



U. S. Naval Observatory  
UNUSUAL SUN SPOTS

These spots appeared on the sun when little expected near the minimum of the sunspot cycle. They may have disturbed radio reception.

four groups were observed at Mt. Wilson Observatory at one time. Dr. Seth B. Nicholson, of this Observatory, estimates that the minimum of sunspottedness will occur near the end of this year or early in 1934. The first spots of the next cycle may be expected any day now.

"Until science can answer most of the questions about the sun, it will be impossible to get a satisfactory theory of the nature of the stars," Dr. Menzel said. "Unfortunately known facts about the sun are completely overbalanced by our ignorance of solar matters. We know the sun's size, mass temperature and approximate chemical composition of outer layers. We recognize various surface features such as sunspots, atmosphere, prominences and corona.

"We do not understand why sunspots occur or what holds up the sun's atmosphere or what forces cause prominences to shoot out like volcanic eruptions, or what is the composition of the corona."

One of the clues to many of these phenomena and a clue that has not been interpreted is the existence in sunspots of enormous magnetic fields.

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MEDICINE-CHEMISTRY

# Lack of Vitamin B<sub>2</sub>, a Cause Of Pernicious Anemia

Latest Researches Also Show Victims May Eat Proper Foods But Then Fail to Absorb Vitamins in Digestive Tract

ONE CAUSE of pernicious anemia may be lack of vitamin B<sub>2</sub> in the diet, Dr. William B. Castle, of the Thorndike Memorial Laboratory, Boston City Hospital, and Harvard Medical School, reported to the American College of Physicians. His studies also suggest a new idea of the relation between certain vitamins and the conditions caused by their lack.

Dr. Castle received the John Phillips Memorial Prize of the College. Associated with him in the anemia research were Drs. Wilmot C. Townsend, Clark W. Heath, and Maurice B. Strauss of the Thorndike Memorial Laboratory, and Dr. C. P. Rhoads of the Rockefeller Hospital.

Liver may be a means of curing pernicious anemia, but lack of liver in the diet is not the cause of the disease. Pernicious anemia develops in those people whose stomachs cannot make their own supply of liver extract from a normal diet. When vitamin B<sub>2</sub> is fed to a normal human being, his stomach makes it into something that acts like liver extract because of a reaction with what Dr. Castle calls the intrinsic factor in the stomach juice. It is chiefly lack of this intrinsic factor which causes the usual cases of pernicious anemia and also some of those occurring in mothers before the birth of a child. After the child is born, however, the intrinsic factor reappears to a certain extent, as it did in one exceptional case of pernicious anemia following liver treatment.

### Where Found

Vitamin B<sub>2</sub> is found in meat, milk, eggs, the outer layer of rice, and yeast. It is lack of this factor in the diet which produces the type of pernicious anemia found in the tropical disease, sprue, and in celiac disease, an intestinal ailment of children. The vitamin factor in the cause of pernicious anemia Dr. Castle calls the extrinsic factor.

A third important factor in the de-

velopment of this disease is what Dr. Castle calls "defects of absorption." Even if the vitamin is eaten in abundance and the intrinsic factor is present in the stomach juices, the body may fail to absorb the product formed by the interaction of these two factors. This is seen in certain cases of pernicious anemia or sprue in which enormous doses of liver extract have little effect when given by mouth, whereas the usual dose given by hypodermic produces a typical response.

Dr. Castle's researches have thus shown that there are three ways in which the formerly fatal disease, pernicious anemia, may be caused. It is a deficiency disease in a novel sense, since the deficiency is not so much a lack of vitamins in the diet as the failure of a reaction with a vitamin in the digestive tract or elsewhere in the body.

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PHYSICS

## Cosmic Rays Warm Bodies In Interstellar Space

ENERGY supplied by cosmic rays would raise the temperature of a body in interstellar space to 3.1 degrees over the absolute zero of temperature, Prof. E. Regener of Stuttgart, Germany, states in a letter to *Nature* basing his calculations upon new measurements of the intensity of cosmic radiation.

Dr. A. S. Eddington, Cambridge physicist, had calculated that a "black" body placed in our system of stars, but sufficiently far away from any one star in particular, would acquire an equilibrium radiation corresponding to a temperature of 3.18 degrees above the absolute zero, due to the light coming to it from all the stars. Combining the two sources of energy it is found that the temperature of a body absorbing both radiations would be 3.7 degrees absolute. The radiation is proportional to the fourth power of the temperature.

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