Government without any payment of royalties to himself.

Instead of poisons or poison gas, Mr. Dutky compounds an insecticide of ground up bacteria of the kind that produce an ailment known as milky disease in the larvae of the Japanese beetle and related insects. The bacteria are mixed with an inert substance, chalk, marble dust, or similar powder, in such proportion that each ounce of the powder contains 30 billion of the deadly spores.

The insecticide can be diluted with water to use as a spray, or mixed with solid materials and applied directly on the ground or mixed with the soil.

The bacteria used belong to the groups *Bacillus popilliae* and *Bacillus lentimorbus.*

Science News Letter, October 25, 1941

RESEARCH

Research Job For Defense Used 150 Scientists

ONE of the most extensive jobs of scientific research in the defense effort took 150 different physicists from 25 different universities to the Massachusetts Institute of Technology's Radiation Laboratory to work on "a highly confidential and important subject with the greatest possible speed," President James Bryant Conant of Harvard, Chairman of the National Defense Research

Committee, revealed in a phonographically recorded message sent to the "Science and the New World Order" conference of the British Association for the Advancement of Science in London.

Approximately 1,000 scientists are at work for the NDRC in universities and 700 in industrial laboratories, Dr. Conant said. Three-quarters of the most distinguished research physicists of the nation are now at work on war problems, he added, and the remaining 25% will be at work in a few months.

"We have found that the nature of the problems in this present war are such that physicists and certain types of engineers are in greater demand than chemists."

Dr. Conant gave no hint as to just what secret weapon was developed by the large group of scientists working at M.I.T.

Science News Letter, October 25, 1941

BOTANY

Radioactive Carbon Reveals Secrets of Photosynthesis

New and As Yet Unidentified Substance Discovered That Does What Formaldehyde Was Supposed To Do

TEXTBOOK theories of photosynthesis have been upset by the use of radioactive carbon, a product of the atom-smashing cyclotron, in tracer studies at the University of California. This product was used by Dr. S. Ruben of the Department of Chemistry, and Dr. M. D. Kamen of the Radiation Laboratory, to test former theories of plant chemistry.

A new and as yet unidentified compound that does what formaldehyde was supposed to do has been discovered.

All animal life depends on the ability of plants to convert inorganic elements into organic forms that can be assimilated by animal organisms. Any animal, from man to microbe, would starve if soil, water and air, primary storehouses of nature's supplies, were his only source of food. But plants can use elements in the raw and by a mysterious chemical process involving chlorophyll, a green coloring matter, change basic elements into sugars, starches, proteins, vitamins and other organic foods according to their kind. This process is known as photosynthesis.

The mystery of photosynthesis has long baffled and intrigued scientists, and though theories on the process have been offered, none could be proved because chemical methods of proof were inadequate.

The most widely accepted theory of photosynthesis was that plants take carbon dioxide, light and water and produce formaldehyde. This process, common to all plants, was supposed to be an intermediary step, preceding the chlorophyll action that produces carbohydrates and other nutritive substances.

Dr. Ruben and Dr. Kamen placed algae plants in chambers containing radio-active carbon in a carbon dioxide compound. Leaves of the plants literally pulled the charged element from the air and its course through the plant could then be followed. If the old theory were true, the tagged carbon should appear in the formaldehyde formed by the plants, but this substance extracted from the test plants contained none of the active carbon.

An unsuspected compound was discovered, however, that contained most of the charged carbon the plant "breathed"—the true intermediary step in photosynthesis. The chemical formula of this important compound has not yet been determined, but scientists are hard at work on this problem.

Dr. Ruben, Dr. Kamen and their associates also disproved the theory that photosynthesis is a process carried on exclusively in the light. They found that some phases of the process may be independent of light, for plants continued to assimilate charged carbon dioxide in total darkness.

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pressed the "practical hope" that intellectual peaks may in future be reached and maintained on a less opportunistic basis through a systematic program of research by biological and social scientists of the factors that tend to maintain and restore mental vigor.

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Find Cancer-Causing Rays

IDENTIFICATION of rays from the sun that cause skin cancer was announced by Dr. H. P. Rusch and Dr. B. E. Kline, of the University of Wisconsin, to the National Academy of Sciences.

The rays are 2,900 to 3,341 Angstrom units in length and lie in the ultraviolet part of the sun's spectrum from which also come skin tanning and rickets healing rays.

White mice exposed to these rays developed within two and one-half months tumors which were "true malignant cancers of the same type found in humans," the Wisconsin scientists reported.

Very little radiant energy was needed to start the changes which ended in cancer.

The sun's rays have long been suspected of playing a part in causing cancer. The high incidence of skin cancer in sailors has long been known, and nearly 50 years ago, Dr. Rusch pointed out, "seaman's skin" was described as a precancerous condition due to continued exposure to sunlight.

Strong experimental support for the theory that sunlight is a direct cause of cancer has, however, only come within the past decade.

Science News Letter, October 25, 1941

Better Cancer Treatment

HOPE that practical methods may be developed for making healthy tissues resist X-rays that fight cancer cells is raised by experiments reported to the Academy by Dr. Titus C. Evans of the University of Iowa.

A great problem in cancer therapy is to give a large enough dose of the roentgen rays to have effect upon the cancer and leave the tissues around it unharmed.