

we hope to analyse more particularly hereafter, when we have the complete work before us.

Two important suggestions present themselves to us, as tending to render the book more useful. The first of these it is now impossible to apply. We think it would have been far better had the author intercalated the diagnoses of those British species not found in Dorsetshire amongst the descriptions of the others; this no doubt would have been done, but for the original indecision in the plan of the work. It is not yet too late to consider the other suggestion, viz., that a table of the family and generic characters be given at the end of the second volume. The expression at p. xxxvii. of the introduction, to the effect that "the subject of classification being practically exemplified in each of the ensuing descriptions, need not be further gone into here" is not in keeping with the popular aims of the work, and is not fair to those students who have not already acquired a considerable amount of that knowledge possessed by the author.

The three plates are excellent, and in Mr. Cambridge's usual analytical style. The work reflects great credit upon the local Society that issues it, which deserves the support and hearty thanks of all (we fear but few) who are interested in British Spiders.

Studies on Fermentation; the Diseases of Beer, their Causes, and the Means of Preventing them. By L. Pasteur, Member of the Institute of France. A Translation, made with the author's sanction, of "Etudes sur la Bière," with Notes, Index, and original Illustrations by Frank Faulkner and D. Constable Robb, B.A. Oxon. (London: Macmillan and Co., 1879.)

We thoroughly agree with the following sentence from the English edition of Pasteur's important work: "The debt which English brewers owe to M. Pasteur can hardly be over-estimated;" but, further than this, we believe that the debt which biologists of all countries owe to him for his researches is also a very large one, for it is by a study of these low and simple forms of life that they may expect to learn something of the very beginnings of life itself.

On the appearance of the original work a very elaborate notice of it appeared in these pages (NATURE, vol. xix. p. 216); we need, therefore, now only call attention to this excellent translation, which contains many notes supplementing the facts mentioned in the original edition, several original illustrations, which cannot but be of great value in the microscopical study of the changes in the liquids with which the brewer has to deal, and an excellent index, which immensely facilitates the using of the volume.

This book may be, in the first place, one of special interest to the practical brewer, but it has a nearly equal interest for every careful student of nature, and it is so clearly written, with all the technical expressions so well explained, that we doubt not that the ordinary reader who takes it up will not put it on the shelf again without a perusal. The chapter on the physiological theory of fermentation is one we would specially commend to the general reader, to whom it may open up a quite new field for thought.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Ice-Crystals

I DO not know whether any satisfactory explanation can be given of the different forms assumed by ice-crystals on the

different substances on which they may be formed. These forms are very various. During an intense frost some years ago I observed upon the handrail of a wooden bridge a perfect forest of ice-crystals very closely resembling the form of ferns, standing upright, or rather at right angles with the surface from which they sprang, with stems, midribs, and fronds, the only difference being the prominence of rectangular arrangements.

Everyone has seen the variety of forms assumed on window-panes, where the crystals do not take erect positions as they did in the case last mentioned, but lie flat upon the surface of the glass.

My object, however, now is to direct attention to another form assumed by ice-crystals which is comparatively rare, and which seems to me to indicate the action of forces of a very peculiar kind.

When frost occurs suddenly as a change from a mild atmosphere highly saturated with moisture (which is common in the climate here), a peculiar form of ice-crystal is often formed upon rotten branches lying on the ground under trees. This form is that of long silky filaments, from two to three inches long, like finely spun glass. These seem to effloresce from the rotten wood, and form plumes of the most exquisite delicacy and whiteness, often curling towards the ends, and lying over the branch from which they spring.

It is curious that this form of ice-crystal seems never to be attached to any rotten branch of which the bark is unbroken; but whenever the bark upon such branches has been split, broken, or exfoliated, then from the exposed ligneous surface in certain stages of decay, these lovely plumes of ice rise up, pushing their way from underneath the projecting bits of bark, then bending round them and curling over them.

What is it in rotten woody fibre which determines this peculiar form of the ice-crystal? The phenomenon seems to be due to some special "lines of force" connected with this special material under special conditions.

During the last two nights we have had sharp frost succeeding some very mild and very damp days. In the mornings it appeared as hoar frost upon the grass, but during the whole day, long after all hoar frost had disappeared, there were scattered, under all the old woods, shining spots of snowy whiteness, and on going up to these one found invariably that they were bits of rotten branches, with exfoliated bark, and bearing these peculiar plumes.

If any of your contributors can give any scientific explanation of this phenomenon, they would much oblige. ARGYLL

Inverary, January 13

Re-Reversal of Sodium Lines

THE notice of the *Proceedings* of the National Academy of Science in NATURE, vol. xxi. p. 143, misrepresents, of course unintentionally, certain remarks of mine upon "dark" spectrum lines. I have not, and never have had, the slightest doubt that the dark lines of the solar spectrum are true absorption lines. The lines in question, which I am inclined to think may not be due to absorption, are only those produced in certain peculiar cases. If, for instance, a sodium flame be "urged," by increasing the intensity of the flame and the quantity of metallic vapour present, each of the two D-lines becomes double, as is well known, widening out and showing a dark stripe down the centre. Hitherto this dark stripe has been universally ascribed to the absorption produced by the envelope of colour-vapour surrounding the flame. But if a lime-light be placed behind the flame, then, as I have found by repeated experiment, this central dark stripe *re-reverses*, and we have the sodium lines quadruple, and dark upon a light ground. The experiment is rather delicate. The bead of fused sodium bicarbonate in the flame of a Bunsen burner is placed some two inches from the slit of a spectroscope of sufficient dispersive power to separate the sodium lines about a degree; then the incandescent lime is set four or five inches behind the flame, and so as to bring the edge of the shadow of the bead just on the slit.

Now it seems to me that this re-reversal shows that the dark stripe which appeared before the lime-light was placed behind the sodium flame, could not have been a mere *absorption*-line, but must have been due to a real doubling of the line, the substitution of *two* maxima of radiation for a single one; I am unable to see how, on the contrary supposition, the centre of the line should have less absorptive power than the two pairs of lines which show black when the lime is brought into action.

May I mention in this connection a very pretty experiment