Every new mountain observatory is a new field of aerial exploration greatly needed and most welcome to the true meteorologist.—C. A.

The interest in the frost studies has been heightened by a second observation like the one already mentioned, i.e., that low temperatures on Mount Rose seem to precede those below at Reno and in the northern section of Nevada by from twenty-four to thirty-six hours. Thus on the morning of June 6 (2 to 5 a.m.) the thermograph on the summit registered 11°F. The temperature during the day registered from 28°F to 20°F., rising from 10 p.m. until about 6 a.m. of the 7th, when it registered 37°F. On the morning of the 7th, at Reno, however, a killing frost was reported, twenty-four hours after the corresponding condition on Mount Rose had occurred and at the same time as the rise of temperature from 20°F to 37°F. was taking place on that peak. If there had been a simultaneous correspondence on Mount Rose and at Reno, the frost at Reno should have occurred on the morning of the 6th and a temperature of approximately 57°F. should have been recorded at that place on the morning of the 7th.

The Nevada Agricultural Experiment Station has now, with the consent of the Division of Experiment Stations, made an appropriation for the purpose of continuing these frost studies and investigations in precipitation and evaporation at high altitudes. This will enable us to obtain an anemometer, a barograph, and a thermograph capable of making a month's continuous record, and a small observatory ten feet square for housing instruments and sheltering observers. A large precipitation tank and small evaporation tubs will be installed.

The standard thermograph and barograph now in use may be placed elsewhere, either on Mount Rose or on a neighboring peak, to continue the study of barometric and thermometric peculiarities mentioned in my article; they may also be used in the further study of plant environment on Mount Rose.

It is interesting to note that the mean daily range of temperature on Mount Rose has not increased to a remarkable degree, the extremes during June being 5°C and 23°C, and that the approximate difference in temperature of 20°C between Reno and Mount Rose has been increased often to 30°C or more. A more careful comparison of both winter and summer readings at the two stations will be made as opportunity is afforded.—J. E. C., Jr., July 29, 1906.

USE OF THE LANTERN IN TEACHING METEOROLOGY.

By J. Paul Goode, Assistant Professor of Geography, University of Chicago. Dated Chicago, Ill., July 1, 1906.

With many well meaning people the magic lantern is in something of disrepute. One says, "When I see a lecturer beginning to set up his screen and lantern, I know that now there is to be put on exhibition a plentiful lack of wit." And another says, "The instruction in meteorology * * * needs to be of a fundamental, solid character, and not of the popular, superficial character appropriate to lectures that are illustrated by lantern slides"; and again, "A lecture with stereopticon illustrations should come in only as a sort of luxury once or twice during the course".

This attitude of antipathy is catching, like measles, and in many places settles the question of the use of the lantern without argument or evidence, adversely to the judgment and interests of the growing scientific teacher. Of course we all know the brainless person, who calls for "the next slide"; and announces the very obvious fact: "This is the picture of a house"—going through with a so-called "lecture" by talking about a collection of slides. Such performances may be entertaining, but they are often neither scientific nor literary, and may have little or no power of instruction. But to pass judgment on the use of the lantern upon such a basis of evidence is on a par with the action of the good people who condemn all novels because there are, forsooth, dime novels.

We can all understand this impatience with the merely entertaining use of the lantern, but that is only one side of the shield. Let us look at the other side.

We will all agree that, from any point of view, the most fundamental element of geography is the matter of space relation. In its ultimate phase, geography is the science of the "where", and the written language of the "where" is the map and diagram. Now we cannot talk a map. We see a map, and we think it in terms of space relation, in terms of form and place, but we can only talk about these things. The sight language is many times more rapid and efficient than the verbal language that articulates a sort of shorthand of form and space relation. Think of how long a chapter it would make to describe a map of the North American Continent, in its three dimensions, with its mountain axes, and with its intricate detail of coast line and drainage. And yet this mass of detail is presented to the eye in an instant. One second of view brings to us a quantity of perceptions it would take many minutes to relate even in part. In short the sight language, compared with the word language, is as the flight of an eagle, compared with the painful passage of an ox team. Moreover, we can keep the map in mind easily, while the very number of things listed in words becomes difficult of retention in memory, and very hard to correlate. We all understand this. We want the map when we really want to know the lay of the land and no amount of explanation will take its place.

So we provide our libraries with atlases and our geographies with maps, and even the clerk of the rural school sees to it that the schoolroom is supplied with some kind of wall maps. Our best schools have more wall maps and better ones, yet scarcely one has so many or such good ones as could be most profitably used in class work by a live and well trained teacher.

But wall maps are expensive. They run from three or four dollars apiece to several times that price, and the mere cost of a large collection becomes burdensome to the best of schools. They are bulky, and their storage is a problem, and the larger the number the harder this problem. Then, too, they deteriorate rapidly, even under the best of use. All these handicaps are so effective that the result is a very small and inadequate collection of wall maps in most public and private school rooms.

But the teacher in geography and meteorology must use maps. And we who are teaching know too well the waste of time and attention, and the cancellation of good teaching, when we attempt to do the next thing, that is, to bring into the class the good map or intricate diagram which we may have found in the Monthly Weather Review, and which shows exactly what we want to present. We put up the beautiful little drawing before the class and the two pupils in the front row, nearest the map, get a good view and can follow the discussion. Those a little farther away can see a little, but uncomfortably. If the class is of ordinary size the others can not see, and in so far can not attend the recitation; they do not know what is going on up in front, and disorder enters the room. In a well trained school they may look out and make no disorder, but they are barred from participation in the recitation. But then, of course, the map can be passed around, yet this is only less bad than the other way. The discussion was for the benefit of the two who could see the map. The teacher has now passed on to another topic. The map comes to a pupil who may now see what he was hearing about some time before, but in seeing he must lose the recitation just now in progress. And the attention and concentration of the whole class for a good fraction of the recitation is sacrificed to the lack of proper equipment—the want of a map that all may see at once and at the time when the seeing should be done. And is it not a pity that this high tariff should be imposed upon teaching, when by the expenditure of fifty cents that map may
be converted into a slide, which in an instant is thrown on the screen, much larger and more legible than any wall map, visible to everyone in the largest class at one and the same time. The teacher may put his pointer upon the very spot he wants discussed and all the pupils may be solving the problem together with equal advantage. And then the next point comes up for discussion with no renewal or diversion of interest or attention on the part of any one.

But the ready advice comes: 2 "Carefully draw charts elucidate hurricanes", and, "It is especially important for the teacher himself to be so interested in his subject as to devise his own diagrams", and, "It is only after one has taught in his own original way for several years, that he begins to realize the power of his own ingenuity, and finds that he is doing better, with crude material, than many another man is doing with elaborate equipment." This is the encouragement a hard working and earnest teacher gets. He is doing so well with no advantages, it really is not worth while to give him any.

The writer of this paper can speak about this question from the point of view of that very teacher; for, after seventeen years teaching in normal schools and universities, much of the time without equipment, having to devise the maps and graphs and make them too, or go without, for lack of mere time and strength, and much of the time nourished upon this appetizing sawdust of doing better work than some one else who has a good equipment, he is in a position to know the condition of the average teacher in this country. Be it known then that there are many teachers in our normal schools and high schools who are required to do from twenty-five to thirty hours of teaching per week, and with classes very often running to fifty or over. Now the man in the office thinks what his own diagrams are made by the teachers, who are required to do from twenty-five to thirty hours of teaching per week, and with classes very often running to fifty or over. 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