

PHYSICS

Liquid Nitrogen Used To Liquefy Oxygen

► "FREE as air" isn't always an apt simile. Air separated into its constituent gases and liquefied can be sold at a good profit, especially the liquid oxygen. To make this profitable use of air, C. C. Van Nuys, research physicist of the Air Reduction Company, Inc., has developed two processes in which liquid nitrogen is used to chill oxygen to the liquefying point.

One of the processes, covered by U. S. patent 2,423,273, operates at low pressure—not more than 45 or 50 pounds per square inch—because such pressures can be developed by blowers that do not pollute the air with lubricating oil to form a dangerously explosive mixture with liquid oxygen. The other process, on which patent 2,423,274 has been granted, uses pressures around 3,000 pounds per square inch and accepts the risk.

Both processes depend on the fact that oxygen liquefies at a different low temperature from the liquefying point of nitrogen and the rare gases krypton and xenon. The latter, insofar as they are not needed for refrigerating purposes in the apparatus, are discharged separately and can be either sold or thrown away.

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NUTRITION

Orange Juice Adds Color To Frozen Sweet Potatoes

► YOU MAY have orange juice in your sweet potatoes and ice cubes in your gravy one of these days. These are two of the latest frozen food wonders. The wonder will be that you won't know if you do have these delicacies.

Ice cube gravy and sweet potatoes with orange juice are two developments in a study being made by home economists at Cornell University to help the Navy serve palatable meals from frozen foods.

Ella Gleim and Faith Fenton found that gravy must be frozen rapidly to avoid excessive bacterial growth. The solution to that problem was to put ice cubes in the gravy for rapid chilling.

Mashed sweet potatoes with milk had a gray color, so the home economists used orange juice. After three months in freezer storage, the sweet potatoes still had a fresh flavor and a bright orange

color which made them appetizing.

The Cornell investigators have discovered some complications in planning meals for freezing and reheating when they are to be served. Foods differ in the rate of heat penetration. Thus, a cook reheating a frozen meal with chicken, potatoes and broccoli would find the broccoli cooked by the time the chicken and potatoes were thawed out.

This can be adjusted, the home economists found, by completely cooking the chicken and potatoes before freezing.

Tests with temperatures of zero and 15 degrees Fahrenheit showed that the food was acceptable after three months storage at either temperature, but the lower temperature produced the better result. Experiments are now planned at below-zero temperatures.

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ZOOLOGY

National Zoo Acquires Some New Inhabitants

► THE National Zoological Garden will have a variety of new beasts and birds. Just received by Director William M. Mann are a pair of tamanduas, which are middle-sized anteaters from South America; a pair of pacas, large guinea-pig-like rodents, also from South America, and a pair of young spotted hyenas from Africa.

Antarctica contributes a pair of king penguins, and from Panama come 10 pairs of honey-creepers. The latter are small, beautifully deep-blue birds that cling tightly to the stems of plants while they sip nectar from the flowers.

Two secretary birds, long-legged snake-destroyers from South Africa, have just been received. The sharply-curved tips of their beaks and their bold golden eyes give them the general appearance of hawks on stilts.

These birds get their name from the resemblance of their stiff-feathered crests to a bunch of quill pens stuck behind the ears of some counting-house character out of Dickens. They are the African "opposite numbers" of the road-runners of our own Southwest. They attack snakes by beating them down with their strong feet, then finishing them off with their beaks.

In Boer country they are known as "slangenvreeter," which is Afrikaans for snake-eater. So useful are they in the control of cobras and other venomous serpents that they have been given the protection of a special law.

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IN SCIENCE

VOLCANOLOGY

Iceland's Mt. Hekla Erupts Same Old Lava

► WHEN Iceland's famous volcano, Mt. Hekla, erupted last March, it was news, but a scientist has found that the lava which flowed from the crater was nothing new, geologically.

Dr. G. W. Tyrrell of the geology department of University of Glasgow in Scotland received a sample of lava from this year's eruption of Mt. Hekla and compared it with earlier samples, including one collected by a British scientist in Iceland in 1810.

The geologist's conclusion: Same old stuff.

Or as Dr. Tyrrell concluded in a report to the British journal, *Nature*: "It may therefore be concluded that the Recent basalt lavas of Iceland are very uniform in composition and that there has been little or no change in that respect during the historical period."

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ELECTRONICS

Purifying Equipment Available for Homes

► NOW private homes can be free of dust, soot and pollen—at least of any that enters with the fresh air for circulation by hot-air heaters or air-conditioning.

The removal unit is of the type known as the electronic precipitator, which is already used in theaters and other public buildings. This home unit, which occupies a space about two feet square, is attached in the basement to the furnace or air-conditioner. It is made by the Raytheon Manufacturing Co., and operates on the house current.

Within the cabinet in the unit, a strong electrostatic field is created by the current. The particles of dust passing through the field are given a positive electric charge. As the air moves onward, it passes through vertical collecting plates charged negatively. These are the dust collectors.

These plates need occasional cleaning. The process is simple. The electric current is cut off, and a water valve turned on. A spray quickly does the washing.

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CE FIELDS

ENGINEERING

Prefabricated Shelter Made for Cold Climates

► A PORTABLE, prefabricated shelter for troops in Arctic climates, revealed by the Army, is under advanced design by the Corps of Engineers. Complete building, unassembled, will be light enough for cartage by plane.

Lightness and warmth are two essentials. The sidewalls and flat roof will be made up of panels, eight by four feet in size, composed of two thin sheets of aluminum with insulation between. The flooring is the same type of panel with the addition of an eighth-inch layer of wood on its upper surface. Outside surfaces need no paint; inside walls are painted to give a "warm color."

The standard building is eight feet wide, 20 long and nine high. Its width, however, can be doubled, and its length increased. The building is supported by a rigid aluminum frame. A novel feature is the floor beam. It is an open truss aluminum joist with a jack at each end. This makes easy levelling of the structure on rough land or ice.

Heating plans are designed for an indoor temperature of 70 degrees Fahrenheit when it is 70 degrees below zero outside. The structure will withstand a 125-mile-an-hour gale. It can be quickly assembled by unskilled workmen wearing Arctic clothing, including gloves.

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PHYSICS

Tube and Cellophane Used for Shock Wave Study

► A SIMPLE instrument, basically a metal tube about eight feet long, divided by a piece of cellophane, has been devised for shock wave studies by Dr. Lincoln G. Smith, of the department of physics at the University of Michigan.

Shock waves produced in the tube are like those from bombs and depth charges, though much weaker.

Dr. Smith suggested that this equipment might be used as an inexpensive wind tunnel. Very high pressures in the small chamber would force wind from the explosion through the tunnel at supersonic speeds, he said.

Cellophane separates the metal tube

into two sections, one longer than the other. The shorter chamber is filled with compressed air. The compressed air explodes through the cellophane when the partition is punctured by a plunger.

In a fraction of a second, the shock wave from the explosion rushes to the end of the tube's longer section. There it strikes a metal plate, which can be adjusted to different angles.

The tube has a glass window on each side of the plate. An electric spark outside one window photographs the shock wave, just as it hits the metal plate, on a film held against the other window.

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PUBLIC HEALTH

Much Money Needed For Safe Sanitation

► NEARLY \$8,000,000,000 is needed to give some 100,000,000 Americans improved water supplies and waste disposal to cut down danger from filth-borne diseases such as dysentery, diarrhea and typhoid fever, the U. S. Public Health Service revealed.

The figures are based on an extensive survey just made by the Service, with state and local health authorities cooperating. It is called a sanitation inventory, and the report of the survey itemizes, state by state, the cost of obtaining the healthy environment essential to a national health program.

Water works construction is needed to serve 81,000,000 persons living in cities and towns. Sewerage facilities are needed for some 85,000,000 people in cities, towns and communities of over 200 population. Approximately 27,000,000 persons living in rural homes have unsatisfactory water supplies, and 33,000,000 rural residents lack adequate waste disposal facilities.

A full report of this sanitation survey will be available to officials and others interested early in the fall from the Federal Security Agency.

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HORTICULTURE

Cut Your Roses Late If You Want Them to Keep

► ROSES are gathered better late than early. Late afternoon is the best time to cut roses you want to keep well, say U. S. Department of Agriculture scientists. This is probably because the leaves and stems have more carbohydrate in them after a sunny day.

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ASTRONOMY

Sunspot Maximum Predicted For the End of Next Month

► SUNSPOT maximum will be reached this August, if the calculations of Dr. A. G. McNish and Miss J. Virginia Lincoln of the Central Radio Propagation Laboratory, National Bureau of Standards, are correct.

From now until the end of the summer, the number of gigantic spots on the sun that may easily be seen through smoked glass and small sunspots visible only with a good telescope may be expected to increase. But after August, fewer large clusters and minor splotches will be seen on Old Sol's disk.

The number and activity of sunspots, whirlpools in the outer layers of the sun showing variations of the sun's temperature, are general indicators of the relative intensity of radiations sent from the sun to the earth. Prediction of long-term changes in solar activity is therefore important in forecasting several months in advance just how radio waves will act. This helps radio engineers calculate the best usable frequencies for communication between any points in the world at any hour of the day.

Prolonged, moderate disturbances are frequent during sunspot minimum. Briefer, more erratic storms tend to occur during sunspot maximum. They usually take place a day or two before a large spot passes the sun's meridian.

It is the sun's ultraviolet rays that ionize the atmosphere. The upper regions, 30 to 250 miles above the earth where the air particles are spaced so far apart, stay perpetually ionized. The lower ones, ionized during the day, return to their normal non-ionized state at night.

When a broadcasting station issues a series of radio signals, the energy travels in two ways. One wave travels along the ground, gradually becoming weaker as it spreads out over a greater area and as energy is absorbed from it. The sky wave travels upward until it reaches the ionized region of the atmosphere and then is reflected back in much the same way that light is reflected from a mirror. Sometimes short radio waves are bounced back and forth between the ionosphere and the earth's surface many times before they reach your receiving set.

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