

PHYSICS

Cosmic Rays for Altimeter

► COSMIC RAYS and Geiger tubes have been combined in a new altimeter to tell pilots what their altitudes are when conventional altimeters become unreliable in the thin upper-atmosphere.

Designed by John W. B. Barghausen of the Applied Physics Laboratory at Johns Hopkins University, Silver Spring, Md., and Dr. James A. Van Allen, formerly of the Laboratory and now at the State University of Iowa, the instrument uses two layers of five Geiger tubes each. The layers are separated by a lead shield.

Cosmic rays which regularly shoot through the earth's atmosphere strike one layer of Geiger tubes, activate them, pass through the lead shield and activate the second layer of Geiger tubes. When both sets of Geiger tubes are thus energized, an electric impulse is sent by wire to a voltmeter calibrated in feet of altitude.

The lead shield was included to eliminate low-intensity cosmic rays which filter

through the atmosphere, but which are unreliable as an altitude indicator.

When a weak ray strikes the top layer of tubes, it energizes them, but the lead shield prevents it from hitting the lower set of tubes. The instrument sends electrical impulses only if both sets of tubes are activated.

As the aircraft climbs higher, the number of cosmic rays striking the Geiger tubes increases. The meter registers a correspondingly higher altitude.

The Geiger-tube altimeter was designed especially for aircraft which fly three or more miles above the ground. Conventional aneroid-type altimeters become unreliable at those altitudes because changes in air pressure are small for corresponding changes in height.

It is estimated the new altimeter will be not more than 1,000 feet off at a height of 30 miles above the ground.

Science News Letter, March 22, 1952

GENETICS

Lethal Gene Discovered

► A LETHAL gene that affects the sex ratio, resulting in two females for every male born to a stock of mice, has been discovered by Dr. Theodore S. Hauschka of Lankenau Hospital Research Institute and Institute for Cancer Research in Philadelphia.

The lethal gene in this strain of mice kills one-half the unborn males when the mother carries the gene as a recessive on one of her two X-chromosomes.

Dr. Hauschka's discovery marks the first time a lethal gene has been identified in the chromosome which determines the sex of a mouse. His primary interest is in genes

which may influence the development of cancer.

So far, he reports to the American Cancer Society, he has found that mouse cancer cells with extra sets of chromosomes and genes can be transplanted readily to unrelated stocks of mice, while tumors with normal chromosome complements grew only in the inbred strains in which they originated. In these experiments he uses cancer cells which grow as free cell suspensions in a body fluid.

Next step will be to determine whether the degree of host-specificity in several types of cancer depends upon the cells' lacking

certain chromosomes or containing additional sets.

The possible relationship between genic imbalance in the malignant cell and the body's defense reaction is considered a challenging question. Normally, when protein from one species is injected into an animal of another species, the inoculated animal produces antibodies which neutralize the foreign protein. Why this does not occur when cells with unbalanced sets of chromosomes are injected will, it is hoped, throw some light on mechanisms of immunity to cancer.

Science News Letter, March 22, 1952

SCIENCE NEWS LETTER

VOL. 61 MARCH 22, 1952 No. 12

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc. 1719 N St., N. W., Washington 6, D. C., North 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs. \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeograph form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STAtE 2-4822.

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