

While the process is fatal to all microbes if continued long enough, Dr. Cleveland has found that the pathogens, or disease-causing germs, are the easiest to destroy. High pressures or long exposure periods kill the germs completely, while less drastic treatment will leave them alive but unable to multiply; that is, it will preserve the material without absolutely sterilizing it.

Dr. Cleveland did not discover this process suddenly; it came as the result of a long series of experiments. The first inkling of the principle underlying this new method of preserving fruit juices was discovered while he was studying the minute, one-celled animals or protozoa that live in the digestive tracts of termites or white ants. He wanted to get the insects free of their tiny guests, and tried various methods, including heat treatment, with success. He found finally that if he increased the oxygen present in the atmosphere of the jars in which they were kept, the insects would live while the protozoa inside them died. The difference in the effect of oxygen on the microorganisms in white ants and on the white ants themselves was very great; the ants survived more than forty times, the amount of oxygen required to kill their intestinal guests.

Following this, Dr. Cleveland very soon discovered that many other animals, including even the cold-blooded vertebrates among the higher animals, lost their protozoa when confined in oxygen. Applications of this principle may be made in combating the diseases of economic insects such as silkworms and bees, in freeing young fish of disease-causing parasites, and in testing out the ability of insects to transmit protozoa and spirochaetes to man, animals, and plants.

Turning from the study of the killing effect of oxygen on parasitic microorganisms, Dr. Cleveland found that it was possible to kill such organisms as bacteria, molds, and yeasts living free in nature by confining them in oxygen under pressure. This suggested the query: "Is it possible without rendering food unwholesome to kill the microorganisms which cause it to spoil?" The work on fruit juices is an answer to this question.

NOISELESS GAS CAR FOR SWEDISH RAILWAYS

A "silent" railway motor car without engine vibrations has been achieved, and during its recent trial run over the Swedish State Railways from Malmoe to Stockholm the passengers heard no other noise than that of the wheels clicking against the rail joints. It is the design of a Swedish engineer, Magnus Tacklind, of Stockholm, but has been manufactured in Germany. Except for certain motor parts it will later be built in Sweden.

The absence of the noise and vibration is due to the fact that the motor is not placed on the same frame as the passenger car itself, but is entirely isolated from it, being slung underneath. The power is transferred to the driving axle from the motor through five different sets of gears, which are kept going all the time, so as to make the driving smoother. The speed attained reached over 50 miles per hour while the consumption of fuel, a mixture of benzine and benzol, averaged about eight miles to the gallon, or about twice that of an ordinary taxicab. Its seating capacity is sixty persons, but a trailer with the same number may be coupled behind. It

is a "one man" car and is operated from the driver's seat through electrical connections.

NEW KIND OF LIGHT SUPPLIED BY CHEMISTRY

"Chemiluminescence" is the term applied to a new kind of light caused by chemical reactions which involve no burning or combustion. The practical application of this principle has been worked out in a factory in Hungary where a tube has been devised in which chemiluminescent reactions can be carried out in a vacuum.

The materials which have thus far proved most successful in this capacity are chlorine gas and sodium vapor. These two elements brought together in this form combine to produce sodium chloride, or common table salt, giving off in the process a brilliant yellow light. About one-tenth of the energy involved in this reaction is converted into light.

It is expected that such tubes will find practical use for special scientific experiments and among surgeons, due to the fact that the light they give off is of only one color and not composed like ordinary daylight of all the colors of the spectrum.

An idea following somewhat similar lines has been devised in this country for making luminous compounds. According to a patent recently granted, the phenomenon of phosphorescence can be produced by the reactions of two classes of substances known as "luminophores" and "phosphorogens" with a base of some mineral carbonate and combustible material like starch or sulfur. Luminophores are compounds of the lighter metals such as sodium and potassium, while the phosphorogens are compounds of heavier metals like silver, nickel, and the radioactive uranium and thorium. These latter make the limestone base phosphoresce and the former impart the desired color to the glow.

DANISH SCIENTIST STUDIES EELS OF PACIFIC

The man who found out where the eels of Europe and America go when they disappear in the fall has set out to solve a similar problem in the Pacific Ocean.

That the breeding ground of the common fresh water eels of both countries overlap in a section of the Atlantic south of the Bermuda Islands, a location thousands of miles from their summer homes, was ascertained largely through the research of Dr. Johannes Schmidt of the Carlsberg Laboratories of Copenhagen. For the last twenty years he has been studying young eels picked up in nets from points all over the Atlantic, working much of the time under very primitive conditions. The young eel larvae of both the American and European eels are hatched in the mysterious Sargasso sea. How these eels know which continent to make for when seized by the migratory urge to reach fresh water is a question the scientists refrain from answering but according to Dr. Schmidt there is no record of their ever having made a mistake