

most common errors among mankind are those that are based upon fallacies in reasoning rather than errors in observation. Thus, in the present case, we have innumerable reports to the effect that "a black cloud was seen approaching, cannon were fired, and the cloud passed over without hail," or "it passed to one side and the hail did not fall on the protected vineyard," or "it advanced to the edge of the vineyard and there the hail ceased" or "the cloud broke in two, passing to the right and the left, leaving the sky cloudless over the cannon." Now all these are quite common cloud and storm phenomena; they will happen oftentimes without any cannonading. The best friends of the Stiger or Italian method of annihilating hailstorms have recently confessed that the method is still in its infancy or experimental stage and that it is still necessary to investigate and demonstrate its value.

It is not yet time to say with an American writer—

The cannonading does seem to have some effect in the way of changing hail to rain, and though the exact measure of that effect is still a matter of dispute, chiefly among those who, like the scientific paper mentioned, do more theorizing than observing, yet the owners of the vineyards are convinced that the protection secured is worth much more than it costs.

As to theorizing, those who are best acquainted with the true scientific man know that he is wholly devoted to observed facts, to the recognized laws of nature, and to arguments that are as logical as mathematics. It is the popular writers who are so apt to disseminate ideas that have no scientific basis.

#### METEOROLOGY AS A COLLEGE COURSE.

In previous numbers of the MONTHLY WEATHER REVIEW we have stated rather fully the recent work of members of the Weather Bureau in the matter of instruction in meteorology, either collegiate or otherwise. It will be interesting to review the early activity of our colleagues in this matter. Thus we understand that in 1887-88, at Northfield, Vt., Prof. H. J. Cox inaugurated a course of meteorology as a member of the faculty of the Norwich University.

In 1885 the president of the Columbian University invited the Editor to establish a course of instruction in meteorology and climatology in the Corcoran scientific school of that institution. In 1877 the board of directors of the Cincinnati University invited Mr. S. S. Bassler, then in charge of the station in that city, to give instruction in meteorology as a part of the regular course of the university. Preparations for this work were completed when Mr. Bassler was transferred to Chicago, Ill., in November, 1877, and the project fell through.

The Editor would be glad to receive short statements of the early services of other men in this special field of college work. If those residing in university or college towns would look up the history of the respective institutions and send us short notes as to the instruction given in our science, usually as a part of the duties of some professor of astronomy, chemistry, geology, or physics, these would constitute interesting contributions to the history of the part taken by American colleges in the development of this science. It is quite common to forget what was done a hundred years ago, but most of us probably know that Prof. Elias Loomis taught this subject quite thoroughly from the beginning of his career at Yale College, 1833; then in the Western Reserve College, at Hudson, Ohio, 1837-1844; again at New York University, 1844-1859, and finally at Yale University from 1860 to 1889.

In former times this subject was usually taught in connection with some other science; thus Prof. Robert Hare, the chemist, wrote and lectured on meteorology in the University of Pennsylvania, 1818-1847. Prof. Joseph Lovering, the physiologist, included this in his lectures at Harvard University. His

present successor, Prof. John Trowbridge, has also interested himself in vortex motions, atmospheric electricity, and other meteorological problems, but the special teaching of meteorology is left to Prof. R. deC. Ward. Professor Olmstead, at Yale, and now Professor Brewer, at the same institution, also Professor Renwick, at Columbia, have taught meteorology as a part of the courses in physics and chemistry. Professors Chamberlin, at Chicago, and Tarr, at Cornell, include it in geology and physical geography. Nearly all the professors of natural philosophy have given it some attention ever since the days of Newton and Cotes at Cambridge, England, but natural philosophy is now generally broken up into special courses of physics (which is sometimes subdivided into mechanics, optics, acoustics, and electricity), chemistry, geology, meteorology, etc. At the University of Michigan, Prof. M. W. Harrington gave special courses of lectures on climatology for several years before he was appointed Chief of the Weather Bureau. We do not seem as yet to have anything in America quite equivalent to the eminent professorships of meteorology held by Kämtz, at Dorpat, Schmid, at Jena, von Bezold, at Berlin, and Hann, at Vienna.

#### MARS AND THE EARTH.

On December 16 Professor Pickering, of the Harvard College Astronomical Observatory, received from his assistant at the Lowell Observatory at Flagstaff, in Arizona, a telegram saying that a shaft of light had been seen to project from the planet Mars, lasting seventy minutes. Whenever anything remarkable is observed in the heavens the facts are at once telegraphed to all interested astronomers in order that they may concentrate attention upon the subject, and add as much as possible to our knowledge before the fleeting phenomenon has vanished. This was done in the present case, telegrams being sent to astronomers in both Europe and America. The Lowell observatory gives especial attention to the planet Mars, and has already published a magnificent volume showing the apparent changes that occasionally occur.

This simple announcement of an observed fact has come back to America as a news item scarcely recognizable, viz, that Professor Pickering has been in communication with the planet Mars. This story has brought out from Tesla the statement that he also has observed on his telegraph wires electrical oscillations that may have come from Mars or some other planet, though he does not give us any data by which to judge of the rationality of this conclusion. Following him, Mr. William A. Eddy, of New York, announces that ever since 1890, or whenever he flew his kites by means of metal wire, he was liable to receive electric currents that must have come from some planetary region, or possibly, the sun, or the upper atmosphere.

Following upon these newspaper paragraphs an occasional correspondent inquires, first, as to their authenticity, and next as to their relation with meteorology.

We think we have said enough to show that the original observation published by Professor Pickering is reliable. We believe the other observations by Tesla and Eddy are probably explicable as the result of the ordinary irregularities in terrestrial magnetism, and do not necessarily place us in connection with planetary bodies. Finally, we agree with our colleague, Mr. Talman (and others who have written on the subject for a century past), as to the extreme improbability of there being any one alive on any of the planets with whom we could have intelligent exchange of ideas, even if optical or electrical signals could be sent and received.

Recent studies by means of liquid air have shown that the earth's atmosphere is undoubtedly constantly giving to and taking from interplanetary space a little of the more vol-