

FRIDAY, JUNE 8, 1883.

AN ILLUSTRATION OF AN ABUSE.

AFTER having taken special care in the selection of daily papers for quiet reading, it is disheartening to find one of the most conservative and elevated of these making use of methods which are suggestive of the broad prairie and the backwoods. It appears, however, from a recent example, that we cannot feel quite safe in taking up even the dignified *New York evening post*. In the issue of that paper of May 15, there is a notice headed, '*A Thrilling Government Report.*' A careful examination of the matter shows that the sole object of the heading and the notice is to ridicule the report, or, at least, to create merri-ment at its expense. This is a mode of procedure against which the present writer has already protested in an article entitled 'Science and the newspapers,' and it seems desirable to again call attention to the true nature of the crime against science which is here involved.

The objectionable notice begins thus: "The United States geological survey has just issued its 'Bulletin No. 1,' on the popular subject, 'On hypersthene-andesite, and on triclinic pyroxene in augitic rocks.' These are the conclusions reached: 1, 'An apparently typical augite-andesite from the Buffalo Peaks is found to contain *hypersthene* as its chief pyroxenic constituent,' " etc. Other conclusions drawn by the author, and, of course, expressed in technical language, are then quoted, and nothing further is said. The wit, it will be seen, is very simple, depending upon the heading above quoted, and the introduction of the word 'popular' in the introductory sentence. To one who is constantly dealing with scientific matters, or to one who is tolerably familiar with such matters, even though he may have a keen sense of humor, there is nothing particularly funny in this. But probably it does appear funny to those who are totally ignorant of science. Big words are apt to seem funny to those who do not understand them. One has not far to go

for fun of that kind. Almost any paper on a special subject will furnish it. A mathematical paper, for example, is richer in material for it than any other. It must be acknowledged, however, that, if the simple quoting of the language of a technical paper is wit, that wit must be of a very low order.

Leaving entirely out of consideration the character of the wit, the questions suggest themselves whether the display of such wit is worth while, and whether the harm done by it does not greatly over-balance the little good that comes from it in the shape of fun.

What we need as much as any thing else in this country, is an increased appreciation of the real value of scientific work. The 'we' is used in the broadest sense. We as a nation need it, and the influence of those in high places should be exerted in such a way as to develop this appreciation. The average man has somehow got the idea that pure science is of no value, and that there is something absurd about the efforts of quiet investigators who spend their lives in dealing with matters which are of no 'practical' importance. This is a state of mind which is very common, and it needs treatment. Now, the proper way to treat it is not to encourage it, but to point out, over and over again, its error. Ridiculing scientific papers tends to encourage the average man in his false notions, and to perpetuate his benighted condition.

The subject is one of more importance than may appear at first sight. Progress in the greatest things is dependent upon attention to the smallest things. If it is desired to improve the state of the public mind in regard to scientific matters, the greatest care should be used in presenting these matters. Above all, let us be extremely cautious about sacrificing science for the sake of humor. We, as a people, are especially susceptible to the influence of humor. It has been said with considerable truth, that there is nothing about which an American will not joke. Every one has known cases in which this tendency to joking has led to a pretty definite form of insanity, than which there is nothing more hopeless. Now,

when the results of scientific investigations are used as a medium for humor, their true objects are, of course, entirely lost sight of, and science is belittled; and, as humor appeals to the greater number the lower its order, it is clear that the kind of humor we are dealing with must appeal to large numbers of those who are in special need of enlightenment.

Scientific investigations are not proper subjects for the display of wit. The object of these investigations is to discover the foundation of all things,—the truth. Let a man once grasp that idea, let him become imbued with it, let him go through the process of intellectual regeneration necessary to enable him fully to appreciate it, and it will henceforth be impossible for him to touch upon the subject of investigation without experiencing feelings which are totally incompatible with ordinary wit. This is the right attitude towards scientific matters. It cannot be brought about all at once, but the day when it shall be the general attitude can be hastened by those who mould public opinion.

Gentlemen of the press, it is your duty to do all in your power to encourage scientific work, and to give the people right ideas concerning it. We cannot expect this from all. There are many among you whose highest ambition it is to secure and construct 'readable' articles at any sacrifice of principle. But surely it is not too much to expect of those who evidently recognize the importance of higher things.

THE DRY- AND WET-BULB HYGROMETER.¹

It is not my purpose at present to discuss the theories which underlie hygrometric observations, but rather to ascertain if it is possible to obtain uniform and trustworthy results from the simple observation of this instrument. There has been much discussion of late upon this subject, and grave doubts are continually being thrown upon its accuracy.

It is proposed to ascertain, first, the best method of conducting observations, and, second, the accuracy of the results when compared

with a fixed standard. The following is a brief statement of the principles upon which the action of this instrument is based:—

"The evaporation of a liquid involves the conversion of sensible into latent heat; and the supply of heat must be drawn from the liquid or from surrounding objects. At some point the amounts of heat subtracted and communicated will be equal, and an invariable temperature of evaporation will result, depending upon the amount of moisture present."

From this invariable temperature we may be able, by suitable formulae, to obtain the hygrometric state of the atmosphere.

It would seem as though a thermometer-bulb, from which moisture is continuously evaporated, ought to give this needed temperature; yet every one who has had occasion to make such observations has encountered great difficulties, and has become satisfied, that as commonly made, though the readings are of the simplest character, yet the results are frequently entirely inaccurate. This is partially shown by an examination of the various directions that have been published from time to time. Regnault, writing in 1845, says, "I prefer thermometers with cylindrical bulbs as more susceptible to the variations of temperature, and because, for the same mass of mercury, they present a much greater surface to the air. The manner of moistening, I find, makes no difference so long as there is an abundance of liquid. If a drop falls from time to time from the extremity of the bulb, I have still observed no sensible difference. The longer or shorter course which the water runs on the cotton wick exercised no perceptible influence." Other authorities may be quoted as follows:—

Bulbs of both thermometers should project an inch and a half to two inches below the scales; and all objects, metallic or otherwise, which can affect the temperature, should be removed.¹

All authorities mention the necessity of using rain or distilled water, of frequent cleansing of the muslin, and of changing it at intervals of from half a month to three months. The greatest difference of opinion, however, is in relation to observations below freezing, 'under which circumstances,' says Mr. Scott in his

¹ Read before the Philosophical society of Washington, D.C., May 5, 1883, at its 235th meeting.

¹ This is an important matter. I have seen several illustrations of this instrument, showing the scales extending below the thermometer-bulb; and many otherwise accurate thermometers are made with a metallic scale prolonged so as to afford protection to the bulb. In using such a thermometer as a wet bulb, I have found, with the scale, a mean temperature 1.2° higher than without it; the air was still; there was an abundance of moisture, and over 10° difference between the dry and the wet. This is due partly to the heat radiated from so near an approach of metal at least 10° hotter than the wet bulb, and partly to the arrest of evaporation by the scale.