The annual range varies from 120° to 160° F. The maximum temperature reported is 96° F., the minimum −76° F. A range of 90° or more is experienced in the months of January and February. The winters are long and intensely cold, with the result that the ground has become frozen, in places, to depths of more than 300 ft. The effect of the brief summer warmth is merely to thaw a few feet at the surface.

The mean annual rainfall is estimated on the incomplete data available at about 12 in., but there is considerable local variation, and the records are as yet too inadequate, both in extent and duration, to permit of any definite conclusions being drawn from them. Vegetation generally takes the form of a covering of moss, beneath which is the *tundra*, a thick turf, consisting of a wet, spongy mass of roots and accumulated vegetable matter. Spruce trees are plentiful, and birch and cottonwood grow in certain areas. The conditions are scarcely such as to lead one to expect to find much horticultural development, yet it is stated in the report that in nearly every small town and in many outlying districts gardening has proved successful. Many varieties of vegetables are profitably grown for local use.

Transportation is difficult, slow, and expensive. There are three main routes, two available during the summer months only, the third mainly used for passengers and mails during the winter at considerable cost. Many outlying places are accessible with the greatest difficulty.

From the data collected, it is evident that the water resources are not adapted for hydraulic development to any extent. Mining is, of course, the principal consideration at present, and for this the winter supply is quite inadequate, while in summer the flow fluctuates considerably. Hitherto wood fuel has been exclusively used for the production of steam for power purposes, but each year the cost increases with the greater distance of transport. The problem of obtaining power is therefore annually becoming more serious with the diminution in the supply of fuel. It is one, moreover, which will have to be faced and solved before any extensive industrial development of the region becomes practicable. B. C.

UPPER AIR INVESTIGATION.

THE Meteorological Service of Canada has published an interesting account of its upper-air investigation. Part i., which is now published, deals with the records of registering balloons; the work has been done, and the report prepared by Mr. Patterson, under the direction of Mr. Stupart, the director. Ninety-four balloons were sent up, and fifty-three recovered, a fair proportion perhaps, considering the nature of the country. The instruments and methods are practically the same as in England, but the balloons have all been started at 8 p.m. local time, so as to avoid solar radiation. The mean annual temperature at each height up to 11 km. is very similar to that in England, the temperature fall per kilometre is almost identical, but the actual temperature is a degree or two higher. In view of the lower latitude this is not surprising. But in Canada the fall of temperature continues to a greater height than in Europe, the mean value of H_c being given as 11·7 km., against about 10·7 for Europe, and in consequence the temperature of the stratosphere is from 6° to 7° C. colder. Except in the case of the surface pressure, the variations of all the elements are larger in Canada; the amplitude of the seasonal variation of H_c is about 2·0, and the standard deviation is 1·96. The correlation between H_c and the pressure at 9 km. is very high, but the correlation between the surface pressure and the other quantities is very small, perhaps on account of the small variation shown by the former. The most remarkable result given is that the temperature of the stratosphere over Canada is colder in summer than in winter. The number of observations is scarcely enough to establish this with absolute certainty, but they suffice to make it almost certain, and, after all, it is no more surprising than that the lowest temperatures of the stratosphere should have been found over the equator. The general drift of the balloons, in Canada as in Europe, is towards the east, but there are a few instances of a balloon falling westward of its starting point.

GENETIC STUDIES FROM AMERICA.

A FURTHER instalment of Dr. Raymond Pearl and M. R. Curtis's "Studies on the Physiology of Reproduction in the Domestic Fowl" appears in the *Journal of Experimental Zoology*, vol. xix., No. 1. In this paper they deal with the distinction between "genetic" and "somatic" sterility. Some hens from high-laying strains, with the genetic characters for rich egg-production, were found to be sterile; the cause, when made evident by dissection, proved to be an oviduct with a mouth too narrow to afford entrance to the yolks, which, shed into the body-cavity, became absorbed through the peritoneum.

Some suggestive remarks on "Heredity and Mutation as Cell Phenomena" will be found in a paper by Dr. R. Ruggles Gates (*Amer. Journ. Bot.*, 1915, pp. 519–28), in which attention is directed to the fact that whereas the normal number of chromosomes is fourteen in Œnothera, *Œ. lata* has fifteen, one of the original chromosomes having been doubled through an irregular meiotic division; *Œ. latescens* has sixteen; and *Œ. gigas* and its derivatives have twenty-eight, the chromosome series in this case being doubled and "the plant being a cell-giant and not merely gigantic in its external dimensions."

In view of the importance now assigned by many biologists to the "mutation theory," interest will be aroused by Dr. Gates's appreciation (*Amer. Nat.*, vol. xlix., pp. 645–8) of the neglected work of Thomas Meehan (1826–91), a British gardener who settled in Philadelphia. Meehan asserted, from his observations on wild and garden plants, that "strikingly distinct forms come suddenly into existence . . . and act in every respect as acknowledged species," and that "morphological changes in individual plants are by no means by gradual modification."

CHEMICAL SCIENCE AND CIVILISATION.[1]

WE who enjoy all the privileges of modern civilisation are apt to forget how much we owe to the efforts of mankind to investigate, understand, and utilise the things around them. Let me very briefly trace this element of civilisation in its relation to the chemical arts and chemical science. It is certain that the early development of human beings was dependent upon their ability to gain the mastery over other animals of greatly superior strength, speed, and power of attack. This was rendered possible by the discovery of means of making efficient weapons and tools; the former for purposes of attack and defence and for the obtaining of food, the latter for building secure habitations, tilling the ground, and

[1] From an address on "The *Rôle* of Chemical Science in Civilisation," delivered in the Lecture Theatre of the new Chemical Laboratories at University College, London, on May 16, by Prof. F. G. Donnan, F.R.S.