

the shocks extended to the region of the Trondhjems fjord, the Swedish border, and the Christiania fjord, and Bergen, but the extreme south-west part of the country seems to have been undisturbed. The earthquake is also reported from Fünen, in Denmark. The movement proceeded in about seven minutes from the west coast to Christiania (at Christianund 11h. 38m. Christiania time, 11h. 15m. Greenwich time). It is interesting to notice that the earthquake resembles one which occurred on March 9, 1866, and was felt across the North Sea at the lighthouse of Flugårrock, on the Shetland Islands. As I am engaged in collecting data about the earthquake of this month, I should be glad to know whether it was observed in the British Isles.

Christiania, February 11.

HANS REUSCH.

#### "The Black-veined White Butterfly."

My experience of this species in England enables me to support Mr. W. Warde Fowler's opinion (*NATURE*, February 14, p. 367) as to the preference of the species for open ground. I met with it in abundance in the New Forest in 1866, 1868, 1869, and 1870. It rarely occurred in or near dense woods, but preferred the open heaths and wastes of the Forest, where thistles were plentiful. In 1867 I found the species swarming, about mid-summer, in hay fields on hillsides in Monmouthshire. There were a few small orchards, but not much wood, in the neighbourhood. For a detailed account of the former distribution of *Aporia crataegi* in this country, I would refer Mr. Warde Fowler to my article on the subject in the *Entomologists' Monthly Magazine* for March 1887.

H. GOSS.

Surbiton Hill, March 16.

#### The Zodiacal Light.

At the present moment—7 p.m. February 16—the zodiacal light is more distinct than I ever remember to have seen it in England. The middle of the base is about 2° to the northward of the point where the sun set, and the axis is directed towards the Pleiades, and can be traced as far as the middle of Aries. The afternoon has been remarkably clear, and it is now a brilliant starlight evening.

J. P. MACLEAR.

Cranleigh, Surrey, February 16.

#### OYSTERS AND TYPHOID.

THE statements that have recently appeared, both in the general and in the medical press, concerning the communication of typhoid fever through the agency of oysters when eaten raw, make it desirable to review some of the data on which the suspicion in question is based. For many years past it has been a matter of assumption, when typhoid fever has followed, within some ten to fifteen days, on the consumption of raw oysters, and when no obvious cause for the disease could be detected, that the oysters stood to the fever in the relation of cause; and this attitude received no inconsiderable impetus when, a few years ago, a member of our Royal family sickened of typhoid fever under circumstances that were suggestive of oysters as the vehicle of the disease. Then again, it must be admitted that it has been a matter of no very uncommon experience amongst medical men to have to treat typhoid fever in patients who, at an antecedent date corresponding with the incubation period of typhoid fever, had indulged in an oyster supper after leaving some place of entertainment. And the suspicion has been confirmed, in some cases, when it has been ascertained that another member of the same party, having nothing but the oyster supper, in common with the sufferer referred to, has also had typhoid fever about the same date, or had suffered from vomiting and other symptoms the day after the consumption of the oysters. The assumption in cases of this latter class has been, that the specific poison of typhoid fever was, with other matter that had become objectionable to the system, got rid of by the attack of sickness. A case generally illustrative of this class of occurrence was recently recorded in the *British Medical*

*Journal*. Four friends had an oyster supper on November 5. Two of them lived not far apart, but the others had nothing in common as regards residence or anything else. On November 23 three of them sickened, and they were, later on, all found to have typhoid fever. One of the patients, during convalescence, disclosed both his profession and his views by re-naming his malady "bivalvular disease."

Amongst leading medical men who have adopted the view that oysters are a source of typhoid fever, we may name Sir William Broadbent, who early this year announced that from time to time he had seen cases of typhoid fever "apparently attributable to oysters," but that during the course of last autumn the evidence as to the communication of the infection through this agency has been of such a character as to produce "conviction" in his mind.

This naturally leads us to ask how the oyster becomes the vehicle of such a disease; and the evidence already forthcoming on this point is such that we could only wonder if typhoid fever were not occasionally conveyed to those who eat this favourite mollusc in an uncooked form. Investigation of some of the river estuaries and other places where oysters are cultivated and prepared for market would almost lead us to believe that conditions favourable to typhoid fever were deliberately chosen for the purpose. Indeed, it is notorious that a number of our British oyster-beds are in such relation to sewer outfalls, that the oysters must of necessity be bathed in a solution of sea-water and sewage at every tide. According to a commissioner appointed to inquire into this matter by the *British Medical Journal*, a well-known Essex oyster fishery has "a sewer discharging between oyster-beds on either side"; and at a "health-resort" (!) on the same coast, it is a common practice to moor the oyster-boxes to a pier or groyne, within a few feet of which the evidences of sewage are too palpable to be specified. In both the places referred to, the typhoid fever poison, which it is known finds access to drains, had had ample chance of fouling the sewers in question.

It has been alleged, on the evidence of certain recent bacteriological investigations as regards the contents of London sewers, that the organism producing typhoid fever cannot live and multiply in sewers. But the organism has been found in sewers; it also lives in sea-water; and the fact remains that sewage bathes our oysters during cultivation to an extent that is essentially disagreeable, and that ought not to take place; and, also, that typhoid fever follows the use of oysters so cultivated. It may also be alleged, as is done by certain oyster-growers, that sewage is fatal to the oyster itself. In answer to this, we can only say that such evidence as we have obtained, as to some of our oyster-beds, is absolutely opposed to this statement; and not only so, but we know of more than one instance where the oysters are deliberately brought from the beds to fatten in still nearer proximity to outfall sewers for a week or more preliminary to their sale. In brief, if sewage and noxious micro-organisms can be retained in the beard and other portions of the oyster, or in the "juice," which is so much relished, everything seems contrived to secure such retention of filth at some of our oyster fisheries.

Doubtless the same applies to many foreign oyster-beds. Indeed, the recent experience embodied in a report by Prof. W. N. Conn, as to an epidemic of typhoid fever amongst the students of a college at Middletown, Connecticut, not only supplies convincing evidence of this, but it affords the most connected and complete proof of "oyster-typhoid" as yet published. Quite an epidemic of typhoid fever occurred amongst the students of certain fraternities, and amongst a number of their friends who had joined them at their "initiation suppers," but who had subsequently returned to their distant