

the use of the organization referred to above, but the limited time will not permit of their being gotten ready for use on this occasion. The results of the observations made will be looked for with interest.

At the national museum the employés have been busy for some time in arranging the exhibits received from the New Orleans exposition. Many of these were sent from the museum originally, and are only now being returned to their places; but many were not, and, in fact, it is stated that the museum has been a great gainer in the operation. It is said that one thousand boxes were sent to New Orleans, and that two thousand have been received from there, all of which goes to prove that the officers of the museum, and particularly its representatives at New Orleans, are alive to the interests of the great and rapidly growing collection, and is also conclusive evidence that a rolling stone *does* sometimes gather moss. Z.

Washington, D. C., Oct. 5.

#### 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.

#### The color of the sky.

I read with interest the communication of Prof. E. L. Nichols on the above subject published in *Science* September 11. As the views there expressed (that the color is really only a subjective phenomenon) run quite counter to those generally held, it seemed desirable if possible to confirm or disprove them. Everyone who has used a spectro-photometer is well aware that it is an instrument with which it is impossible, even when most carefully handled, to obtain results of great precision. It, therefore, seemed to me preferable to compare directly the colors of the sky, and the illuminated sheet of paper.

For this purpose I employed a polarimeter, consisting of a tube furnished with a double-image prism at one end, and a revolving Nicol prism at the other. Before it, in the sunlight, was laid a mirror, half of which was covered with a sheet of white paper. Between these and the instrument was placed a sheet of black paper suitably screened from the sunlight, and containing two square holes, through one of which the illuminated paper was seen, and through the other the blue sky reflected in the mirror. The instrument was then used in the ordinary manner, being so placed that one of the images of the illuminated paper was in contact with the oppositely polarized image of the reflected sky. The Nicol was then turned till the two were of the same brilliancy, and the colors compared. There was no question but the sky was decidedly the bluer of the two. The tube carrying the double-image prism was then rotated about its axis through 180°, to allow for any difference of color which might have been introduced by the polarization, no appreciable change, however, was noted. The white paper was next removed, and some of a bluish tint substituted, but it was not until paper of a decided sky blue color was employed, that an accurate match could be obtained. Since then the color of the reflected sky matches that

of blue paper illuminated by direct sunlight, and does not match that of white paper so illuminated, it seems clear that the color of the sky is something distinctly inherent to itself, and is not a subjective phenomenon as supposed.

Further evidence bearing upon this subject, collected by Prof. E. C. Pickering from polarimetric observations of the sky will be found in the *Proceedings of the American academy*, vol. ix., p. 20.

WM. H. PICKERING.

#### Woodhead and Hare's 'Pathological mycology.'

Permit me to add a few corrections to those recently made by a correspondent concerning this publication, (*Science*, Aug. 14). The authors state on p. 17 that "in artificial media it is a frequent experience to find organisms destroyed by the virulence of their own products before all food material has been exhausted." I doubt very much whether this observation has ever been made. *A priori* it seems unreasonable to suppose that bacteria would commit suicide so speedily. It is well known that the products of fermentation may check the process after a time, but the organisms survive for some time after. Pasteur's method of attenuating the virus of fowl cholera depends on the act of allowing months to elapse before a new culture is made. I have still to find a microbe which dies in a liquid medium within, at least, two months after inoculation.

The authors seem to think that when fluids are not albuminous they will not adhere to the coverglass when dried and heated, hence the method of irrigation is recommended (p. 46). As the method of staining on the coverglass is of fundamental importance, it seems strange that such a statement should be made. In fact the dried layer from albuminous fluids is very apt to be washed away, while the ordinary 'broth,' from which probably all albumen has been precipitated by heat in sterilizing, always forms a firm layer. I doubt whether any one will succeed well in staining and washing bacteria by irrigation. They will, very likely, find their way to the blotting-paper used to stimulate the current. Had the authors followed Koch, as closely here as elsewhere, this error would not have occurred, as he is very explicit on this point.

In the formula, for Cohn's fluid given on p. 111 'as recently modified,' we find, by comparing with the most recent foreign publications (Zopf, Flügge, Hüppe, Cornil and Babes) that the quantity of all the salts but one is from ten to twenty times too great. It would be desirable to know to whom the modification is due. I do not believe that bacteria, parasitic or saprophytic, would appreciate such a concentrated solution.

There are many indications throughout the work that the methods and processes described were not fully mastered by the authors themselves. Thus, on p. 75, filters are to be washed with 'boiled distilled water,' even though the filtered gelatine must be subsequently sterilized by steaming the stock flasks for fifteen minutes (p. 76) which is, at least, five minutes too long, and would certainly ruin the gelatine. After removing the potatoes from a solution of mercuric chloride (p. 62), why not rinse them in boiled distilled water, where its employment might do some good? Finally, the use of caustic potash or turpentine for cleaning slides (p. 51) seems a rather unpardonable suggestion.

THEOBALD SMITH.