the drug in checking cell division at one particular point in its progress had been studied and reported on by a number of men, working mostly on animal cancers. Possibilities in turning this behavior to account in artificially producing cells with increased chromosome counts (and hence new genetic properties) suggested themselves to certain French investigators and simultaneously to the Nebels and to Dr. A. F. Blakeslee of the Carnegie Institution of Washington. They did their work independently, and published results almost simultaneously in the journals.

Now all plant breeders are using colchicine. Some of them have produced plants which promise to be of considerable economic value.

The illustration on the cover of this number of THE SCIENCE NEWS LETTER is from a photograph of one of the Nebels' colchicine-produced marigold varieties. The improved tetraploid flower is contrasted with one from a plant of the original parent variety, shown at lower right.

Science News Letter, May 25, 1940

BIOLOGY

Food Made Without Sun And Without Chlorophyll

One-Celled Water Organism, Chilomonas Paramecium, Can Also Grow and Reproduce on Only Inorganic Salts

MAKING food substances (starch and fat) without chlorophyll and in the dark, rated as a biological impossibility by all accepted standards, is a regular performance of a one-celled water organism known scientifically as *Chilomonas paramecium*. Not only that, but Chilomonas can make food, grow and reproduce in a solution containing only inorganic materials, Prof. S. O. Mast of the Johns Hopkins University told fellow biologists at the meeting of the Eighth American Scientific Congress.

In Prof. Mast's experiments, single individuals of this microscopic aquatic species were isolated and kept in bacteria-free drops of water in hollowed microscope slides. Rate of growth was determined by the rapidity of reproduction by division. Starch grains and oil droplets could be seen through the transparent body substance of the tiny creatures.

Chilomonas can form food in light as well as in darkness, Prof. Mast reported, but he found that starch accumulated in its body more rapidly when it did its work in the dark. It can use organic substances if they are present, but it can get along perfectly well with only inorganic salts and carbon dioxide.

Increasing the amount of carbon dioxide in the atmosphere in contact with their tiny watery world enables the organisms to produce more food, and up to a certain point also to divide more rapidly. At the highest carbon dioxide concentrations reproduction stopped. Non-reproducing Chilomonas individuals, however, were found to be more heavily stocked with starch than the others.

Chilomonas belongs to the primitive group of organisms known as flagellates, which occupy a position near the bottom of the evolutionary ladder. Botanists and zoologists have sometimes disputed whether they are really plants or animals. They have been known to science for a long time, for they are extremely common. But until now the ability of this animal-like species to do a plant's work and make food out of inorganic substances—and without the supposedly necessary tool, chlorophyll, at that—has never been suspected.

Science News Letter, May 25, 1940

GEOGRAPHY—MILITARY SCIENCE

Alaskan Defense Can Be Learned from Finland

AMERICA can learn vivid lessons in Alaskan and Canadian defense from Arctic battling in the present European war, in the opinion of Dr. Vilhjalmar Stefansson, noted Arctic explorer, in Washington to consult with government officials on Arctic problems.

As a scientist concerned with geographic and climatic problems of the Far North, Dr. Stefansson said that a huge area of the world's surface is country where warfare—if and when it comes—must be on the Arctic and sub-Arctic plan. And as the course of military power is steadily moving northward, and has been for several thousand years, he points out, understanding Arctic conditions becomes increasingly vital.

"A vast area where wars will be winter wars exists in Alaska, Canada, northern Europe and Siberia," said Dr. Stefansson. "This coincides roughly with the area where the subsoil is continually frozen. Where the land is flat or rolling, incredible numbers of lakes form in such conditions, interspersed with thick forests.

"In summer, mechanized units cannot make progress in such country. But in winter, the rivers, such as Alaska's Yukon and Canada's Mackenzie, become broad ice boulevards into the heart of the country. And the innumerable lakes frozen over and linked by stream channels can be traversed by troops moving from one to another, guided by maps or by airplanes."

If well defended, all such countries can hold off invaders by the type of fighting the Finns did from the forests, lying in ambush for the invading army, exposed to attack on the expanses of the ice. If, however, invasion is not opposed, the lakes and rivers of Far Northern areas provide opportunity for amazingly rapid advance of mechanized troops, Dr. Stefansson points out.

Greenland, he explained, is an exception, in which this type of fighting would not work. The fringe of land surrounding the enormous central ice cap