PHYSICS

Paraffin Lenses Concentrate Neutrons as Glass Does Light

Discovery by California's Dr. G. N. Lewis Promises Aid to Cancer Treatment—Neutron's Nature Queried

PRELIMINARY tests indicating that neutron beams can be concentrated by use of paraffin lenses have been reported to the American Physical Society by Prof. Gilbert N. Lewis of the University of California.

Prof. Lewis' announcement, appearing in the *Physical Review* (March 1) in collaboration with Philip W. Schutz, will be of the greatest importance to physical, chemical and medical radiation research if confirmed independently in other laboratories.

Importance of the announcement lies in the fact that neutrons are the latest and in many ways the most effective "bullets" with which scientists probe the nuclear cores of atoms and learn new knowledge of this hidden physical world. Moreover, it has recently been found that neutrons are much more efficient in creating ionization in living tissues than are X-rays or gamma rays from radium. Thus the possibility of using neutron beams for treating cancer has been a motive behind much of the recent research.

If Prof. Lewis' findings, that use of a paraffin lens will gather and collect neutrons and can increase the concentration of these non-electrical particles in a beam, turns out to be correct, then laboratories throughout the world will take up the technique used.

"Howitzers" Used

More and more potent beams of neutrons are being sought in all laboratories for their researches. Either "howitzers" of paraffin are used which contain a mixture of beryllium and radium, or else giant accelerating apparatus like the cyclotron is employed for creating neutrons. The high price of radium handicaps many scientists in pursuing neutron research. The large accelerating apparatus, too, is costly. Concentrating neutron beams with lenses of paraffin thus would be a major aid to research, for weak sources could be used with an effectiveness now attainable only in a few favored laboratories.

Prof. Lewis is, perhaps, best known for his theory of atomic structure in chemistry which proved most fruitful in interpreting valence of atoms. Prof. Irving Langmuir, Nobel prize winner, later extended Prof. Lewis' atomic theory and every textbook in chemistry today discusses the famous Lewis-Langmuir atom.

Present evidence reported by Prof. Lewis and Mr. Schutz indicates that neutrons are bent, or refracted, as they pass through paraffin. Although neutrons are considered to be of a particle or corpuscular nature the new finding cannot be interpreted by present theory, points out Prof. Lewis, saying:

"We have been unable to conceive of any purely corpuscular explanation of this remarkable phenomenon."

Waves With Neutrons

If it is assumed, however, that each neutron is accompanied by a train of waves, an interpretation consistent with the facts appears possible which is closely akin to the phenomenon of refracting, or bending by the passage through the paraffin.

"This view at once suggests," state the University of California investigators, "the use of a paraffin lens for the focusing of neutron beams. Preliminary experiments have been made which strongly indicate the existence of such focusing."

The process of concentrating radiation or particles has been one which has the utmost significance to the advance of scientific research.

The discovery that prisms of glass and other materials could bend light rays and split a beam into a spectrum led to the invention of the spectroscope, which has been called the most useful of all physical instruments in its power of analysis. The bending ability of materials also finds wide application in the use of light-concentrating lenses in microscopes, spectacles, telescopes and other optical equipment.

The concentration of charged atomic particles like electrons and protons is accomplished by the use of magnetic and electric fields and is used in television equipment, as only one example.

Neutrons, being of a non-charged particle nature, have never been found to be affected by electric or magnetic fields. Prof. Lewis' present work is the first indication that their path is bent by passage through prisms of paraffin.

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SEISMOLOGY

Seek Quake Information From Persons in Area

FIRST-HAND information about the effects of the March 2 earthquake in the Midwest, as observed by persons who actually experienced it, is being sought by seismologists.

All persons who felt the earthquake or have seen any of its effects are invited to mail a brief statement to The Jesuit Seismological Association, St. Louis University, St. Louis, Mo. The information will be transmitted to the U.S. Coast and Geodetic Survey in Washington, D. C., and to university earthquake observatories the country over.

Most desired is information about kind and extent of damage caused by the earthquake. Photographs showing details will be welcomed. The seismologists also wish to know, for each town or farm community, approximately what percentage of the people felt the tremors. Time and duration of the shake, for each locality, are specially important points. Where accurate notes were not taken, estimates are helpful.

Some manifestations of an earthquake that would attract attention in the shaken region are: objects upset, plaster or chimneys cracked, snow sliding off the roof and icicles crashing from the eaves, cracking of ice on frozen ponds and creeks, change of water level in wells, or of rate of flow in springs, etc.

It is desirable, if photographs are sent, that the compass direction in which the camera was pointed be indicated.

It was not possible to obtain an exact epicenter of the shock.

Best determination was that the quake occurred in southwestern Ohio somewhere near the boundaries of Ohio, Kentucky and Indiana. The shock was classed as a "weak" one but is much stronger than the much-publicized shock that occurred during the recent Ohio River floods.

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The hide on the neck of a Canadian wood bison may be fully an inch thick.