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Radiation and Space Travel/Men of Science

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radiation in space travel

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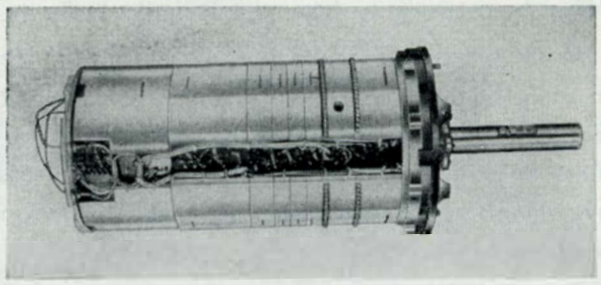
Jan S. Paul was born in Iowa and lives in California. She specialized in nuclear engineering when much of the Free World had never heard of the field. She acquired her Ph.D. from Phoenix University in Italy. She served with the British and later the U.S. forces during World War II, and with the Air Force Public Information Office in Korea. Dr. Paul is now specializing in radiation pathology and is engaged in teaching and research.

With the confirmation of the presence of bands of dangerous radiation in Space, the concern over the effects of such radiation on man and materials ceased to be the sole concern of nuclear scientists, and became a part of the Space and rocket engineer's thinking as well.

What is the significance of all this? First of all it should not be assumed that such findings will prevent, or even appreciably slow down the research now going on; we may still travel to the Moon and beyond in due time. The basic problem of keeping radiation inside a reactor is much the same as that of keeping it out of a Space ship. Therefore, with many of these basic problems already solved, the direction from here will be primarily in adaption and modification.

What, then, are the actual limitations and effects of this radiation? As with the beginning stages of many undertakings, certain assumptions are sometimes necessary. Here we must



A Geiger Counter used in connection with radiation experiments conducted by the Explorer earth satellites.

assume that this radiation is the same basic type with which we are familiar on Earth and that the same basic irradiation principles are true. The National Committee on Radiation Exposure has set the permissible radiation dose at 15 roentgens per year, or 0.3 rotentgens per week, based on the curie system of measurement in which radioactivity undergoes 3.700×10^{10} disintegrations per second.

In such case, 15 roentgens is the maximum safety factor for which Space engineers must plan, design, and build. But just what happens to the human organism beyond that limit? Experiments, conducted for the most part on animals, have brought to light the following facts:

An excess overall total dose of 1000 roetgen will produce a shortening of average life expectancy by five years.

An excess dose of 100 to 1000 roentgens causes a marked decrease in the weight of the spleen and thymus.

The kidneys are affected by excess doses of 100 to 500 roetgens; and an excess dose of 50 to 300 roentgens was found to affect the sex organs.

However, only one organ, the eye, need ever cause immediate concern. It was found that a dose of 12.5 roentgens—less than one year's total exposure if directed only at the eyes—could cause tendencies toward cataracts. But let us note carefully two words—*could* and *tendencies*. What this means is that for certain persons 12.5 roentgens of radiation on the eyes could be dangerously harmful, just as for some, the sting of a bee or the bite of a spider may prove deadly, while for others the effect would be simply uncomfortable.

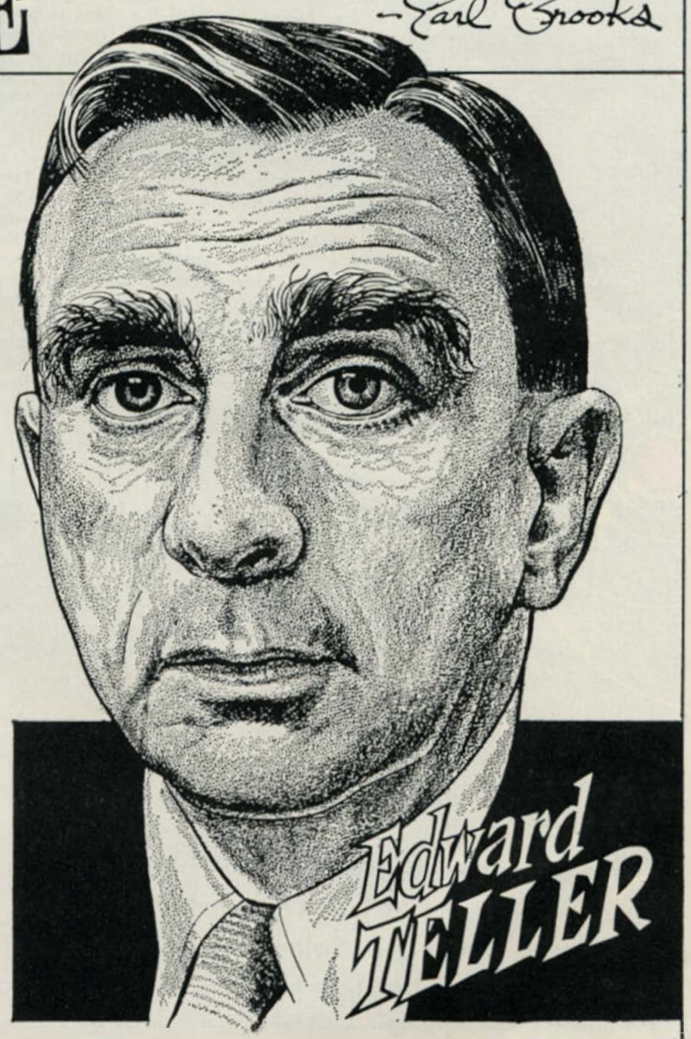
The obvious conclusion appears to be that Space engineers will work out protective ratios to take care of the overall exposure and to keep the dosage below the 15 roentgen level. Perhaps leaded glass goggles will be the vogue for all Space travelers. Regardless of the technicalities, one fact remains: man will travel through Space safely. These bands of radiation may call for changes in ideas and designs in Space gear; but they will neither halt, nor slow down to any appreciable extent, man's conquest of Space.

MEN of SCIENCE

—Earl Brooks

FORMER A.E.C. CHAIRMAN LEWIS STRAUSS ONCE STATED, "THERE ARE THREE KINDS OF PHYSICISTS; THEORETICAL, APPLIED, AND POLITICAL." THE NAME OF EDWARD TELLER STANDS OUT IN ALL CATAGORIES. AS AN EXAMPLE—HIS PURE RESEARCH IN STELLAR FUSION WAS LATER APPLIED IN DEVELOPING THE HYDROGEN BOMB. TELLER THEN HAD TO DEFEND THE DECISION TO MAKE THE BOMB AGAINST MANY OF HIS SCIENTIFIC COLLEAGUES LED BY ROBERT OPPENHEIMER AND A LARGE SEGMENT OF THE PUBLIC. TELLER, OF COURSE, DID NONE OF THIS SINGLE HANDED, BUT HIS LEADERSHIP WON HIM THE UNOFFICIAL TITLE "FATHER OF THE H-BOMB". EVEN BEFORE THAT, HE WAS INFLUENTIAL IN PERSUADING EINSTEIN TO WRITE HIS NOW-FAMOUS LETTER TO F.D.R. THAT INITIATED "MANHATTAN PROJECT" AND THE ATOMIC AGE.

BORN 50 YEARS AGO IN HUNGARY, TELLER FLED STRIFE TORN AND ANTI-SEMITIC EUROPE WHEN THE NAZI THREAT LOOMED. HIS STRONG DEVOTION TO HIS ADOPTED COUNTRY IS EVIDENCED BY HIS HIGHLY VOCAL CONCERN OVER RUSSIAN PROGRESS IN SCIENCE. HE HAS BEEN TIRELESS IN HIS EFFORT TO AWAKEN THE U.S.



TELLER WORKED EXTENSIVELY WITH THE LATE ENRICO FERMI AT CHICAGO'S INSTITUTE FOR NUCLEAR STUDIES. AT PRESENT HE IS CARRYING ON RESEARCH AT CAL-TECH.

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