quite unconscious of the fact that the camera was winking at the mountain slope when I thought it was photographing the lake.

In the vertical view features are flattened. This is true for vision and is even more pronouncedly true in photographs. It would be desirable therefore to observe during the earlier and later hours of the day when shadows are strong. The swiftness of flight makes this practicable, since miles become short when expressed in minutes and a distant field of study can be reached quickly. Photography, however, requires the strongest light possible because the exposure must be very brief when the camera is moving a hundred miles an hour, and this requirement limits the available hours to those when shadows are weak or lacking. The effect of this limitation is yet to be worked out, but since rift features are to a great extent relief features, it is of consequence.

So far as the trial flights of June 9 and 11 go they seem to demonstrate that aerial observation of a linear structural feature such as an earthquake rift is practicable. If one end of a rift be known it can be followed by a man skilled in the interpretation of topographic forms. Or if a line of features be detected, it may be so traced as to demonstrate their continuity and to facilitate the closer examination which may be necessary to prove the existence of a fault. I conclude that the airplane can be used to advantage as a means of rapid geologic reconaissance to map large structural features.

Bailey Willis

SCIENTIFIC EVENTS

INTERNATIONAL EXPLORATION OF THE UPPER AIR[1]

International exploration of the upper air dates from 1896, when a conference took place at Petrograd. Methods of sounding the atmosphere, even to a height of 23 miles, were devised. By the use of drifting free balloons, and recording instruments carried up by kites and anchored balloons, an unexpected stratification of the atmosphere has been discovered. The temperature falls regularly up to a height averaging six or seven miles from the ground, lower over the equator, higher near the poles. But the upper air is arranged in vertical columns in which the temperature is constant with height at any particular time and place. Little is known as to the cause of this disposition, and less as to the influence it must have on other factors of wind and weather. Useful knowledge can be gained only from data obtained by the same methods at the same times at the largest possible number of stations. International cooperation is necessary. It was interrupted by the war, although all the combatants made extensive use of the latest meteorological methods for the practical objects of artillery, aviation, poison gas, and sound-ranging. It has now been resumed. The other day we gave an account of the proceedings of the first meeting since the war, held at Bergen, in the last week of July, under the presidency of Professor V. Bjerknes. The name of that distinguished Norwegian meteorologist is associated with a new theory of the weather in temperate latitudes, on which we commented a year ago. The theory briefly is that just as the poles are capped with snow so they are capped by a great mass of cold air. In a wavering line round each temperate zone this polar air meets the warm air from the equator abruptly. Along the front of contact the warm air rises over the cold stream. Cyclones and anticyclones are born of the contest. The professor urges the formation of a closely set chain of observing stations round the globe in the zone of struggle. Other meteorologists are more disposed to assign the causes of our weather to the vaster regions of the upper air. An international meteorological committee, to meet in London in September, has been appointed by the Commission, and is to give special attention to the polar theory. The progress of its labors will be followed with deep interest. There are few human activities which would not gain by the advance of meteorological science, and the future of aviation will be largely determined by it.

[1] From the London *Times*.

THE WORLD'S SUPPLY OF WHEAT

According to a report issued to the Department of Agriculture prospects for the world's

wheat supply, while not so satisfactory as was expected during the first part of the current season, show at the present time no cause for serious alarm. Estimates of the quantity of wheat harvested in 20 countries, including the United States, for 1921, total 2,461,430,000 bushels, compared with 2,384,143,000 bushels harvested last year according to data compiled by the Bureau of Markets and Crop Estimates, United States Department of Agriculture.

The 20 countries included in this estimate are the United States, Canada, Argentina, Chile, Uruguay, Belgium, Bulgaria, Finland, France, Greece, Hungary, Italy, Spain, British India, Japan, Algeria, Tunis, Union of South Africa, Australia, and New Zealand. These countries produced approximately 68 per cent. of the known wheat crop of the world during the years 1903–1913, according to the annual average production records of the bureau.

Although the long-sustained drought throughout the greater part of the Northern Hemisphere was a serious menace to the various crops in many countries, the fall-sown wheat has not been affected adversely so much as was at first supposed. On the contrary, the fall-sown wheat managed to obtain a firm hold on the soil and a fairly vigorous growth before the beginning of the drought.

Nearly all of northern and central Europe will have larger wheat crops this year than last, according to the last estimates made by the bureau, Belgium and Greece being the only countries in which smaller crops are expected.

Outside of Europe, British India was most seriously affected by the drought. The dryness and the hot winds that have prevailed throughout most of the growing season have resulted in the very low yield 250,469,000 bushels of wheat, or about 50,000,000 bushels less than the quantity normally consumed in that country. With the rice crop also seriously affected, India is expected to import wheat this year instead of exporting it. In an average year before the World War, India exported over 50,000,000 bushels of wheat.

In Canada the total yield of spring wheat is estimated at 273,020,000 bushels, of which 264,137,000 bushels were grown in Saskatchewan, Manitoba, and Alberta. Fall wheat, grown almost exclusively in Ontario and Alberta, was estimated at 15,473,000 bushels. The total wheat yield of Canada for 1921 is therefore 288,493,000 bushels, compared with 263,189,000 bushels last year.

A very unsatisfactory feature in the present international situation is the hopeless condition of the Russian crops. Unofficial reports state that during last autumn and the spring of this year only a very small area was sown to the various crops, resulting in a failure to produce sufficient food for the country's needs. It is also reported unofficially that a considerable amount of wheat will yet be imported by Russia this year. But up to the present time the amount of wheat, as well as other foodstuffs, which will be imported is conjectural, and the Bureau of Markets and Crop Estimates is unable to make a definite statement concerning it.

In northern Africa, the wheat crop was generally larger than last year. In Algeria, thrashing results show a better yield than was expected earlier in the season. In Tunis, bad weather reduced the yields somewhat from those expected earlier, while in Morocco the crop was generally reported as satisfactory. According to estimates published by the International Institute of Agriculture at Rome, these three countries are expected to produce, for 1921, a yield of 66,138,000 bushels of wheat, compared with 36,743,000 bushels in 1920.

AN ENGLISH VIEW OF AMERICAN BIOLOGY

AT a recent meeting of the National Union of Scientific Workers in the Royal School of Mines, London, Sir Daniel Hall took the chair, and a lecture was given by Mr. W. B. Brierley head of the department of mycology at Rothamsted on "Personal Impressions of American Biological Research."

According to *Science Progress* Mr. Brierley opened by explaining that his visit to America was made primarily to attend the Phyto-