far reduced that the air finally became as free from dust as any that Mr. Aitken ever tested on the mountain tops of Switzerland. This increase in purity is ascribed to the 'dragging down' of the upper air to the level of the top of the Eiffel Tower, for the reason that 'rain can not wash the air to anything like that purity.'

KITE-FLYING AT BARBADOS.

The Quarterly Journal of the Royal Meteorological Society, XXXII., 1906, 29–32, contains an account of some kite flights carried out last year at Barbados by C. J. P. Cave, the results having been discussed by W. H. Dines. The humidity traces generally show about 60 per cent. at the surface, rising to 80–90 per cent. at 1,000–2,000 feet, and then falling again in some cases to 50 per cent. or less as the height increases. It is inferred from this that there is some descent of the atmosphere over the region of the smaller West Indian islands in April and May.

RAIN-MAKING IN THE YUKON.

The Toronto News of March 23 contains notice of a contract made by the Yukon Council with one Hatfield, a 'rain-maker,' whereby Hatfield is to receive the sum of $10,000, provided he makes rain to the satisfaction of a board of seven men. If he fails, he is to receive his traveling expenses. Commenting on this matter, the *Ottawa Evening Journal* of March 23 says editorially: "There is no questioning the details * * * as the unique document is on file in the government offices in Dawson."

NOTES.

PHOTOGRAPHS of the aurora borealis, taken by the Russo-Swedish expedition to Spitzbergen in 1899–1900, are reproduced in the *Memoirs of the St. Petersburg Academy of Sciences* (phys. math. class), Vols. XI., XIV., Nos. 9 and 5, 8th series.

THE aquameter, a new instrument for measuring the amount of aqueous vapor in the atmosphere by measuring the reduction of volume produced by the absorption of the water vapor by phosphoric anhydride, is described in the *Quarterly Journal of the Royal Meteorological Society,* XXXII., 1906, 11–13.

R. DEC. WARD.

BOTANICAL NOTES.

AN ALPINE BOTANICAL LABORATORY.

FOR some years an alpine botanical laboratory has been growing from small beginnings into considerable importance on the easterly slope of Pikes Peak, Colorado. The first serious work was done in 1899, although preliminary work and reconnaissances date back half a dozen years further. As finally established, it stands on the southeasterly slope of Engelmann's Canyon, a mile and a half from Manitou, at an altitude of 8,500 feet above the sea. As the altitude of the treeless plains (seven to eight miles away to the eastward) which extend to the foot of the mountains is nearly 6,000 feet, the laboratory is fully 2,500 feet above them, while westward about the same distance the Peak itself rises more than 5,000 feet higher (14,147 feet), far above timber line. The lower mountains and the near-by foothills of the neighborhood afford intermediate altitudes, while marsh and lake vegetation is found in abundance in and about Lake Moraine and the Seven Lakes. The sides of Engelmann's Canyon and its branches are covered with spruce forests and their accompanying vegetation. A hundred feet below the laboratory is the dashing mountain stream, Ruxton Brook, and by its side is the cog-railway from Manitou to the summit of the Peak.

In such surroundings for seven years, Dr. Frederic E. Clements, of the University of Nebraska, has carried on his study of the vegetation of the region. The laboratory proper consists of a single house, large enough to shelter the instruments, apparatus, etc., and if need be, several persons also. More room is needed, but the narrow quarters have not yet seriously inconvenienced those who have worked at the laboratory. Some have taken rooms in the summer cottages in the neighborhood; some have clubbed together and hired a cottage for the summer, taking their meals at the Halfway House, or making

a picnic of it, boarding themselves, while still others have brought their tents and 'camped out.' It is already arranged that eight to ten advanced students in botany are to spend the coming summer at the laboratory, giving their time chiefly to the study of ecological problems.

During these seven seasons Dr. Clements has carried on his own investigations upon those ecological problems which present themselves in mountain regions, and with these he has joined a critical study of the elements of the Colorado forest vegetation. Formal instruction was given during two summers, but for the last few years instruction has been quite informal, and for the most part to graduate college students. Three candidates for the doctor's degree in the University of Nebraska have done the greater part of their field work at this laboratory.

The published results of the laboratory include the following titles by Dr. F. E. Clements: 'Herbaria Formationum Coloradensium,' 1902; 'Nova Ascomycetum Genera Speciesque,' 1902; 'Development and Structure of Vegetation,' 1904; 'Formation and Succession Herbaria,' 1905; 'Research Methods in Ecology,' 1905; 'Cryptogamae Formationum Coloradensium,' 1906; 'Novae Fungorum Species Generaque,' 1906 (in press). And the following by others: 'The Relation of Leaf Structure to Physical Factors,' Dr. E. S. Clements, 1905; 'The Movements of Petals,' Dr. E. P. Hensel, 1905; 'A Study of the Vegetation of the Mesa Region East of Pikes Peak,' Dr. H. L. Shantz, 1906.

The principal problems which are now under investigation are the following:

1. *The Causes for the Dwarfing of Alpine Plants.*—It has already been determined by means of simultaneous readings of light and humidity at three different altitudes that light is not the cause of alpine dwarfing, as commonly supposed, and that this is probably due to differences in humidity. It is hoped to publish the results in detail after the work of the coming summer.

2. *The Origin of Mutants in the Fireweed, Chamaenerium angustifolium.*—This is a problem in experimental evolution to determine whether the many forms of this species arise by variation or mutation.

3. *Studies in Experimental Evolution.*—The method used here is essentially new. Plastic and stable species are moved from their original homes to areas of very different character. The physical conditions of both homes are carefully measured, and the resulting modifications of the plant followed in detail. This work should throw light upon how new forms originate, and also upon the relative importance of adaptation, mutation and variation in the origin of new forms.

4. *The Vegetation of Colorado.*—The study of the development and structure of Colorado vegetation was begun in 1896, and has been carried on continuously since 1899. It is hoped to bring the study to completion after the summer of 1907, and then to publish the results as soon as possible.

The record of the work of this unendowed laboratory, which has not even been subsidized by any institution, is certainly most creditable, and it shows that work of the highest order may be done with an inexpensive plant, and the expenditure of very moderate sums of money. That more might be accomplished with some greater expenditure for apparatus, and an enlargement of the building, is no doubt true, and desirable, and will certainly be realized some day. In the meantime, the economical plan and successful management of this laboratory are to be commended, and should encourage other botanists to like undertakings in similarly interesting regions.

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ROYAL SOCIETY CONVERSAZIONE.[1]

The first of the two annual *conversaziones* of the Royal Society, that confined to men, was held on May 9 in the society's rooms in Burlington House. Guests were received by the president, Lord Rayleigh, O.M., with whom were the treasurer, Mr. A. B. Kempe, and the secretary, Professor J. Larmor.

The exhibits were very numerous, too numerous, indeed, to notice in detail. To a

[1] The London *Times*.