observatories. Patent 3,072,363.

A tourniquet system that automatically alternates pressure between the arms and legs for predetermined time periods. Patent 3,101,085.

A chemical pesticide for protecting the oyster population from marine predators. Patent 3,103,202.

A nuclear gyroscope that uses the principle of the spin of the atom to stabilize aircraft in space. Patents 3,103,620; 3,103,621; 3,103,623 and 3,103,624.

An underwater "island" formed by a submerged buoyant tank containing a derrick for oil-drilling operations offshore. Patent 3,080,583.

A method of reducing sound transmitted from a ship by surrounding the hull with an air-bubble shield. Patent 3,084,651.

The bell-shaped Mercury space capsule that protected six American astronauts in orbit. Patent 3,093,346.

A fish scaler and cleaner that trails in the water behind the boat cleaning and scaling automatically. Patent 3,095,601.

A device for freeze-drying blood, food and other materials at atmospheric pressure. Patent 3,096,163.

An internally worn artificial heart driven by a motor that circulates the blood. Patent 3,097,366.

A sun tracker guidance system by which a missile or satellite corrects its own course without any help from earth. Patent 3,098,934.

A device that traces the path of a net under water to give a fisherman a larger catch of fish. Patent 3,104,928.

A nuclear reactor that uses inexpensive pellets for fuel. Patent 3,058,897.

The method and equipment for making champagne from wine in a continuous process. Patent 3,062,656.

A method of raising sunken ships by injecting plastic foam into the ship, displacing water and restoring buoyancy. Patent 3,091,205.

A nuclear reactor whose inside ring rotates like a lazy Susan to produce needed short-lived isotopes for medicine, research and industry. Patent 3,094,470.

A method of extracting proteins from fish for use in baking as a substitute for egg white proteins. Patent 3,099,562.

A telephone switchboard for the blind consisting of a series of identification pins that can be felt by the operator. Patent 3,057,965.

A motorless wheel chair that can actually climb stairs. Patent 3,104,112.

A "flying automobile" that uses the same power plant for the propellers as the wheels. Patent 3,090,581.

A method for converting light energy to mechanical action for operating window shutters or blinds. Patent 3,067,572.

A cup and saucer designed not to slip, drip or tip. Patent 3,067,904.

A safe way to produce pure cultures to develop vaccines and toxins for bacteriological warfare and peaceful research. Patent 3,075,888.

A "sea sled" towed along the ocean bottom at an angle for marine photography. Patent 3,082,731.

A cheap way of transporting oil underwater, using a "submarine-tanker" towed by a smaller surface craft. Patent 3,085, 533.

Two methods for using nuclear fission chain reactions to produce power, held secret 15 years. Patents 3,070,529 and 3,102,851.

A cheat-proof teaching machine for students. Patent 3,056,215.

A space trainer that can completely duplicate a space flight from take-off to landing. Patent 3,083,473.

A flameproof, synthetic Christmas tree assembled without any fasteners. Patent 3,064,379.

An electronic reading machine that can read 10,000 characters a second from adding machine tapes with great accuracy. Patent 3,104,369.

SPACE

Soviet Lt. Col. Valery F. Bykovsky, 28, was launch in the Vostok V spacecraft on June 14 and orbited the earth 81 times, covering two million miles in 54 minutes less than five days, a new space endurance record.

In an apparently unsuccessful attempt to link up with Vostok V, Valentina V. Tereshkova, 26, the first woman in space, orbited the earth 48 times in 70 hours, 50 minutes aboard Vostok VI; she and Col. Bykovsky parachuted to earth the same day.

United States Astronaut L. Gordon Cooper, in the last of six Project Mercury space shots, orbited the earth 22 times in his capsule, Faith VII, May 15-16.

The United States successfully orbited Tiros VII, a weather satellite containing two wide-angle television cameras, infrared sensors and an electron temperature probe, that obtained vital data during storm seasons and measured the earth-sun heat balance.

The U.S. Navy launched the first satellite to be powered wholly by nuclear energy, a Transit satellite with a power plant called SNAP 9-A that weighs 27 pounds and is fueled by plutonium-238.

The data acquired from the Mariner II flight past Venus were interpreted as showing that the planet has no surrounding region of trapped energetic particles; has a mass equal to 0.81485 that of the earth; its surface temperature is 800 degrees Fahrenheit, and solar winds of plasma cross interplanetary space from time to time.

The X-15 rocket ship, with Joseph A. Walker of the National Aeronautics and Space Administration at the controls, set a record altitude of 354,200 feet, or 67 miles.

McGill University of Canada aimed a 16-inch U.S. cannon straight up and shot a 475-pound capsule of weather instruments 15 miles into the upper atmosphere in the first launching of a high-altitude probe by gun instead of rocket.

Telstar II, a communications satellite owned by the American Telephone and Telegraph Co. and launched by the National Aeronautics and Space Administration, successfully transmitted black-and-white and color television as well as voice messages between the United States, France and England.

Syncom II was the first satellite launched into a synchronous 24-hour orbit; it is being used for experiments in communications.

Relay I, which in December 1962 became the first launch with the revised Delta rocket, successfully transmitted telephone, television, teleprint and facsimile signals between the United States, England, Italy and Brazil.

In a communications experiment, the U.S. Air Force launched 400 million copper needles that spread out in a thin, narrow belt about 2,000 miles above the earth's surface, for bouncing radio signals back to earth; the needles are expected to drift harmlessly back to earth within the next five years.

The British and French Governments agreed to joint development of a 1,450 (Mach 2.2) supersonic airliner.

A new generation of air transport, passenger and freight planes that will travel at twice the speed of sound was assured.

The first earth-space radio license was granted by the Federal Communications Commission to a private concern, permitting experimental work in satellite and related space communications.

Space communications experiments between two transportable ground terminals were successfully conducted.

Scientists began measuring the number of charged particles in the ionosphere by tracking hissing and whistling sounds first detected in radio receivers on the Canadian-instrumented satellite Alouette, which provided the first means of studying the ionosphere with radio waves bounded onto it from above and within the charged air layer.

The U.S. scientific satellites Explorer XVI and XVII measured micrometeoroid impacts on satellite skin samples, compared the performances of protected and unprotected solar cells in space, and took readings of the earth's atmospheric conditions at a variety of altitudes.

Radio contact was lost with a Mars Soviet probe in March, three months before its scheduled rendezvous; it was to have sent back photographs of the planet.

In separate ballistic launchings, France fired two rats, fitted with a series of electrodes attached to the brain and muscle areas, one of which was recovered after a 70-mile flight.

A new heat-sensitive telescope at the U.S. Air Force's Cambridge, Mass., laboratories was turned skyward in an effort to detect silent satellites.

In a program called Vela Hotel, the United States orbited the first two of a complex system of 485-pound "watch-dog" satellites 60,000 miles up to conduct research to improve a system for detecting clandestine nuclear tests in space.

The Telstar I communications satellite was "fixed" by remote control from the ground and then, a month later, it again succumbed to radiation encountered in space.

• Science News Letter, 84:389 Dec. 21, 1963

MILITARY SCIENCE

Plan Manned Orbiting Laboratory in Space

➤ MILITARY SCIENCE, already advanced far beyond the comprehension of most men, is about to enter another almost-fantastic stage with the Defense Department's newly announced Project MOL.

The MOL, which stands for Manned Orbiting Laboratory, would be the size of a housetrailer—big enough for astronauts to move around freely inside.

Potential military uses of MOL as indicated by military officials include:

1. Detection, identification or destruction of enemy spacecraft.

2. Command of strike forces stationed around the world.

3. Taking part in anti-missile defense.

MOL astronauts would be boosted off in a capsule similar to the one that will be used in Gemini rendezvous tests by a Titan rocket with two million pounds of thrust.

MOL is an Air Force project, separate from the National Aeronautics and Space Administration's moon-landing project Apollo. Instituting MOL means giving up Dyna Soar, a winged spacecraft that was to return to earth after a brief orbit.

Dyna Soar, short for dynamic soaring, was to have been a manned winged glider.

There are three military strategies behind manned orbiting vehicles that have been set out by defense officials. The first is the defensive approach involving anticipation of the nature of the military threat in space. The second, the deterrent approach, involves developing an advanced military space capability. The third stresses basic research toward to end of developing manned and unmanned military spacecraft.

• Science News Letter, 84:394 Dec. 21, 1963