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

which shows that the *ordinary* dark line is simply due to absorption? Put into the spectroscope, in place of the micrometer wires, an opaque diaphragm of tinfoil with two narrow slits in it at right angles to each other, thus . Put the sodium flame alone in front of the collimator slit, and by a little management one of the bright lines can be brought to shine through the vertical slit in the diaphragm, while it can also be seen as a sort of star in the horizontal one below. Now bring the lime-light behind the flame; the brightness of the vertical slit will at once considerably increase, but the horizontal slit below exhibits what was before the star, as an intensely *dark* spot in the midst of the bright continuous streak of colour, showing very strikingly that the apparent darkness of the line when no diaphragm is used, is a mere effect of contrast.

The paper referred to in the report as a discussion of "the want of achromatism of the ordinary achromatic object-glass," was a comparison of the secondary spectrum of a glass of the usual form and of great excellence, formerly used by me at Dartmouth College, with that of the instrument now used here. The latter is of the Gauss form, and is found to be decidedly superior in its colour corrections, while it is inferior in no other respect.

C. A. YOUNG

Princeton, N.Y., January 5

Death of Captain Cook

ON reading a paper reprinted from the *Memoirs* of the Boston Society of Natural History, vol. i. part 3, entitled "Notes on the Volcanoes of the Hawaiian Islands," by William T. Brigham, A.M., I find at page 370 the following strange paragraph: "Starting from the western coast at Keālakeakua Bay—the memorable scene of Cook's *punishment*—the island may be described," &c.

With writers accustomed to the correct use of the English language, the word punishment infers crime. Its use here by Mr. Brigham may be only a bilious outpouring of New England puritanism, but as it stands on the face of a grave scientific paper, it is a permanent accusation against Capt. Cook, whose reputation and memory as one of our greatest navigators and geographical discoverers, deserve the reverence of every Englishman. If there be any charge against Capt. Cook's reputation or moral character, which can justify the slur gratuitously cast upon his character by Mr. Brigham, in the above passage, let it be substantiated by one of his countrymen in your pages or elsewhere, but if there be no grounds on which this grave slur is justifiable, then let it not stand unchallenged by your permitting this letter to appear in the pages of NATURE.

London, January 14

ROBERT MALLETT

Electricity of the Blowpipe "Flame"

I HAVE discovered what I believe to be an important fact, viz., that the blue pyrocone produced by the blowpipe from an ordinary gas-burner is not merely magnetic, but possesses polarity, for its point *attracts the north pole of a compass, and repels the south pole.*

W. A. ROSS

Acton House, Acton, W., January 17

Suicide of Scorpion

I MUST crave a bit of your space to beg Dr. Hutchinson (*vide* NATURE, vol. xxi. p. 226) to look to *facts* when he would refute anything based upon *facts*, and not trust to *inferences*.

My experience concerning *scorpion suicide* points to the fact that the "central temperature" of a circle of glowing charcoal embers (*i.e.* glowing when first placed on the ground in the open air, and left to die out gradually), one foot inner diameter, was never greatly in excess of the summer heat, often above 40° C. in the shade in these parts, and no doubt greater at Peshawar. I keep no record of this, but I have just made a circle of glowing embers of the size of walnuts, one foot in diameter, on the kitchen floor, before the open window, suspending immediately a Casella standard in the centre and one inch from the ground, and a highly graduated Secretan, two inches from charcoal and one inch from the floor, both bulbs free, the result being:—

Centre.—After three minutes, 49° 50 Cent.; at five minutes it had fallen to 46°, and continued to fall gradually.

Two inches from charcoal.—The heat declined gradually from 76° C., to which it rose quickly in the beginning; general temperature of kitchen = 15° 25 Cent. So much for Dr. Hutchin-

son's *glowing inference*! which points to little short of stupidity on my part.

The *fact* is that so far from being cruelly scorched, the scorpions I have watched did not appear out of their element, except when they tried to escape; then they quickly receded before burning themselves, and it was after many such attempts that they "pierced their head with their sting and died," as I have stated.

As to your correspondent's theory that "the heat kills the scorpion," it does not follow from the experiments as I conducted them; and as for his *defying* any one to *prove* that the insect dies in consequence of the self-inflicted sting, for my part I am no entomologist, and consequently am unable to make the necessary post-mortem examination. I simply state what I saw several times with a very good pair of eyes, though not, of course, "patent double-million-magnifying gas microscopes of hextra power." I now confirm the statement, and submit that if Dr. Hutchinson's paternal solicitude for his scorpions (which feeling, mind, I respect) prevents him making such cruel (?) tests, he should be content to doubt, and not pit unsound *inferences* against tangible *evidence*, much less hurl defiance at the heads of practical men.

F. GILLMAN

Prov. Jaen, Linares, Spain, January 12

The Fertilisers of Alpine Flowers

A FEW years ago I stated my belief in this journal that lepidoptera are far more frequent visitors and fertilisers of flowers, and that from this cause by far more flowers are adapted to cross-fertilisation by lepidoptera, in the Alps than in the lowland. But it was then impossible for me to give a sufficient number of facts. Now, therefore, having continued my observations in the Alps during six summers, and being about to prepare a detailed work on "Alpine Flowers, their Fertilisation by Insects, and their Adaptations to them," I will here give a statistical statement of all visits of insects on flowers which I have observed (1) in the lowland, (2) in the Alps generally, (3) above the boundary of trees; the numbers under 1 being extracted from my work, "Die Befruchtung der Blumen durch Insekten, &c." (Leipzig, 1873).

Tabular Statement of the Visits of Insects to Flowers, observed by myself

	1. In the Lowland.		2. In the Alps generally.		3. Above the boundary of trees.	
	a. Species of insects.	b. Different visits to flowers.	a. Species of insects.	b. Different visits to flowers.	a. Species of insects.	b. Different visits to flowers.
Coleoptera	129	46½	83	337	33	134
Diptera	253	1,598	348	1,856	210	930
Hymenoptera	368	2,750	183	1,382	88	519
Lepidoptera	79	365	220	2,122	148	1,190
Other insects	14	49	7	15	3	6
Total	843	5,231	841	5,712	482	2,779

Hence of 1,000 different visits to flowers (differing either by the species of flower or by the species of insect) those by—

	1. In the Lowland.	2. In the Alps generally.	3. Above the boundary of trees.
Coleoptera are	89'66	59	48'22
Diptera „	305'49	324'93	334'65
Hymenoptera „	525'71	241'95	186'96
Lepidoptera „	69'77	371'50	428'31
Other insects „	9'37	2'62	2'16
	1000'00	1000'00	1000'00

Lippstadt, January 10

HERMANN MULLER

"Ideal" Matter

IN NATURE, vol. xxi. p. 185, you published a letter from Herr v. Nudeln, in which he alluded to the researches of Pro-