

SCIENCE.

FRIDAY, MARCH 14, 1884.

COMMENT AND CRITICISM.

IF one wishes to study man, it may be desirable to seek large cities, where men abound in great numbers and in almost infinite variety; but, if nature is to be questioned and cross-examined, it is wise to betake one's self to the fields, the woods, and the mountains, over which the artificial has not yet gained control. In the study of various problems in terrestrial physics, it is of the utmost importance to place the observing-stations so that they may fairly represent general conditions, and not be influenced by merely local disturbances; and it has long been customary to give such considerations proper weight in the selection of points at which various physical constants are to be determined. An article in the present issue, on the exposure of thermometers, furnishes evidence that it is quite possible for large cities to be fortunate in the possession of a climate which is largely artificial; that a meteorology which is based on observations taken under such artificial or peculiar conditions is likely, now and then, to go astray; and that in physics, as in politics, it is sometimes safe to await 'returns from the country.'

If the earth be represented by a globe sixteen inches in diameter, the largest city in the world will hardly be visible to the naked eye; and yet in most large cities there will be found to exist a set of meteorological conditions differing considerably from those of the surrounding country. It is not likely that difference exists alone in temperature, or that it is not noticeable, and worthy of serious attention, in other elements which go to make up 'the weather;' and it would appear desirable for working-meteorologists to agree upon some systematic plan of investigation which might

result in the determination of the proper location and exposure of their instruments, that they may more truthfully exhibit the average condition of the area which they represent.

THE close connection and interaction of religion, statescraft, and science in the modern world is illustrated in an interesting way in a recent number of the *Proceedings of the Royal Society of London*. The British government, desiring to introduce cheese-making as an Indian industry, was met by the difficulty that the religious beliefs of a large portion of the population of India placed an absolute veto on the use by them of cheese, in the manufacture of which rennet obtained from the stomach of an animal had been employed. The leaves of a species of *Pinguicula* are used by the Laps to coagulate reindeer-milk; and the government circulated in India a request for information as to any Indian plant which was known to have a similar property. Surgeon-Major Aitchison called attention to *Withania coagulans*, a Himalayan and northern India plant, the seeds of which were said to coagulate milk. A quantity of this material was sent from Kew to Mr. Sheridan Lea of Cambridge for examination. He was able to extract from it a ferment identical with the rennet ferment of the gastric mucous membrane of animals, and capable of preservation in solution as a commercial article in a similar way. The ferment exists in the seeds in considerable quantity, and is readily and cheaply extracted from them.

OF the 'change in the unit of time' controversy, to which we alluded in a late issue, there seems as yet no likelihood of abatement. Originally begun by Mr. Stone, lately her Majesty's astronomer at the Cape of Good Hope, it was at once participated in by Sir George Airy, the late astronomer royal, by Professor Newcomb, and later by a number of continental astronomers. When the Royal astronomi-

cal society met last autumn, Mr. Christie, the present astronomer royal, declared the subject "pretty well thrashed out, and quite unsuitable for discussion at their meetings." Since that time, both sides have had important accessions; no less a person than Col. Tennant, of her Majesty's mint, Calcutta, taking essentially the same view with Mr. Stone, and Professors Cayley and Adams coming forward with the clearest of proof that no such deviations as those indicated by Mr. Stone exist.

At first blush, it will seem very improbable that an astronomer of Mr. Stone's well-earned reputation for acuteness should get muddled in a matter of fundamental astronomy involving only simple algebra; but when he finds himself unable to clarify, after a half-dozen astronomers more able than himself have been endeavoring for six months to convince him of his fallacy, it can scarcely be called rash heterodoxy to suggest that an error on the part of his opponents may be at least among the possibilities. Although he is now aware that it may appear useless to continue researches of which the fundamental principle is disputed by astronomers of note, his latest utterance is, "I have not seen at present any evidence which weakens in the slightest degree my confidence in the accuracy of my results." It is very difficult for the non-mathematical to recognize the possibility of a mathematical dispute, even when the terms involved are of slight importance; but no sort of excuse can appear for a difference regarding a supposed discrepancy of this magnitude, involving the early disruption of fundamental tables of the celestial motions. Unless, then, this matter admits of speedy and permanent decision, the one way or the other, with the entire agreement of all parties to the controversy, astronomy would appear to run the serious risk of forfeiting her claim to a place among the exact sciences.

ONE of the indications of the activity in chemical matters in Germany may be found in the great prosperity of the Berlin chemical society. This organization dates only from

the year 1868, when it was started under the auspices of the Berlin chemists, headed by the genial Hofmann. In that year the volume containing the articles communicated to the society numbered only about two hundred and eighty pages. In a short time the society became a national instead of a local affair, fully deserving the name, '*Deutsche chemische gesellschaft*,' given to it at the outset. According to the last annual report, the number of members is now nearly three thousand; an increase of about two hundred having been made during the past year. The last annual volume published by the society numbers over three thousand pages. Of the members, eight hundred and forty-eight are foreigners; the largest number (one hundred and eighty-four) of these being English, while there are one hundred and forty-five Americans; and one hundred and forty-four Swiss, on the list. It will be seen that more than two-thirds, or about two thousand, of the members, are Germans.

It would lead too far to discuss fully the causes of the activity thus indicated. One of the most potent direct causes is, no doubt, the close bond of connection that has been established in Germany between pure chemistry and its industrial applications. While there is, perhaps, no country in which the maxim 'Science for the sake of science' is more frequently heard or more firmly believed in than in Germany, it is equally true that in this same country the most successful applications of the truths established by the votaries of pure chemistry have been made. Industries are there springing up every year, founded directly upon the most recent discoveries made in the university laboratories. Large numbers of thoroughly trained chemists are employed in the new factories. The value of science in carrying on industrial operations is fully recognized. It is certainly instructive to note that this state of things has been brought about by devotion to pure science. The much talked of 'practical man' who wants 'none of your theories' is not a common phenomenon in Germany.

THE notice in another column, of the pamphlet by Mr. Frank B. Scott, calls attention to a class of publications which belong to the idiosyncrasies of scientific writings. The law of variation among men involves the occasional occurrence of an extreme departure in any given direction from the normal average; and it is quite in accordance therewith that there should be from time to time a writer who seriously propounds startling views on a scientific subject about which he is ignorant. Such a person is one who is both very inexperienced and thoroughly unpractical, yet perhaps really intelligent. Something arrests his attention. He begins thinking about it, and finds a series of superficial or casual resemblances, which leads to a grand general conception. Startled and delighted, he eagerly hunts up some textbook: it contains no hint of the grand conception. The thought is then new. With feverish excitement, a few facts are patched together out of a fragmentary and too often inaccurate knowledge, and the idea is confirmed. The theory is then given to the world, condemned by the critics, laughed over as a choice bit by a few, and then forgotten according to its deserts. Fortunate is the author if he gains in experience what he does not secure in fame.

ATTENTION has recently been called to the bill for the establishment of 'national experiment-stations,' now pending before Congress, by a circular sent out by President S. A. Knapp of the Iowa agricultural college, who is the chairman of a committee appointed in January, 1883, by the U. S. department of agriculture, to have the matter in charge. The most interesting portion of the circular is, of course, the text of the bill. This provides for the establishment, at every agricultural college which possesses an improved farm, of a 'national experiment-station.' These stations are to be under the general control of the regents or trustees of the colleges where they are located; and the general character of the work to be done at each station is to be determined by the U. S. commissioner of agriculture, the president of the college, and the

director or superintendent of the station. The sum of fifteen thousand dollars is to be appropriated to each such station, but only so much of this sum is to be paid over to the station as will cover expenditures actually incurred.

The objects aimed at in this bill appear to be twofold, — first, to promote the advance of a scientific knowledge of agriculture; and, second, to unify to a certain extent the work of investigation now carried on at scattered and independent centres. To the first of these objects it would seem that no one could take exception. If it be admitted to be within the province of the national government to aid at all the advancement of science, it would certainly seem that a branch of applied science which touches the every-day interests of fully half our people, and which deals with a calling which is one of the chief sources of our national wealth, might reasonably claim a portion of that bounty which is so freely extended to other sciences, especially since the experience of Europe, and of several states in this country, has abundantly demonstrated the great utility of such stations. Certainly such an expenditure of the public money is at least as legitimate as river and harbor appropriations or arrears of pensions acts.

As regards the second object of the bill, while it may be desirable, it is not so certain that it can be readily attained. It may be lamentable, but it certainly is a fact, that scientific men do not work well in harness, and are apt to entertain extreme ideas of the value of personal independence in their work. Much would depend upon the character of the commissioner of agriculture. No man fit for the position of director of an experiment-station would be likely to consent to conduct that station according to a plan laid out in Washington. On the other hand, if the commissioner were a man whose personal character and scientific attainments commanded respect, he would have an opportunity which, if judiciously used, could not fail to bring honor to him, and profit to the interests of agriculture.

Should the bill pass, it is not impossible that one of its benefits might be, that it would render more difficult the appointment to the responsible post of commissioner of agriculture of individuals such as some who have in the past held without filling that position.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Red sunsets and precipitation.

THE readers of the scientific journals have, no doubt, observed that the prevailing explanation for the red sunsets and colored sky during the past few months is that of chromatic diffusion of light by volcanic-ash particles. There are some apparent incongruities as pointed out by Mr. Proctor and others; but we believe that the established physical laws will permit a satisfactory solution of the phenomena, assuming volcanic matter as the cause.

The object of this letter is to notice what seems to the writer a probable connection between the conspicuous sunset colors and the excessive cloudiness and precipitation during the last month or six weeks. With regard to precipitation we must recognize Professor Aitken's discovery; viz., that clouds and all forms of precipitation occur by virtue of the solid particles of matter suspended in the atmosphere, serving as nuclei upon which the aqueous vapor is condensed. The supply of this solid matter in the aggregate is nearly uniform; but, if an excess occur from any cause, we should expect a larger precipitation for the same hygroscopic state of the atmosphere. This conclusion, we believe, has been verified during the past two months, in meteorological observations. It might be argued that the cloudiness and rain have not been evenly distributed, as would be expected if caused by the settling of the ash-particles; but in what has been said, no regard is taken of the various causes for an unequal distribution of the matter, and the common conditions of storms. We should expect weather-records to show the greater precipitation in regions where the sky colors have been most conspicuous. The writer, however, has no data for verifying this.

The above is advanced rather as a suggestion than as an exposition, in the hope that it may stimulate a more exhaustive study of this connection, if such there is.

W. H. HOWARD.

Does Unio spin a byssus?

Attached to the female of a *Unio* which I collected, last August, from the middle fork of the Holston River, at Marion, Va., were stones, some of them more than an inch in diameter. So strongly were these attached that not only could they be lifted from the water by the attachment, but it took considerable force to separate them from the *Unio*. I had often seen *Unio* shells covered with gravel and mud firmly cemented by the *Confervae* that commonly grow upon the anterior portion of the valves exposed above the water; but these shells under consideration were unusually free from such growths. At the time, I removed the pebbles without giving attention to the phenomenon; but, recurring to it afterwards, I found, on examination, what appeared to be the bases

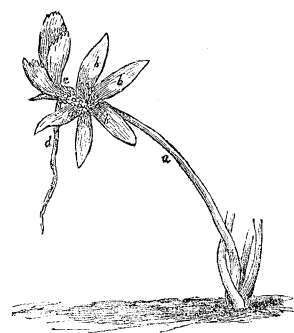
of *byssi*, situated at about the middle of the anterior fourth of each valve.

Again: these were only found on females, all of which were gravid, having the eggs well developed. Is it a provision to prevent the strong current of this river from sweeping them into unsuitable spawning-grounds while depositing their eggs? Are these *byssi* (?) seasonal, or permanent? If *byssi*, how are they spun?

E. P. LARKIN.

Retrograde metamorphosis of a strawberry-flower.

Mr. J. H. Foster of Orange county, Fla., sends a monstrous form of a strawberry-blossom, which is shown in the accompanying engraving. During the winter there were several hard frosts which blasted many of the strawberry-flowers in Florida. This injurious weather may have been the cause of the strange malformation. The engraving shows the flower-stalk,



a, raised from its reclining position. The calyx-lobes are at *b*, *b*, and within these is a circle of stamens. In place of the fleshy receptacle, so much relished by all when ripe, there is a small strawberry-plant, *c*, with its short stem, and a root, *d*, springing from near its base. This root, doubtless, penetrated the soil soon after it started out from the stem, and became a source

of nourishment for the young plant. The base of the stem has many undeveloped pistils scattered over its surface, which plainly show that the plant is a transformed receptacle. The young leaves, when unfolded, are of the normal form, consisting of three wedge-shaped, coarsely serrated leaflets.

Flowers, and in fact all organs of plants, have been known to undergo strange changes of form. All gradations may be found, from one set of floral organs to another. This is seen between petals and stamens in almost every white water-lily, and between stamens and pistils in willow, apple, poppy, and other blossoms. Stamens are changed into, or become, petals in the familiar process of the 'doubling' of flowers. This tendency to retrograde is carried still farther when both the stamens and pistils become green, leafy expansions, and thus reveal their true nature. In many cases the floral axis is prolonged beyond one or more circles of floral organs, and the stem again assumes the ordinary leaf-bearing form. Such a metamorphosis sometimes takes place in an apple or pear blossom; and as a result, there may be a fully developed fruit, with a leafy branch extending beyond the blossom end (basin).

The metamorphosis which has taken place in the strawberry-flower shown in the engraving is in the line of our expectation: the strawberry-plant propagates itself readily and rapidly by slender branches sent off from the base of the parent-plant. Each one of these runners strikes root at its apex, and soon develops a tuft of leaves and an independent plant. In the case discovered by Mr. Foster, this strong tendency to increase by runners is carried out by a flower-stem with a frost-injured blossom lying upon the moist earth.

BYRON D. HALSTED.