The present 4,340 page work is an admirable successor to Wilmarth's monumental lexicon of 1938. As before, the area covered includes the United States, its possessions, the Trust Territory of the Pacific Islands and the Panama Canal Zone.

In all, 14,634 names are included, together with summaries of stratigraphical papers which were published between January 1, 1936, and December 31, 1960. The number of such abstracts and "original references" now exceeds 35,000. The lexicon differs from Wilmarth's in that it omits all palaeontological and descriptive terms, trade names, moraines, orogenies and miner's terms.

Obviously there has been erosion of many geological names and also deposition of numerous new ones in the literature. Enthusiasts of the "Western" cult will be disappointed to learn that the U.S. Geological Survey has abandoned "Silver Creek Shales" and the "Panhandle Beds". They can take heart, however, that their heroes will still be able to ride high over the "Death Valley Formation" and "Diamond Creek Sandstone".

Nuclear Fuel for Space

THE establishment of an artificial atmosphere on Jupiter's moons, communications from beyond Pluto, water extracted from the surface of the Moon—science fiction turned to fact, with the help of nuclear energy; these and more immediate problems confronting space scientists will be solved with nuclear power according to Dr. Glenn T. Seaborg, chairman of the United States Atomic Energy Commission.

Speaking at the Western Electric Show and Convention in Los Angeles a few weeks ago, Dr. Seaborg outlined the AEC's present joint programme with the National Aeronautics and Space Administration, and the Department of Defense, on atomic energy in space. The two areas of development are the Rover Programme to develop systems for nuclear rocket propulsion and the SNAP Programme to generate electric power. The nuclear rocket is a single engine that would satisfy a number of upper stage and spacecraft applications—a 5,000 MW NERVA engine producing 250,000 lb. of thrust. So far, 1,000 MW rocket reactors have been successfully operated, and Dr. Seaborg stated that this included restarting and operating them at full power through multiple cycles. He added that the AEC had achieved on a single reactor a running time of 30 min at full power—which is approximately the same running time required for a single engine to boost a manned mission to Mars.

Research is also being carried out on a nuclear-electric rocket for use during long voyages. In this system, a highly efficient low-thrust engine is envisaged which will produce a high specific impulse and use electrical energy to accelerate the propellant. Because such a system could be used continually throughout a long voyage, the rocket could eventually build up to a far greater velocity than a chemical or nuclear rocket. NASA and the Air Force are developing the necessary thrust components; the AEC is developing the power source under its SNAP programme. SNAP's broad aim is to provide long-lived electrical power systems for all the scientific and communications equipment in satellites and to provide the energy needed to keep men alive in space. Dr. Seaborg explained that of the two general categories of SNAP systems, the first was based on the generation of electricity from the heat created by decaying radioisotopes while the second used the heat from fission reactors to produce electricity. The first isotopic power system to be used was powered by plutonium-238; this went into orbit on a U.S. Navy navigational satellite in 1961 and its signals are still being monitored. Dr. Seaborg stated that a SNAP unit will power the *Apollo* lunar surface package left on the Moon by the *Apollo* astronauts.

Looking further into the future, Dr. Seaborg visualized the place of nuclear rockets in lunar and planetary exploration. He sees the more efficient nuclear rockets transporting enough supplies to a lunar base camp to last several months. Later nuclear rockets would be used as lunar ferries, shuttling between re-usable chemical rockets travelling from the Earth or Moon to a rendezvous in orbit with the nuclear rocket. A similar system could be used for voyages to Mars and beyond. As Dr. Seaborg said, "The combination of high-thrust nuclear rockets for escape from planetary gravity fields and low-thrust, low-weight, nuclear-electric systems for interplanetary propulsion promises to do great things for solar system exploration".

Vetlesen Prize

JAN HENDRIK OORT, the Dutch astronomer, has won the 1966 Vetlesen Prize for distinguished achievement in the earth sciences, President Grayson Kirk of Columbia University announced last week. Dr. Oort received the Vetlesen Gold Medal and $25,000 for "outstanding achievement in the sciences resulting in a clearer understanding of the Earth, its history or its relation to the universe". The Vetlesen Prize was established at Columbia University in 1960 by the G. Unger Vetlesen Foundation.

Dr. Oort, 66, is a professor at the University of Leiden and is director of the Leiden Observatory. He has achieved world-wide recognition for his studies of the rotation of our galaxy and of radio astronomy. In 1927, Dr. Oort showed that the galaxy rotates about its centre and determined the speed of rotation and the direction of the centre of rotation. Since the early fifties Dr. Oort has worked in radio astronomy. The mapping and detailed study of the spiral structure of the galaxy, during the fifties, was made possible through his research and other research under his leadership.

Food Research

THE first annual report (1965) of the Food Protection and Toxicology Center, University of California at Davis, describes the foundation, objectives and progress of the centre. The centre is carrying out research, has established an information and documentation service in chemical and microbiological toxicity, and has started new undergraduate and postgraduate courses in agricultural toxicology, fundamentals of radiation biology and environmental engineering. Research at the centre covers a diversity of topics—rapid tissue culture methods for detection of chemical residues and toxins in foods and feed stuffs; the use of isolated organs for detecting the precise location of toxic effects and the nature of the effects; methods to increase mobilization and excretion of DDT in cows; and isolation of breakdown products and determination of the mode of decomposition of agricultural chemicals.