

MEDICINE

Plastic Sponges Fill Hollow Lung Cavity

► PLASTIC sponges now on the market for washing faces, dishes and even the family car may turn out to be just what the doctor orders for a patient who has had a lung removed because of disease.

Preliminary tests at the Mayo Clinic, Rochester, Minn., show the plastic sponge to be "the most promising material yet studied" for a permanent false lung to fill the space left in the chest when a lung is removed.

In such cases the body tries to wipe out the space by a raising of the diaphragm, a shift of the partition between the lung sacs, narrowing of the spaces between the ribs and over-expansion of the remaining lung tissue. Usually these changes do not cause any serious disturbance or disability, especially in young people. But in cases where the operation has been performed for tuberculosis, the over-expansion of the remaining lung tissue is not so good. And cancer of the lung, chief condition for which an entire lung is removed, occurs most often in older patients who do not have very elastic tissues and consequently can stand least well the over-expansion of the remaining lung.

A bag of plastic material (polyethylene film) filled with spun glass and air and a hollow, lung-shaped job of a molded methyl methacrylate plastic had previously been tested. Both were satisfactory in some respects but the polyethylene bags eventually broke and the plastic molds did not fit the lung cavity well.

The plastic sponge is trimmed with surgical scissors to fit the space left when the real lung is removed. It is then moistened with a solution of salt containing penicillin and then stitched to the lining of the chest wall. The sponge itself is derived from formalinized polyvinyl alcohol and sold under the tradename, Ivalon.

Trial of these sponges in dogs was successful enough to warrant their use in selected human patients, Drs. John H. Grindlay and O. Theron Claggett reported at a staff meeting of the Mayo Clinic.

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DENTISTRY-NUTRITION

Norwegian War-Time Diet Gave Children Better Teeth

► FISH, carrots and potatoes instead of more artificial carbohydrate foods gave Norwegian children better teeth during the war.

Dr. Gutterm Toverud, professor of pedodonty at the Dental School of Oslo, Norway, now in this country, has reported this information to the American Dietetic Association in Denver, Colo.

Dental decay in Norwegian children decreased 60% to 80% during World War II, he found. This decrease in decay resulted

partly from the war-time diet which contained a low amount of refined carbohydrates, especially sugar and the sugar products. Norwegians also ate more of the natural foods such as fish, salted herring, potatoes, and carrots—foods high in calcium, phosphorus, iron and vitamins A, B, C and D.

Since 1945, dental decay in pre-school children has increased 30% to 40%, Dr. Toverud found. Dental examinations have been made annually since 1940 on 8,000 to 9,000 Norwegian school children, aged seven to 14 years. An even greater reduction of caries during the war years was noted in two and a half to seven-year old children, Dr. Toverud stated.

Prevention of tooth decay depends on the strong resistance of the teeth and on the small percentage of carbohydrate particles on which the bacteria in teeth crevices can act. These factors were present in Norway during the war years, Dr. Toverud explained. The minerals present in the natural foods built up good resistance of the teeth to decay, while lack of carbohydrates in the diet lessened the amount of bacterial activity.

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NUTRITION

School Lunches Now Served Children Overseas

► SCHOOL LUNCHES, such as we have here, have gone abroad, although the menus vary greatly in the different countries, Marjorie L. Scott, nutrition officer of the Food and Agriculture Organization, United Nations, reported to the American Public Health Association in New York.

In the United Kingdom a complete hot meal is served to over half of the school children, she said. In addition, many children also receive milk, a program started before the war.

Belgium and the Netherlands among others, where the custom is for the child to have all his meals at home, supply only milk during the school day.

Greece has recently started a school breakfast which consists of a cup of hot milk cocoa and a slice of milk raisin bread.

In Bangalore, India, experiments on a group of school children showed that soy products are less desirable than cow's milk in supplementing the rice diet.

School meals in Singapore, Malaya, and Java, are based on cereals such as lightly-milled rice, high extraction wheat and millets, and the small fish called pulse to provide calcium, as well as green leafy vegetables, and an oil containing carotene.

A simple snack of milk and crackers was advised, at a conference in Montevideo, for countries unable to provide full meal service in schools.

These programs are being encouraged with financial aid and technical assistance by FAO in many other regions where malnutrition is prevalent.

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IN SCIENCE

CHEMISTRY

Mercury Vapor Poisoning Prevented by New Device

► AN ordinary toy balloon and a vacuum-packed coffee jar are helping glass blowers in the laboratory escape the danger of poisoning from mercury vapor fumes that appear when glass vacuum apparatus is undergoing minor repairs.

Developed at the physics department of the Illinois Institute of Technology, Chicago, Dr. James J. Brophy reports in the REVIEW OF SCIENTIFIC INSTRUMENTS (Oct.), that this device has been in successful use for some time.

Two pieces of copper tubing are soft soldered to the metal cap of a vacuum-packed coffee jar. An ordinary toy rubber balloon is held to one of the tubes inside the jar by a rubber band. From the other end of this copper tube rubber tubing leads to the glass blower. The other copper tube is connected to the glass vacuum system.

When the glass blower blows through the rubber tubing, the balloon expands and forces the air in the jar into the vacuum system, yet protects the blower from dangerous mercury vapor.

Glass blowers in a laboratory are highly skilled technicians upon whom the success of experiments being conducted by scientists depends. Many studies are made at much reduced pressures in apparatus containing mercury, and the danger from poisonous mercury vapor in repairing is great.

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OPTICS

Artificial Sapphires Are Now Made into Lenses

► ARTIFICIAL sapphires can now be made into lenses for microscopes and cameras, and it is expected that these jewel lenses will be of particular use in correcting optics for color transmission.

Dr. Robert E. Hopkins and Brian O'Brien of the University of Rochester's Institute of Optics reported to the Optical Society of America in Buffalo, N. Y., that a lens of one-inch focal length and f/1.5 has been constructed with two sapphire elements.

Sapphire of acceptable optical quality has been manufactured in sizes up to 20 millimeters diameter. Methods of polishing this material which is harder than glass have been worked out.

Manufacture of artificial sapphires was begun in this country during the war to provide hard and long-wearing bearings for precise instruments needed in military work.

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E FIELDS

GEOPHYSICS

Picturing Earth's Shape From Gravity Differences

➤ TWO scientists at the University of Wisconsin are busy with computations which they hope ultimately will give the exact shape of the earth.

Prof. George Prior Woollard, University geophysicist, and Norman C. Harding, a graduate student, are correlating gravity measurements taken at different points on the globe by Mr. Harding and other graduate students during the summer.

Since the earth is of irregular shape, being pumpkin-shaped rather than perfectly spherical, the pull of gravity varies by minute but measurable differences. From measurements of these differences recorded from many points on the earth's surface, scientists will be able to make an exact model of the earth showing all its bumps and wrinkles.

However, it will take many thousands of such measurements and long and painstaking correlation of them before this point is reached. Prof. Woollard, who instituted the project in 1940, has traveled all over the northern hemisphere taking measurements. Mr. Harding took readings at some 400 different places throughout South America and Alaska on his expedition this summer.

Although the theoretical basis for relating earth size to varying gravitation has been known for a hundred years, it is only recently that the development of a portable, accurate gravimeter, the gravity-measuring instrument, made extensive field work possible.

Many other organizations are engaged in collecting gravity measurements all over the world. In this country, the U. S. Coast and Geodetic Survey is making an intensive study of gravity differences in the Midwest. Some day it is hoped all these figures will add up to the exact shape of the earth.

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NUCLEAR PHYSICS

Static Electricity Being Fought with Alpha Rays

➤ RADIOACTIVE materials are being used to fight the danger of fire from static electricity produced in many industrial operations. Dr. John E. Silson of the New York State Department of Labor told the American Public Health Association in New York.

Alpha rays, composed of the nuclei of helium atoms, have been found effective for this because they ionize the atmosphere and thus break up the static charge, he said.

But this has created a new danger to health because radium is the material used as source of the alpha rays. The danger is from the beta and gamma rays which radium also gives off.

This danger from gamma rays can be held in check by the simple precaution of keeping workers a safe distance from the radioactive material, Dr. Silson pointed out. Shielding he called impractical because it would require great thickness of lead.

He recommended film badge monitoring which shows how much radiation is hitting the body of a worker as a check on the control measures being used.

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CHEMISTRY

Many Products from Fat To Come from Unique Plant

➤ HUNDREDS of products of fat, plain animal fats from meat packers and markets, are to be obtained at an unique new plant opened in a nearby Chicago suburb by Armour and Company. While glycerin will be the principal product, there will be a long list of old and new chemicals in addition.

The new plant is intended to process up to 100,000,000 pounds of fat a year. From the fatty acids obtained many products will be made by conversion into amides, nitriles, amines and other substances. Applications of products will range from better detergents for cleaning to waterproofing for concrete, improved binder for asphalt roads and for use in recovering iron from its ore.

The work of the new institution will be based on years of study of each of the acids found in fats and the various chemical variations possible for them. Edible fats have been used largely as lard and other shortening and in margarine. Inedible fats have been used mostly in soap making but they have been used also in lubricants, cutting oils, candles and a few other purposes. The present plan is to find more worthy uses for the fatty acids.

A fat molecule consists of a molecule of glycerin holding together three molecules of acid which may be all different. The types of acids depend upon the source of the fat. In this new plant steam is fed into the top of a high tower under 700 pounds pressure per square inch and at a temperature of 450 degrees Fahrenheit. Liquid fats are pumped up from the bottom. The glycerin is separated, washed out and recovered at the bottom. The mixed acids emerge from the top.

The mixed acids may be converted into amides by mixing with ammonia and heating, then into nitriles by the use of high temperatures, and finally into amines by hydrogenation. However, the various acids may be separated from each other in the high vacuum fractional distillation section of the plant, on the basis of the differences in their boiling points.

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PALEONTOLOGY

Prehistoric Sea Cow Skeleton Is Unearthed

➤ SCIENTISTS now have their hands on the first skeleton of a rare beast of the prehistoric world, a 30,000,000-year-old sea cow, which had been known only from fossil skull fragments and curious peg-like teeth.

The animal was the ancestor of the modern sea cow and, like his offspring, he was a stupid, ugly and ungainly beast, having an appearance something like a cross between a hippopotamus and a small whale.

Paradoxically, the sea cow appears to have inspired the creation of one of the loveliest individuals in mythology, the mermaid. True, the sea cow had a flipper, but here the resemblance ends.

The skeletal remains of the prehistoric sea cow were unearthed near the California town of Coalinga by Roy H. Reinhart, teaching assistant in paleontology. The remains will make it possible for Mr. Reinhart to make the first definite assignment of the animal's place in evolution.

Mr. Reinhart says the sea cow apparently has always been rare on the earth. Only two skulls, two partial jaws and some teeth of the prehistoric animal had been unearthed prior to the Coalinga find.

Two genera presently inhabit the earth: the Manatus along the coast of Africa and from the West Indies to central South America on the Atlantic Coast; and the Dugong from the Philippines and Australia to Madagascar and the Red Sea.

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BIOCHEMISTRY

Cows' Thyroid Gland Size May Be Key to Milk Yield

➤ SOUTHERN cows give less milk than northern cows, on the average. Southern cows have smaller thyroid glands than northern cows, on the average.

Dairy scientists of the U. S. Department of Agriculture, placing these two facts side by side, speculate that there may be some connection between them. Although they are not sure, they think they are on the trail of something better than a mere hunch. Here are some of the facts that make them think so:

1. Cows fed with thyroxine often give more milk.

2. Thyroxine is a substance secreted by the thyroid gland.

3. In some animals, environmental temperature is known to affect thyroid activity.

4. Diet and heredity may also affect thyroid activity.

Intensive research into the thyroids of cows in relation with their environment, diet and heredity is on foot already in the hope that some day southern cows will produce as much milk per cow as their northern cousins.

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