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*.

large extent they were rigidly special, confined to certain restricted departments of science, mainly physical. There were a certain number of chemical exhibits, and a few—some of them specially interesting—in the domain of biology. There was much that was fascinating and in some cases almost oppressively suggestive. As might have been expected, Professor Milne was prepared to exhibit some of his remarkably instructive seismograms of the recent earthquakes which have been so numerous and wide-spread. The diagrams which he showed related to the Formosa earthquake of March 16, the Californian earthquake of April 18, and the Columbian earthquake of January 31 of this year. Other similar records were exhibited by the Royal Observatory, Edinburgh, from various parts of the world. Another interesting series of records was that from the Meteorological Office, consisting of charts and diagrams showing some of the physical, meteorological and other results of the National Antarctic Expedition. Many of the exhibits which may be classed as physical were of an optical, spectroscopic and photographic character. Dr. W. Marshall Watts's exhibit of a binocular spectroscope, which might otherwise be described as a spectroscopic opera-glass, by means of which both eyes may be used in spectroscopic work, constituted a new departure. Of special interest in connection with the recent mining disasters in France were the oxygen rescue apparatus and other appliances shown by Messrs. Wallach Brothers, used by the rescue parties at Courrières. It is known as the 'Evertrusty' oxygen apparatus, and an adaptation of it may be used in case of carbonic-oxide poisoning and after inhalation of poisonous fumes, etc. Mr. C. V. Boys's gas calorimeter, a somewhat complicated but ingenious arrangement, must have interested many, as it is the instrument by which London gas is officially tested. From the Solar Physics Observatory at South Kensington came various eclipse photographs, stellar spectra, barometric curves and photographs and diagrams illustrating the work done on the orientation of some British stone circles, also some barometric curves in different parts of the world, which seem to suggest a key to the apparent difference of periods. Some very interesting photographs of the solar corona, taken in Spain on the occasion of the eclipse of August 30, 1905, were shown by the Rev. A. L. Cortie. Another interesting astronomical exhibit, sent by the Royal Astronomical Society, consisted of six remarkably brilliant photographs of the Milky Way, taken in 1905 by Professor Barnard at Mount Wilson, California. The specimens of color photographs and photomicrographs, shown by Mr. Edwin Edser and Mr. Edgar Senior, were wonderfully beautiful specimens of this process.

Another notable exhibit was Mr. W. Duddell's mechanical and electrical phenomena occurring in the telephonic transmission of speech, which was an attempt to show the various phenomena which take place between the transmission and reception of a telephonic message; the difference in the vibrations caused by the sounds of the different vowels was most striking. Worthy of inspection was Professor George Forbes's model of naval gun sight, giving correct elevation for any variations of muzzle velocity, air density and time of flight, as arranged for the six-inch B. L. gun, Mark XI., under construction at Elswick, for trial in H. M. S. *Africa*. Mr. W. Rosenhain's improved metallurgical microscope, of somewhat complicated construction, is likely to be of practical value, as also Sir James Dewar's metallic jacketed vacuum vessels, filled with liquid air, the vacuum being produced by the use of cooled charcoal. The series of picrates of Dr. Silberrad and Mr. Phillips was of interest as the salts of picric acid have been the probable cause of some of the most disastrous lyddite explosions on record. Many of the specimens exhibited were in many cases prepared in the course of exhaustive investigations recently carried out at the research laboratories of the Royal Arsenal. Mr. E. G. Rivers's new electric heater deserves attention as an entire departure from the principle of construction usually adopted, the object being to secure a large heating surface at a moderate temperature. Sir Oliver Lodge and Dr. Alexander Muirhead

exhibited a portable pack-transport 'wireless' telegraphy apparatus for military field purposes, available for communications across country up to 50 miles, or 150 miles over sea. Perhaps one of the most important exhibits, from both a scientific and a practical point of view, was Dr. P. E. Shaw's electrical measuring instrument. This machine gets rid of several objections to those ordinarily in use. From the director of the Imperial Institute came a large and varied exhibit which may be taken as a substantial evidence of the useful practical as well as scientific work which is being done under Professor Wyndham Dunstan's direction. The exhibit included a variety of new and rare minerals from Ceylon and several minerals from Canada, as also specimens of cyanogenetic plants, illustrating an investigation which has been conducted by Professor Dunstan and Dr. T. A. Henry, to throw light on the origin of the prussic acid which is produced by certain plants.

As usual, from the Marine Biological Association came quite an interesting exhibit, consisting of a small collection of living fishes from the shore and from shallow water, to illustrate the differences in habit and mode of life adopted by different species. Mr. J. Stanley Gardiner showed some of the many valuable results obtained by his recent very successful expedition for the investigation of the Indian Ocean. These consisted of photographs illustrative of the vegetation of the Seychelles Islands, and some rocks dredged off Providence Coral Reef, 844 fathoms. From the director of Kew Gardens came an attractive exhibit in the shape of some specimens showing the precocious flowering of plants, and some exalbuminous grass seeds. The exhibit by Mr. J. E. S. Moore and Mr. C. E. Walker, showing recent researches in cell-division, was evidence of the good work which continues to be done at Liverpool University. Two of the most notable, attractive and suggestive exhibits were Mr. K. A. Tarrant's photographs of electric discharges and Dr. Albert A. Gray's spectroscopic photographs of the membranous labyrinth of the ear in different animals. There were many other exhibits of solid scientific interest, but we have only space to refer to the varied specimens of work from the National Physical Laboratory, including a great variety of photomicrographs, an apparatus for the test of the strength of materials at very high temperatures, the Picou permeameter designed for testing the magnetic permeability of rods or strips and a bifilar galvanometer, free from zero creep. Sir William Crookes exhibited ultra-violet spectra of the metals photographed with a quartz train of five double prisms and some remarkable stereoscopic photographs taken in South Africa. The demonstrations in the meeting-room by means of the electric lantern proved, as usual, to be the great attraction of the evening. Mr. G. W. Lamplugh showed some very striking photographic slides of the Batoka Gorge of the Zambesi River, while the slides and miniature demonstrations by Professor Silvanus Thompson of the electric production of nitrates from the atmosphere were remarkably brilliant and striking. They were intended to illustrate a process for obtaining from the air products of great value for agriculture and in the dyestuff industry.

THE MIKKELSEN EXPEDITION TO THE BEAUFORT SEA.[1]

We have received from Mr. Mikkelsen a detailed statement of his plans for the expedition to the Beaufort sea, to which frequent reference has already been made in the *Journal,* and on which he proposes to sail from Victoria about the middle of May. The vessel which he has acquired for that purpose has been renamed the *Duchess of Bedford,* in honor of a prominent supporter of the expedition. She is a sailing craft of 66 tons, with a length of 67½ feet, 18 feet 9 inches beam, and 7½ feet depth of hold, and is built of camphor wood, the outside planking being of heart quakewood, which again is sheathed with gumwood above and below the water-line, and with iron plating at the bows. The ship was built as a sealer, and is specially strengthened by bulkheads, etc., to withstand ice-pressure. As already mentioned, Messrs. Leffingwell, Stefansson, and Ditlevsen will proceed down the

[1] From the *Geographical Journal.*