SCIENCE NEWS

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RADIOACTIVE PHOSPHORUS

A PRODUCT of the atom-smashing cyclotron, radioactive phosphorus, is announced as a treatment for a serious blood disease by Dr. John Lawrence, who is director of biological and medical research of the Radiation Laboratory at the University of California.

Polycythemia, a deadly disease of the hemoglobin-producing bone marrow, causes an abnormal multiplication of red corpuscles in the blood and is usually treated by drugs, bleeding, radium and x-rays. This new form of treatment, although not generally used, seems to offer advantages over the older methods.

Elements made radioactive in the cyclotron emit rays similar to those of natural radium or x-rays, but as they travel in the system as natural phosphorus, these charged phosphorus atoms are carried directly to the bone-marrow where red corpuscles are normally produced. Harmless to normal body tissues in the small amounts needed, the charged phosphorus atoms enter and destroy the abnormal cells. If orange juice is taken at the same time it speeds phosphorus absorption and aids retention so that even smaller doses are needed.

So effective were the phosphorus radiations in their action on the wide-spread abnormal red blood cells that the blood count of patients was reduced from 7,000,000 to the normal 4,500,000. One reason for the destructive action of radiophosphorus in abnormal cells while normal cells are unharmed is the fact that polycythemia-multiplied cells are new cells, and radioactive research shows that all new cells, normal or abnormal, use large supplies of phosphorus in their growth. When the phosphorus taken up by these rapidly multiplying cells is radioactive, they are destroyed by the atomic "explosions" that are continuous in the substance. Radioactive elements produced in the cyclotron are being used in the treatment of several other types of abnormal growth.

Dr. L. A. Erf, research associate now in the United States Army Medical Corps, assisted Dr. Lawrence in the polycythemia research.

CONSTRICTED HEARTS

A HEART operation that is returning bed-ridden invalids to normal, active lives is being successfully used by thoracic surgeons in the University of California Medical School.

Sometimes rheumatic or tuberculous infections will invade the pericardium, the membranous, fluid-filled sac surrounding the heart. Normally this sac is flaccid and roomy enough to permit easy expansion and contraction of heart muscles in their blood-circulating action.

When the pericardium becomes infected, a condition known as constrictor cordis or Pick's disease results. Calcium, the hardening substance of bones, begins to coat the membranous sac, and it soon takes on a marblelike appearance as it hardens and shrinks. The heart is so restricted in its pumping action that only about half the normal amount of blood can be handled. Besides extreme debility, the abdomen swells and the breath becomes short and difficult.

Surgeons, knowing that the pericardium is not essential to the heart's functioning, removed a large part of the bony sac; sometimes as much as three quarters of the calcium carbonate-hardened membrane, a most delicate operation, but performed successfully on four extreme cases. Even before the operation was completed the freed heart began to return to normal functioning, and the painful symptoms soon were relieved. The patients live comfortably without a pericardium and their hearts are able to pump a normal supply of blood throughout the body again.

The surgeons who conducted the operations on this rare disease, all members of the thoracic surgery staff of the California Medical School, are Dr. Harold Brunn, clinical professor of surgery; Dr. Alfred Goldman, instructor in surgery; Dr. Brodie Stevens, assistant clinical professor of surgery, and A. L. Brown, clinical instructor in surgery.

NICOTIANA RUSTICA

VITAMIN for the enrichment of bread and poison for insect pests may be the double yield of one species of tobacco, so rank that even the hardiest veterans can not smoke it. Tobacco growers whose export market has been upset by the war are experimenting with its cultivation is announced by the U. S. Department of Agriculture, and at the new Eastern Regional Research Laboratory in Philadelphia chemists are trying out methods for extracting the two valuable compounds.

The tobacco species in question is *Nicotiana rustica*, a half-wild cousin of *N. tabacum*, or regular smoking tobacco. It has high content in both nicotinic acid, which is the pellagra-preventing vitamin, and nicotine, the poison used in great quantities in insect sprays.

Because of the resemblance between the two names, confusion often arises, leading some to believe that nicotinic acid has some of the poisonous properties of nicotine. This is not the case at all. Nicotinic acid was so named because it was first studied in *Nicotiana*, the tobacco plant, but it has since been found in a great variety of plants, including yeast. It is perhaps a pity that it was not found first in yeast; then it would have been called zymic acid and nobody would have been bothered.

If the effort to increase the country's supply of nicotinic acid from rustic tobacco proves successful, it will go far toward relieving one of the most troublesome of present chemical bottlenecks. Estimates are that 200,000 pounds of nicotinic acid will be needed this year for the enrichment of flour, and perhaps 20,000 pounds more for the direct treatment of pellagra. This demand is about twenty times as great as the total quantity of nicotinic acid manufactured in 1940.

Nicotinic acid is made synthetically from coal tar. However, the chemicals needed for its production in this

way are expensive, and they are becoming increasingly difficult to get at all. Nicotinic acid from the plant source is more costly to start with, but it requires for its processing only nitric acid, which is cheap and abundant.

SMALL MINERAL CRYSTALS

MINERAL crystals so small that 1,000 of them laid end to end would reach only one inch have been successfully measured by Samuel G. Gordon, mineralogist of the Academy of Natural Sciences of Philadelphia.

These crystals are of a new mineral, discovered in a mine in Argentina, and flown air mail to the academy for description and naming. They are the smallest mineral crystals ever measured.

Called sarmientite by Mr. Gordon and Dr. Victorio Angelelli, of the Argentina department of mines and geology, coauthor of the paper in which it is described, the new mineral is found in fair-sized nodules of great purity, of a pale yellow-orange color, in iron sulfate deposits of the Santa Elena mine.

This mine, high in the mountains of the department of Barreal, lies between San Juan and Calingasta, at an elevation of around 5,000 feet. It has been worked only a short time, yielding alums for use in water purification. Already a number of rare minerals have been found there, some so rare that they had previously been found only at the original localities, mostly in Europe. Practically nothing was known about them until they were rediscovered in the Argentine mine, and restudied by Mr. Gordon.

The new mineral was picked out of a mass of rare minerals. The pale yellow-orange nodules were unlike anything seen before in the mine and excited the interest of Dr. Angelelli, who believed they might be a new mineral. A sample was dispatched at once to the academy, because of its high rank in the field of micro-mineralogy.

Mr. Gordon studied the nodules under a high-power microscope, and could see that they were made up of exceedingly minute prisms, the largest of which were only a thousandth of an inch long. One of the largest, for the smallest were only a twelfth as large, he mounted on the point of a pin, carefully orienting it under the microscope. It was transferred to a two-circle goniometer, a complicated instrument for determining the angles of minute crystals. Light signals could be seen as the various faces of the crystal were turned and the angles of the faces were measured. He was then able to draw a figure of the crystal and classify it as of the monoclinic system. Chemical analysis disclosed that it was a hydrous iron arsenate-sulfate.

The new mineral was named for Domingo Faustino Sarmiento, the Argentinian educator and statesman, who was born in 1811 and died in 1888. Sarmiento held the office of minister of public instruction and minister of the interior, and was made minister to the United States. While in his diplomatic post in Washington, he was made president of the Argentine Republic, in 1868. It was through him that American ideals in education were brought to the Argentine. He also founded the Cordoba Academy of Science in Argentina.

MANGANESE

MANGANESE sufficient for all our needs can be produced right here in the United States as the result of a new process for the treatment of low-grade ores developed by the U. S. Bureau of Mines.

Manganese is of vital importance as an essential alloy in high-grade steels used both in defense and non-defense industries. Until now it has been possible to obtain the metal only from high-grade ores containing 48 per cent. or more of manganese. Of this the United States produced only about 3 per cent. of its needs, the rest coming from abroad. Last year Russia supplied about a fourth of the amount imported.

While high-grade manganese ores are scarce in the United States, there are huge quantities of low-grade ores. But these were useless because no practicable method of extracting the metal had been found. Success has now been achieved by the use of a new reagent developed as a result of researches in the laboratories of the Bureau of Mines, and known as DLT–958. This reagent floats a good part of the worthless materials away from the ore, leaving a concentrate from which the metal can be extracted by the usual processes. The bureau has also developed other reagents of a similar character so that the operation of a plant is not restricted to a single reagent.

The bureau has built, under a defense appropriation, a group of pilot plants at Boulder City, Nevada, of which the first unit has begun operations. The first test of the new reagent was made in this mill on ore containing 18 per cent. of manganese. It left a concentrate containing 53 per cent. of manganese. It is estimated that there are nearly a million tons of ore containing 10 per cent. or more of manganese in the Las Vegas area. Tests are continuing on ores from many widely separated localities.

ITEMS

RECENTLY installed instruments of the U. S. Coast and Geodetic Survey geomagnetic laboratory at Cheltenham, Md., were able to make a complete record of the great magnetic storm that interrupted wire and radio communication before and during the magnificent auroral display of September 18. They were able to do this, Captain N. H. Heck, of the survey, explained, because they are insensitive, so that their indicators did not swing completely off the scale, as would have been the case with older, more sensitive instruments. Ranges in magnetic intensity of 2,540 gammas (geomagnetic units) in the horizontal direction, and of 1,390 gammas vertically, were recorded. The ordinary magnetic storm records a range of only 300 or 400 gammas.

IN preparation for the eclipse of the sun on September 21, according to Tass, Soviet observatories designed a number of new instruments to be used in photographing the sun's atmosphere during the eclipse. Among the most interesting of these instruments are the nebular spectrographs constructed in the Moscow and Leningrad Astronomical Institutes, which made it possible to study the spectrum of the sun's corona at an enormous distance from the solar edge, where it has never been studied before owing to its dimness.