tion of science in the state, in industry and in education.

RECOMMENDATIONS

1. That an annual list of public lecturers on science subjects be prepared and published, with titles of their lectures. No fees should be mentioned in the list, but addresses should be given so that committees organizing lectures may make their own arrangements with lecturers. Local scientific societies, museums and institutions of higher education should be invited to send the names of members of their bodies prepared to deliver lectures to similar bodies elsewhere without fee other than traveling expenses, and the names of such voluntary lecturers should be indicated in the list by a distinguishing mark.

2. That committees organizing public science lectures should include representatives of as many interests as possible, such as municipal corporations, trades councils, cooperative societies, religious bodies, university extension committees, chambers of commerce, educational institutions, local scientific societies and like organizations concerned with the daily work and intellectual life of the district.

3. That to extend interest in science, and belief in its influence, beyond the narrow circle of serious students, increased use of the bioscope in illustrating natural objects, scenes and phenomena is desirable; and an appeal should be made to the interests of all classes of the community by addresses intended to show the relation of science and scientific method to national life and modern development.

4. That to carry on the propaganda of efficiency through science, local committees should endeavor to secure financial support from manufacturers and others affected by national progress, and that local educational authorities be asked to provide funds to enable free popular lectures of a descriptive kind, for children as well as for adults, to be well-advertised and for reasonable fees to be paid for lecturers and their illustrations.

5. That more encouragement should be given at university institutions and training colleges to the art of exposition and public speaking, for the benefit of those students and teachers whose aptitudes may later be usefully exercised in promoting interest in science.

6. That while the training of an adequate number of scientific workers is of prime importance, it is desirable that everyone should be made acquainted with the broad outlines of natural science while at school, and that public appreciation of scientific knowledge as an essential factor of modern progress should afterwards be created and fostered by means of popular lectures.

7. That this report be brought under the notice of each section of the association with the object of obtaining suggestions upon which organized action may be taken in connection with the Gilchrist Trust or independently.

8. That the committee be reappointed as a committee of Section L, its constitution remaining, as at present, representative of all the sections of the association, but with power to add to its numbers.

THE FOURTEENTH NEW ENGLAND INTERCOLLEGIATE GEOLOGICAL EXCURSION

THE annual meeting of the geologists of the New England colleges and universities was held on Friday and Saturday, October 27–28, under the direction of Professors W. O. Crosby and C. H. Warren, of the Massachusetts Institute of Technology.

The purpose of the excursion was to study the batholithic cycle of the Blue Hills at Quincy, Massachusetts. Here the intricate

relations are well displayed, are not obscured by later dynamo-metamorphism, and have been determined with notable thoroughness and skill in independent and supplemental work by Crosby, Loughlin and Warren; Professor Crosby's results having been published in 1895, Loughlin's in 1911, and Warren's in 1913.

Preliminary explanations of the geology were given with the aid of lantern slides by Professors Crosby and Warren Friday evening, October 27, in the lecture room of the Boston Society of Natural History. The excursion, participated in by 39 persons, representing 12 institutions, left Boston at 8:49 A.M., October 28, and returned at 5:30 P.M. Superb weather, the beauty of the Blue Hills in autumnal foliage, the geological interest of the rock exposures, and the instructive interpretation of them by the leaders, combined to make memorable this excursion.

A synopsis of the geological relations of the Blue Hills complex as they were shown in the course of the day is as follows:

The invaded sediments are dark, uniform, siliceous argillites of Cambrian age. They were closely folded and were metamorphosed by the contact action of the underlying magma into hornstones. The structural relations show that they are remnants of a cover which before erosion extended over a considerable portion of the Quincy granite batholith. Some parts, now marginal, are preserved because they have been down-folded and down-faulted below the present level of erosion. Some isolated remnants indicate by their parallel orientation within the abyssal rocks that they were roof pendants, other outcrops show by their lack of orientation that they were marginal inclusions of greater or less size. These hornstones preserve within them diabase dikes, showing thus the nature of the advance intrusions from the magma which gave rise to the Quincy intrusions. The initial age of these dikes was clearly shown by their restriction to the sedimentary cover and one was pointed out which, furthermore, was cut by a thin dike of fine-grained granite. Next in the series to the diabase dikes is the conspicuous rhomben porphyry, the matrix of which is as dark as the diabase, but whose composition is in reality intermediate between that of the diabase and that of the granite. The series thus indicates a progressive differentiation, but discontinuous intrusion. The rhomben porphyry is associated with the margins of the sedimentary cover and is found also abundantly as angular blocks, cognate xenoliths, within the next marginal phase. During the process of crystallization of the rhomben porphyry there was repeated shattering and invasion by slightly different phases of the same magma. Finally the zone was shattered and invaded by a distinctly differentiated magma, the third of the series. This crystallized as a granite porphyry. It occurs in places in considerable mass, but elsewhere may exist as discontinuous fine-grained rims one or two inches thick about the xenolithic blocks of older phases. In places where a cracking but not disruption of the rhomben porphyry occurred there was some thin infiltration of the following magma accompanied by a metasomatic impregnation of the walls to a depth of a quarter to half inch, bringing about by recrystallization an approach to the nature of the later rock. One of the most interesting relations of the granite porphyry was seen in its chilled contacts with an aporhyolite. The latter appears to have formed a thin chilled cover to the batholith, made from the same magma, yet cut by the porphyritic phase. It indicates that the roof of older rocks had here been destroyed after the stage of the rhomben porphyry and that the batholith was in effect partly deroofed in this acidic stage. Following the granite porphyry came, after another interval permitting some slight further differentiation, the great upwelling of the Quincy granite. This, the main rock of the batholith, was followed later by the feeble injection of a few diabase dikes, closing the cycle. In the opinion of Professor Warren the structure of the roof of the batholith indicates invasion chiefly by stoping.

This small batholith is regarded as a local and structurally high intrusion belonging to the far wider and more complex batholith, which underlies much of New England, which

outcrops in many areas where erosion has worn through the ancient cover, and whose intrusive history covers a long period of time in the upper Paleozoic.

The age relations of the Quincy succession are limited by the facts that the igneous rock cuts the Cambrian sediments and is covered by Carboniferous conglomerates which rest upon the eroded surface of the porphyry. The age is regarded by the leaders as probably Devonian or Mississippian.

In the unavoidable absence of the permanent secretary, Professor Cleland, this record of the excursion is made at his request by the secretary *pro tem.*

JOSEPH BARRELL

YALE UNIVERSITY

CLEVELAND ABBE

IT fell to the lot of this modest man, a distinguished representative of American science, to initiate the national systems of weather forecasting which are to-day maintained by nearly every civilized nation of importance. With the science of meteorology Abbe's name will be associated through the coming ages.

With the death of Cleveland Abbe, chief meteorologist of the United States Weather Bureau, terminated the original phase of national meteorological work in America, for he was the sole surviving active official of the bureau in which he had served forty-six years.

As one of his associates, I accepted the invitation of SCIENCE to pay a tribute to his memory, which adheres to personal relations, and not to the evolution of that great idea which took possession of his soul in the small astronomical observatory in Cincinnati, an idea which was to blossom forth in practical form throughout the world.

When in 1870, at the invitation of Chief Signal Officer A. J. Myer, Abbe entered the signal office of the army to undertake the work of predicting the weather of the United States, he found his position and his duties most onerous and embarrassing. The environment was military, and the young officers had been drafted into scientific work that was tentative and unknown. Besides initiating a novel service Abbe was to cooperate with civilian scientists and to train in the new work officers fresh from the western frontier, from the military academy and from remote artillery seacoast stations. He entered on these manifold duties with the same equanimity and devotion as had marked his astronomical work in Russia and at home. The original scientific force engaged in weather and flood forecasts were nine in number. Besides the civilians, Abbe, T. B. Maury and William Ferrel, there were Chief Signal Officer A. J. Myer, Lieutenants R. Craig, H. H. C. Dunwoody, A. W. Greely, C. E. Kilbourne and J. P. Story. All are dead except Craig, Dunwoody and Greely, who are on the retired list of the army.

Through all the changes, from military to civic control, from one weather bureau chief to another, Abbe continued steadily at his scientific work under six separate administrative chiefs, active along lines of study and research to the last. It is interesting to note that the scientific bodies of the country have not contributed more than half a dozen officials of prominence to the bureau—though it has been under civil control 26 years—to the present force which has grown up under lines initiated by the practicality of Myer and the theories of Abbe.

During twenty years of his service I was intimately associated with Abbe as his subordinate and pupil, as a coworker, and as his administrative chief. During this term of years there inevitably developed situations which were complex, annoying and embarrassing to the scientific force. Yet in all such conditions I never knew him to display bad temper, to unduly prolong discussions, to advance personal interests, nor to abate his most strenuous efforts to carry out such policies as were judged needful for the good of the service—even though they had not originally met with his approval.

As a student in various subjects, such as light, heat, meteorology, etc., as a lieutenant I taxed for months his amiability and temper, for his very serious and methodical methods often excited my amusement and led to jocose