

SCIENCE NEWS

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GIANT MOLECULES AND DISEASE VIRUS PARTICLES

FRESH evidence that virus disease particles are giant protein molecules endowed with the life-like properties of reproduction and parasitic feeding has been obtained by Dr. Max A. Lauffer of the Rockefeller Institute for Medical Research at Princeton, N. J., and was exported by him at the Pittsburgh meeting of the American Chemical Society.

This new advance in science's war against disease was made through the use of a powerful weapon known as the ultracentrifuge, which whirls tubes of solutions at speeds far exceeding those of rifle bullets and cannon shells, separating substances or particles of different densities and sorting them in layers, as a cream separator separates cream from skim milk.

Identification of virus particles as giant molecules was made tentatively eight years ago by Dr. Wendell M. Stanley, also of the Rockefeller Institute, who first obtained a disease-bearing protein from sick tobacco plants in pure crystalline form. At that time it was learned that these suspected molecules are enormous, with molecular weights in the hundred-thousands, as contrasted with the mere tens or hundreds that represent the weights of ordinary molecules like those of sugar or gasoline.

Dr. Lauffer used a special container in the ultracentrifuge, in which an adjustable perforated barrier permits any desired fraction of the contents to be removed without disturbing the rest.

A solution of the disease virus was whirled in this container until just one fourth of it remained above the barrier. When this was removed and samples of it inoculated into healthy plants, it was found to have one fourth the disease-causing ability of the whole solution. This constituted strong statistical evidence for the identity of protein and virus.

The virus on which the Rockefeller Institute researches has been conducted is that of tobacco mosaic, one of the worst loss-causers in tobacco fields. However, that in itself is of less importance than the possibility of transferring the conclusions to apply also to other disease viruses, which include the microscopically invisible causes of such serious human ills as infantile paralysis, yellow fever, smallpox and influenza.

FRANK THONE

PROTEIN FROM CORN GERM

WITH meat shortages making every one increasingly protein-conscious, news that half-billion pounds of good protein a year may be made available for human consumption comes from the chemical laboratories of the University of Illinois. It is corn protein, in the germ or unsprouted plant tucked in the corn grain, which is at present used principally as animal feed because of the tendency of corn germ to turn rancid quickly.

A new kind of "de-fatted" corn germ, with this oil extracted and saved, has been put through a series of

tests on laboratory animals by Dr. H. H. Mitchell at the university, who has now made a preliminary report to the National Research Council in Washington, D. C. In it he states that "except for the cashew nut, defatted corn germ is the only plant food we have studied, the protein of which possesses as high a biological value as lean meat."

To solve the problem, corn germ spoilage, a commercial firm in Monticello, Ill., the VioBin Corporation, has devised a method of extracting the oil at "pre-cooking" temperatures. The fat content is reduced to 2 per cent., moisture to 8 per cent., so that the keeping qualities of the defatted germ have been greatly improved. When the corn germ was found to be palatable to human beings, the University of Illinois began checking the nutritional values of this new food, hopeful of increasing the value of the corn crop.

Dr. Mitchell's feeding experiments showed that defatted corn germ contains 21 per cent. protein, which is 85 per cent. as digestible as beef protein and with a biological value quite as high. It is also rich in several vitamins and has a high mineral content. Its iron content assays at the exceptional figure of 300 parts per million.

AFRICAN MINERAL RESOURCES

AFRICA's mineral wealth will undoubtedly figure importantly in the claims of European nations to colonial adjustments in the post-war period. Africa produces large quantities of essential metallic and non-metallic minerals which Europe lacks. Control of the African products is therefore an important advantage. Background information relative to the mineral resources of Africa is given in a new publication of the University of Pennsylvania Press, prepared by A. Williams Postel.

There are three principal metallogenetic provinces or mineralized areas in Africa. Along the Mediterranean is the iron-phosphate area. An area stretching from the Katanga district, in the Belgian Congo, down into Northern Rhodesia is reported to be the largest copper region in the world. It also produces radium and cobalt ores. The third great area is in South Africa, in the Transvaal and Southern Rhodesia. This area produces platinum, chromite and asbestos. The Belgian Congo now produces the 77 per cent. of Africa's diamonds, the rest being obtained in Angola, Gold Coast, the Union of South Africa and Sierra Leone.

Africa's known coal deposits are not very important, from the inter-continental standpoint. Petroleum is found only in small quantities, the principal supply being in Egypt, where production is only about 6,000,000 barrels a year, according to the U. S. Bureau of Mines. This is about the amount produced in 36 hours in the United States. Little lead and zinc ore has been found in Africa. Most other metals are found in commercial quantities.

Africa produces 99 per cent. of the world production

of diamonds, both for jewelry and industrial uses. It produces much gold, some 40 per cent. of the total world output.

In 1938 the continent produced over 47 per cent. of the world's supply of vanadium, used principally in special alloy steels. Peru is now an important source of this metal for American use.

Other principal African metal ores, and their percentage of world production, are chromium, 31 per cent.; manganese, 21 per cent.; copper, 18 per cent.; tin, 11 per cent.; and platinum, 9 per cent. Silver, iron, nickel, tungsten, molybdenum, titanium, lead, zinc, antimony and cadmium are all mined in exportable amounts.

Phosphates from North Africa constitute the most important non-metallic mineral. Approximately 36 per cent. of the world's supply came from this area before the war, and European agriculture depended upon it largely for its phosphate fertilizers. Fluorspar, asbestos and graphite were the other more important non-metallic products.

SPITTING COBRAS

SPITTING cobras do not really spit their venom, in their peculiar brand of chemical warfare; they squirt it through fang cavities modified in such a way that the thin jet of deadly stuff is thrown straight forward. This has been demonstrated in studies by Charles M. Bogert at the American Museum of Natural History.

Only a few species of cobras are "spitters." The fang cavity of the non-spitting kind runs straight down through the fang, to an opening just outside the tip and slightly above it. This is orthodox snake-fang structure; it functions like a hypodermic needle. A stream of liquid forced through is projected in the direction the fang itself is pointing.

In the fang of a spitting cobra, however, the channel takes a sudden turn as it reaches the discharge orifice, so that a forcibly ejected stream comes out at an angle of approximately 45 degrees to the front surface of the fang. The snake is thereby enabled to hold its fangs in normal position as it menaces its enemy or prey, and yet throw the venom-jet straight forward.

The eyes seem to be the invariable target, in encounters with spitting cobras, and hits can be scored at ranges variously reported to be as much as six to 12 feet. In human beings, venom produces immediate blindness, followed by severe pain and inflammation lasting several hours. There seems to be no permanent injury.

Mr. Bogert suggests that in addition to its defensive function against such enemies as man and mongoose, the spitting habit may aid in the capture of prey. Dr. David Macht, toxicologist of Baltimore, has informed him that the venom can be absorbed through the eyes of smaller animals, producing symptoms of general poisoning.

"Spitter" snakes are to be found in the tropics of both Asia and Africa. Despite their individually dangerous character, they do not constitute a really serious menace to the lives of our soldiers on overseas duty because they are not numerous, and most of them avoid trouble as much as possible. However, it is never wise to bend over a snake you think you have killed; some species have

a wicked trick of "playing possum," and suddenly getting in one last lick at their attackers.

ITEMS

SUMMER'S end on August 31 (as the weatherman reckons it) leaves the densely populated Middle Atlantic region with a distinctive but unenviable record for one of the worst droughts in its history, U. S. Weather Bureau records show. "At Washington, D. C., near the center of the eastern drought area, the summer, June to August, was the driest since 1854, while the average summer temperature was the highest in more than 100 years," the meteorologists state. The drought area in the Southwest has persisted and continued to spread, until now a great dry zone grips the center of the country, from Kentucky to Nebraska, and from Missouri to Mississippi. Yet immediately to the north of that, in Iowa for example, there are complaints of too much rain, with dry, warm weather still badly needed to mature the corn crop. There have also been heavy rains in the Northwest and Northeast. In the latter region the drought, which had been shared with the Middle Atlantic region, was relieved though not fully broken. The late summer drought has been adding its effects to the already troublesome meat-supply problem by causing many cattle to lose flesh. By reducing the quantities of feed it will have a further, delayed effect during the coming winter and next spring.

WELDING layers of fibrous material together with synthetic resins has produced a plastic that is being drafted for sea duty. Plastic propeller-shaft bearings on sub chasers and other light war vessels are given longer life and flying salt spray only makes them run more smoothly. Metal bearings are corroded by salt water and the heavy wood sometimes used wears out nine times as fast as the plastic. V. E. Enz, Westinghouse marine engineer, states that "naval vessels can stay on active duty longer without drydocking for bearing repairs." Developed by Westinghouse, the plastic is also used for gears to prevent sparks in explosive atmospheres and as valve parts formerly made of bronze. Marine engines are "floated" on blocks of the plastic to reduce vibration and noise. This same plastic, Micarta, is being used by the Army for helmet liners.

THE War Production Board states that corundum, a natural alumina abrasive used in manufacturing grinding wheels for tools and lenses, is now being mined again in the United States for the first time since the last war. The mining operations are carried on in South Carolina. American needs for this important abrasive material have been met in the past years by importation from South Africa. A large plant for the treatment of boulder corundum is located at Pietersburg in Northern Transvaal. Corundum is reported to be widely distributed in the State of Musore, India. Little use of the Indian supply is reported. Corundum, after mining, is crushed and sized. The coarse-grain products are sold to manufacturers of grinding wheels and the fine products to optical lens grinders. The fine dust after use by optical instrument workers is sold to retail opticians. In 1940 the United States imported nearly 6,000 tons of corundum. The South Carolina mineral is reported to be of quality closely approximating the African product.