

has been stopped by drowning, gas poisoning or other accident have been helped back to normal breathing by inhalations of carbon dioxide mixed with oxygen.

The lack of oxygen obtainable at high altitudes causes overbreathing and as a result, a deficiency of carbon dioxide, Prof. Henderson has long contended.

His point was proved by the recent tests on Pike's Peak.

These were made on five young men who had been at the summit long enough to be used to the altitude. Wear-

ing a mask open to the air and also connected with a small tank of carbon dioxide, these young men walked 250 yards up the cog railway, grade 1 in 5, in two minutes. The work amounted to lifting the body and the eight-pound apparatus 150 feet vertically. They made the test twice, once inhaling the carbon dioxide and once without these inhalations.

"None felt either the exertion or the respiratory strain to be at all increased by the inhalation, but rather the contrary," the Yale physiologists report.

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## BACTERIOLOGY

## Body Tissues Not Germ-Free; Bacteria in Dissociated State

**W**ITHIN a few minutes after birth, the blood and every normal tissue of the body are invaded by the ordinary bacteria found on the skin and in the mouth and nose, Dr. Lars F. Gulbrandsen of the University of Illinois College of Medicine has found.

This discovery upsets the prevailing idea that the blood and tissues of the body are as a rule sterile, that is, free from micro-organisms. Dr. Gulbrandsen finds the bacteria present in a changed form and believes that this change constitutes one of the body's means of defense against disease.

So far there has not been time for other scientists to confirm Dr. Gulbrandsen's findings and theories, but his study is said to open a new field in the investigation of disease and resistance.

The bacteria come to the tissues through the wall of the intestinal tract from food that has been taken through the mouth, Dr. Gulbrandsen believes.

New-born guinea pigs, he found, did not have bacteria in their body tissues at birth. But within fifteen minutes after feeding them pure cultures of bacteria by mouth, the micro-organisms could be found in the animals' tissues.

The bacteria, however, had undergone decided changes of a type known to bacteriologists as dissociation changes. They had no power to produce disease in the healthy individual and would not grow under ordinary cultural conditions.

It is this dissociation change which Dr. Gulbrandsen believes constitutes one of the body's major mechanisms of defense against disease.

Further work is being done to learn whether the bacteria pass through the lining walls of the intestinal tract intact or whether they are changed in that passage and can then return to their original form in the body tissues.

For this research Dr. Gulbrandsen was recently awarded the \$500 Capps prize of the Institute of Medicine in Chicago. This prize is given each year for the most meritorious medical research by a graduate of a medical school in Chicago completed within two years after graduation.

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## ASTRONOMY

## Gaseous Nebulae May Be Ghosts of Exploded Stars

**A**RE THE great, misty nebulae seen by astronomers the ghost-shrouds of some prehistoric star which exploded as did now-famous Nova Hercules just before last Christmas? Scientists are asking themselves that question.

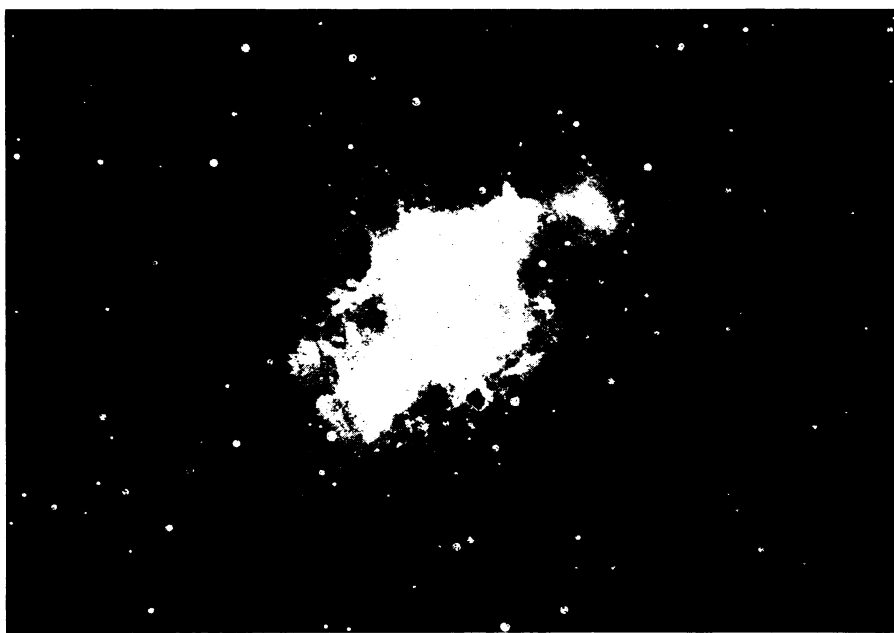
Dr. Gustaf Strömberg of Mt. Wilson Observatory, in a summary of exploding stars written for the Carnegie Institution of Washington, points out one case, at least, which links the appearance of nova stars with the great nebulae so prevalent in the heavens. Dr. Strömberg says:

"In the sky there are certain objects whose appearance and spectra are similar to those of the later stages of a nova. It is quite possible that all of these bodies have gone through a nova stage.

"A peculiar case is that of the so-called Crab Nebula in the constellation Taurus. By comparing photographs taken from time to time we have found that the nebula is gradually expanding. By calculating the time required to reach its present dimensions at a uniform rate we find that the hot gas must have left the star's surface about 900 years ago.

"In the records there is only one account of a nova star in that part of the sky in which the Crab Nebula is located. Chinese astronomers saw a nova there in the year 1054!"

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CRAB NEBULA OF TAURUS