PHYSICS

Reports on Radiation Belts

The earth's radiation belts will not hurt man in his flight into space, says scientist who discovered them. Subsequent work has complemented theories already set forth.

DR. JAMES A. Van Allen has solidly refuted any notion that other scientists are weakening his original picture of the earth's natural radiation belts.

The State University of Iowa physicist, who first observed the banana-shaped radiation zones, said subsequent work, including Soviet investigations, "has only complemented our theories—and in no case I know of has contradicted them."

Some scientists have feared the high energy electrons in the inner of the two radiation zones would mean a harmful overdose of radiation for astronauts moving through the zone. Center of the inner zone lies some 2,200 miles above the earth and is "steady as a rock," Dr. Van Allen said.

Russian scientists, who occasionally have claimed they discovered the radiation zones before Dr. Van Allen did, have recently made announcements tending to distort the belts as originally outlined by the American physicist. In addition, some American investigators have been tentatively redrawing the Van Allen belts.

Dr. Van Allen delivered the 19th Richtmyer Memorial Lecture of the American Association of Physics Teachers at a joint meeting with the American Physical Society in New York. He stressed that he did not believe the radiation belts would cause much trouble for properly planned space travel.

He said definitely that space vehicles "clad with only a millimeter of steel—and I think they would need that much structure just to get off the ground—will enable a quick path through the radiation zone without biological effects."

He estimated the quickest path would be four to six hours, easily within the capability even of a satellite, which moves slower than the speed needed to escape the earth. Dr. Van Allen gauged the thickness of the inner radiation belt at about 1,000 miles.

Fresh from his Iowa City monitoring station, Dr. Van Allen said continuing data transmitted from Explorer VII have "added definitiveness to the indefinite" qualities of the outer radiation zone.

He said his Iowa team had noted "striking fluctuations" in the intensity of the belt and also indications that it is moving towards and away from the earth as much as a distance equal to half the earth's radius.

Explorer VII is making five passes a day during which the Iowa City station is able to extract from five to 15 minutes of information on each pass.

Dr. Van Allen said his group is readying a new satellite to go up "in the near future but not before March" for a more detailed look at the make-up of the outer belt of radiation. Only low energy electrons have been found in it thus far, but the Iowa investigator thinks it also contains low energy protons.

Science News Letter, February 13, 1960

PORTABLE SEISMOGRAPH SYSTEM—For surveying shallow rock formations, Sinclair Research Laboratories, Inc., Tulsa, Okla., developed this miniaturized seismograph system that works to a depth of 2,000 feet. The equipment can be carried by two men. Al C. Reid (left) is making instrument settings while Lester J. Smith (right) stands by to operate the data recording camera.

TECHNOLOGY

Antenna Reflectors Warn Free World From Arctic

See Front Cover

A RADAR system with antenna reflectors "bigger than a football field" is being installed in the Arctic to give a 15-minute warning in case of missile attack on the North American continent.

The antenna reflectors, seen in the background of the cover picture of this week's SCIENCE NEWS LETTER, are 165 feet high and 400 feet long. They are built to withstand a six-inch coating of ice in winds up to 185 mph. The reflector surface is made of 2,240 panels bolted to the truss structure.

A total of 20 backstays and 20 trusses, seen in the foreground of the picture, support each of the 1,500-ton reflectors. Each backstay is 42 inches in diameter and weighs seven and a half tons. Ten thousand cubic yards of concrete were poured in the foundation footings for the antenna reflector supports.

The antennas are being installed by the General Electric Company, Syracuse, N. Y., at the U. S. Air Force's Ballistic Missile Early Warning System, Site 1.

Science News Letter, February 13, 1960

ROENTGENOLOGY

Hand and Wrist X-Rays Identify Living or Dead

AN X-RAY FILM of a human wrist or hand can provide "conclusive proof" of a person's identity, a Stanford University School of Medicine scientist reports.

Individual bones of the hand and wrist differ enough from one person to another that if no other marks are available—such as fingerprints or dental work—the person can be identified, Dr. William Walter Greulich reports in *Science* (**131,** 155, Jan. 15, 1960).

A study of hand X-rays of the same individuals, from early childhood over many years, shows that the skeletal features useful for identification usually are fixed during late adolescence and remain relatively unchanged until at least well into the thirties. Identification is based on the over-all pattern of some 27 complete bones and parts of two others, the radius and ulna of the arm.

There were also enough similarities between one person's right and left hand to permit successful pairing of the X-rays, Dr. Greulich reports.

The differences in skeletal features appear in various groups, including American Indians and American-born Japanese.

Science News Letter, February 13, 1960