

range of war planes by assuring a dependable in-flight aircraft refueling system.

This so-called Flying Boom for refueling was announced by the Air Force, for which it was developed, some six months ago. Details were omitted. It was developed to eliminate as far as possible some of the difficulties of earlier methods of refueling in which gravity was relied upon to bring the aviation fuel from a tanker plane to receiver through a flexible hose.

In this system the feeder pipe is rigid, and the fuel is transferred by pressure. Refueling time is greatly shortened. The boom makes it possible to refuel in flight with greater speed and at higher altitudes than previously was possible.

ASTRONOMY

Tenth Planet Predicted

► A TENTH planet, even farther from the earth than Pluto, is now being predicted by Dr. Karl Schutte of Munich, Germany.

Its discovery, if made on the basis of Dr. Schutte's prediction, will be "unique," a Harvard astronomer states.

Dr. Schutte finds a trans-Plutonian planet necessary to account for a new family of comets. He has been studying the distributions of the comets, orbits, or paths.

It would be a Herculean job for astronomers to prove the existence of the proposed planet. The planet would be extremely faint and would move very slowly.

Pluto, the ninth planet of our system whose discovery was announced in 1930, has a magnitude of 15.5 photographically and 14.7 visually. The new planet would be even fainter than Pluto.

Dr. Schutte reports his findings in the German popular astronomical journal, STERNENWELT. Commenting on the prediction in SKY AND TELESCOPE, Dr. Dorrit Hoffleit of Harvard College Observatory states: "Unique in the history of astronomy would be the discovery of a planet predicted from the observations of comets."

The new planet predicted by Dr. Schutte would be at the distance of approximately 77 astronomical units from the earth. An astronomical unit is the mean distance between the earth and the sun, a little more than 93,000,000 miles. Therefore, the distance of the suspected planet would be 93,000,000 miles times 77, or 7,161,000,000 miles.

Dr. Schutte had been examining the distributions of all of the orbits of comets with periods of less than 80 years. These paths have been figured quite exactly by astronomers.

He found that, with the single exception of comet Encke, all of these comets appeared to belong to discrete "families" of the planets that are farthest from the earth.

In the refueling process, the tanker plane flies above and a little to the front of the plane to receive the fuel. The boom is telescoped down and out from beneath the tanker and is inserted atop the nose of the receiver.

Control of the fueling tube is possible through the use of small vee-shaped surfaces, known as "ruddevators," which govern movements of the fueling boom.

A crewman of the tanker plane, in a rear turret in the position occupied by the tail guns of combat planes, operates the ruddevator controls and places the fueling tube nozzle into the socket on the receiving plane.

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nearby has shown they came from a giant meteorite, Dr. Edward P. Henderson, associate curator of the Smithsonian, told the Geological Society of Washington.

Wolf Creek Crater is 2,800 feet across at the bottom and 150 feet deep. The meteor that dug it, throwing up a rock rim 100 feet high, is the second largest on record ever to have hit the earth.

The biggest struck in Arizona. Indians named the pit, four-fifths of a mile across and 570 feet deep, Canyon Diablo.

Even bigger meteors may have collided with the earth in early geologic eras, although most are so small they burn themselves out in the atmosphere. But unless the missiles struck in an arid region, the craters would be slowly erased by erosion and other natural forces.

Dr. Henderson studied samples brought back by Dr. Frank Reeves, one of the oil company geologists who spotted Wolf Creek Crater. The Smithsonian mineralogist said the analysis showed 86.3% iron oxides, 4.3% nickel oxide, 1% each of potassium and cobalt oxides, and 7.1% water.

Scientists of Australia's Bureau of Mineral Resources also checked fragments, Dr. Henderson said. They agreed that the ironstone material was typical of meteorites.

Science News Letter, April 1, 1950

MINING

Separator Gets Rich Iron From Low-Grade Ores

► LOW grade iron ore is quickly separated from the crushed rock with which it is mixed by a new improved type magnetic separator revealed in Pittsburgh by Westinghouse Electric Corporation.

The new device operates on a somewhat different magnetic principle than previous separators. It is already under test at Aurora, Minn., extracting iron ore from magnetic taconite. It was developed particularly for this purpose.

The rich iron ore of the famous Mesabi Range is facing exhaustion. When gone, iron ore from that region will have to come from taconite of which there is a plentiful supply. It contains about 25% iron and 75% rock.

The new separator consists of a rotating drum mounted in a pulp box of special design. Stationary magnets within the drum provide the means whereby iron ore is extracted from the taconite.

As the mixture passes beneath the separator's rotating drum, the magnets draw the iron ore to the drum. The movement of the drum carries the ore through a washing zone and then away from the direct pull of the magnets.

The ore nodules produced in the process will be about 64% iron. This is several percent higher than the high-grade ores now used in blast furnaces.

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Jupiter has the largest family with 53 known comets as members. Saturn has 6, Uranus 3 and Neptune 8 comets in their respective families. The aphelion distances of these comets average about 10% greater than the aphelion distances of the planets that captured them. The point in the path of a heavenly body that is at the greatest distance from the sun is known as aphelion. That which is at the closest distance is known as perihelion.

In the case of Jupiter, Dr. Hoffleit states, it is of particular interest to note that most of the aphelions of the comets are in the same direction as Jupiter's own aphelion. The planet moving more slowly at its aphelion than at perihelion, in accordance with the law of areas, has more time to capture comets as they speed by.

No comets were found with aphelion distances strikingly intermediate between those of the major planets. Turning his attention to comets with longer periods, Dr. Schutte found that they also had an average aphelion distance some 10% greater than the distance of their foster-parent.

The distance of the planet that should capture eight of these comets would be at about 77 astronomical units from the sun. This distance is in excellent agreement with the position that might be predicted for a trans-Plutonian planet from an astronomical rule-of-the-thumb known as Bode's law.

Science News Letter, April 1, 1950

GEOLOGY

Second Largest Meteor Dug Half-Mile-Wide Crater

► AUSTRALIA'S half-mile-wide Wolf Creek Crater was definitely blasted out by a meteor, studies at the Smithsonian Institution show.

The big hole was found in 1947 in the Western Australia wilderness by three American geologists prospecting for oil by plane. The scientists thought at first it was caused by a volcanic explosion.

But analysis of rock fragments found