from Franz-Josef Land to Archangel by way of Nova Zembla this month. To the left of the map, in an upright panel, appears a picture of the Russian ice-breaker *Sibiriakoff* in the Arctic Sea, with an aeroplane flying overhead, while on the right is seen the Soviet emblem of the hammer and sickle. Designed by J. J. Doobassoff, and engraved and printed at Moscow to the extent of 10,000 copies each, the two stamps in denominations 50 kopecs red (for postcards) and 1 rouble green (for letters) illustrate the results of the latest discoveries made in cooperation with the airship *Graf Zeppelin* last year.

DISCUSSION

SPILLMAN'S WORK ON PLANT BREEDING

ON July 11, 1931, it was announced that Dr. W. J. Spillman, a leading agricultural economist, had died. Little emphasis was placed on the outstanding work that he did as a plant breeder at Washington State College, Pullman, Washington, from 1894 to 1901. Here he laid the foundation for the development of some highly desirable commercial wheats, such as Hybrid 128 and Hybrid 143. He also independently discovered the two chief tenets of Mendelism; that is, the combination and segregation of plant characters in hybridization.

Dr. Spillman was educated at the University of Missouri, where he earned the B.S. and M.S. degrees and by whom he was honored with the degree of doctor of science in later years. He spent some of his early days teaching in Oregon and was finally called to the important post of crop specialist at Washington State College, in 1894. At first he was interested in forage crops and grew as many as one thousand different varieties. Later, he saw that wheat was the most important crop and offered the chief problems. His first method of attack was to get out a questionnaire to the growers. The interest of the growers was indicated by the replies, which numbered 143. These facts, together with the ones which followed, were given by Dr. Spillman himself in an interesting and enlightening talk before the writer's class in advanced crop breeding at Oregon State College on January 29, 1931, just about six months before his death. These facts, I am sure, will be of great interest to all agriculturists in the Pacific Northwest and all interested in heredity, for they show the very able beginnings of a long line of valuable wheat-breeding results obtained by the Washington Experiment Station.

The questionnaire which Dr. Spillman sent out to the wheat growers of eastern Washington revealed the fact that the chief varieties grown were Little Club, Bluestem and Red Chaff. Little Club was grown where there was the most rain; Red Chaff where there was a somewhat smaller amount of rainfall; and Bluestem where there was the least. Dr. Spillman was impressed with the fact that all these were spring wheats, but that they were chiefly grown in the fall and that two thirds of the wheat area was fall-sown wheat. All the growers were interested in varieties which were more winter hardy. They stated that good yields were obtained as long as winter killing was not a factor. Dr. Spillman began, therefore, a search for winter wheat varieties, and made contacts with all experiment stations in the United States and other countries for wheats to use in his breeding program.

One spring a field comprising 10 or 15 varieties of wheat in series was used for a summer pasture. These varieties were sown in the spring. Part of these headed and part did not. He learned the difference by this incident between the winter and spring varieties. At this time leading authorities did not know that there was a difference between winter and spring wheat. In April of the following year 90 winter varieties were sown; 30 headed. These were mostly varieties from the Southern states. Thirty winter types were saved. The other 30 varieties were mixed winter and spring wheats. Wheat with strong straw yielded well. The standard plat used was 1/60 of an acre. This size plat allowed him to take pounds per plat equaling bushels per acre. Five of such wheats were planted for increase. It so happened that rain and wind at heading time flattened out these five varieties of wheat. This probably saved distribution, as it was intended to increase these varieties for circulation.

Later, Dr. Spillman got suggestions from Dr. W. M. Hays, plant breeder at Minnesota, who suggested crossing of varieties, and Dr. C. V. Piper, then at Pullman. At this time it must be remembered that Mendelism was not yet known. The idea of crossing Turkey and Little Club occurred to Dr. Spillman. It was hoped that a combination between the winter hardiness of Turkey and the strong straw and the tight, non-shattering heads of Little Club might be obtained. Eleven crosses were made involving these and several other varieties. Red Chaff and Little Club were parents in all these eleven crosses, at least on one side. Three hundred three kernels were obtained which were thought to be hybrids. The grains were planted on 6″ intersecting lines. Seed was fall planted and 303 plants were produced. It was

thought by fall planting that the winter would kill out all but the most hardy individuals, which were the ones desired. During the winter the rain cut a gully a foot wide and a foot deep right through the patch of hybrids; however, most of the plants were saved. Heads of the parent varieties were saved for comparison. It was found that there were 169 real crosses left after the plants were grown. Each plant was pedigreed separately, a nursery was laid off in ranges, and plant families were begun in the F_2 generation.

The earliest plants found were from crosses between Red Chaff × Valley. The segregations of other varietal crosses were noted particularly where Turkey was one of the parents, because of the beards. About this time Dr. Spillman was sunburned from being in the field so much studying hybrid plants and had to go to the hospital. During this period, E. E. Elliot took charge. Twenty-two types of plants were obtained in the F_2 of his cross of Red Chaff × Valley.

A talk was given to a teachers' association at Pullman, and they were told by Dr. Spillman that the 22 types of wheat were all the kinds of wheat in the world, as he thought this to be true at that time. Segregation was noted and also the recombination of characters which had originally been present in the parent varieties.

In 1901 a paper was prepared and read in Washington, D. C., describing the F_2 generation of the crosses. Segregates from different crosses were mounted on cloth, and the F_{1s} and F_{2s} of all eleven crosses were shown. At the lecture Dr. W. M. Hays was on a front row seat and was much surprised at the results shown. Dr. Spillman emphasized recombination and segregation of characters in plants rather than a general blending. It is interesting to note that the papers of DeVries, Tschermak and Correns were published in January, February and March of 1901, in the months preceding Dr. Spillman's work. His discovery was made in August, without knowledge of the earlier work.

About this time and after presenting his paper in Washington, D. C., Dr. Spillman was offered a position there and left Pullman. Continuation of the work of selecting desirable strains from the crosses was left to Mr. Elliot and those who succeeded Dr. Spillman. Spring wheats were discarded, since the winter wheats were the types desired. After four years, Hybrid 128 and Hybrid 143 were isolated. Hybrid 128 has long been a standard variety in the Pacific Northwest, where the rainfall is over 13½ inches.

Thus, although not responsible for the selection of the segregates which later proved to be valuable varieties, Dr. Spillman was the one who planned and began this work and in doing so made an important contribution as a plant breeder.

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AN OBSERVATION ON THE LONGEVITY OF SERRATIA MARCESCENS (B. PRODIGIOSUS)

ON April 24, 1932, the writer had the opportunity to examine certain old stock cultures which had belonged to the late Professor H. H. Waite. The oldest of these cultures had been made in 1903, and other cultures ranged from that date up to 1911. All these cultures had been sealed by means of sealing wax.

The media upon which the cultures had grown consisted for the most part of nutrient agar and nutrient broth. The cultures had been stored in the dark at room temperature. Cultures which showed evidence of drying due to breaks in their seals were not examined.

A broth culture which had been inoculated on November 1, 1909, with *B. prodigiosus* (now known as *Serratia marcescens*) was chosen for examination. The wax seal was removed with the aid of heat and the cotton plug taken out. Using a sterile platinum wire loop, one drop of the culture was distributed to each of the following media: standard nutrient broth, standard nutrient agar (liquefied and held at 45 degrees Centigrade and later poured into a sterile petri dish), and "K" medium. All cultures were incubated at room temperature.

At the end of a 24-hour incubation period all the cultures showed visible signs of growth. The petri dish culture showed three colonies about 3 mm in diameter with a slight pinkish tinge at their edge. After longer incubation the colonies took on the deep red metallic sheen of fuchsin and when touched with the platinum wire exhibited the characteristic ropy test. All the other cultures proved to contain *Serratia marcescens* in pure culture.

The observation seems then to have shown that an organism of a non-sporogenous type can remain viable in a fluid medium, in the presence of its own metabolic waste products, and at a reduced oxygen tension, for at least a period of twenty-two and a half years.

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POINTERS FOR STARS

IT is difficult to point out to another person a particular star or constellation when the night heavens are being viewed without instrumental aid. If a fairly powerful long focus flash-light, such as can be pur-