

representation of it with Balmain's luminous paint. When dry the drawing may be hung up in the lecture-hall and covered with black tissue-paper until required. At the appointed time the lights are lowered, the tissue-paper withdrawn, and magnesium wire burnt in front of the painting. I had last week the pleasure of showing this to an audience of 500 persons, and from the expressions of curiosity and approval found it to be a very taking experiment.

WM. ACKROYD

Sowerby Bridge, March 10

Squirrels Crossing Water

HAVING read in NATURE the two interesting communications on Squirrels Crossing Water, I was so free as to cite them in my paper *Lumir*, requesting the readers to let me know whether any of them had seen instances of squirrels taking to water here in Bohemia. Upon this I received from my friend Prof. A. Tirášeh of Litomyšl the following:—

"You seem to doubt of squirrels taking to water, and I hasten to give you notice of what I myself witnessed when a boy. With the help of other young fellows like myself I succeeded in driving a squirrel down from an old ash-tree that stood in our garden, not far from the River Medhuje (Metan). The squirrel must have come from the other side of the water, where there was a wood, and must have crossed the river. Of this however I cannot be sure, but when driven down from the tree, and seeing its way to landward cut off, the squirrel turned to the river, and sprang in, I following it. Now it swam very cleverly, but was overtaken by me in the middle of the water, and brought back in triumph, of course with my hands all bleeding from its sharp teeth, which the animal used cleverly too."

Prague, March 13

T. V. SLÁDEK

Tacitus on the Aurora

THERE is a passage in the "Germania" of Tacitus (chapter xiv.) which I do not think can have ever been examined by the historians of natural science, or it would have created a considerable stir amongst them. Side by side with a plain account—probably the earliest written one—of an arctic twilight, there lurks in it a description of the aurora borealis, which moreover lends countenance to the still prevailing notion that the northern lights are accompanied by sound.

Speaking of the Suiones, a tribe on the northern borders of Germany, the great writer says:—"Beyond them is another sea, calm even to stagnation, by which the circle of the earth is believed to be surrounded and confined; because the last gleam of the setting sun lingers till he rises again, and so brightly that it dims the stars. It is believed too that a sound is heard, that the forms of gods and rays from a head are seen (*persuasio adjicit sonum audiri insuper formas deorum et radios capitis adspici*). Up to that point [however]—and the report [I have given] is true—everything is natural."

As to the question of sounds being heard, the din of carts and factories in our city, and the roar of trains in our suburbs make an observation here for determining it impossible; while the rarity of the phenomenon in England generally keeps spectators from being on the watch. But I have heard an intelligent old man who has often gazed on the bright streamers during the clear still nights of Aberdeenshire declare that he has plainly observed sharp switching sounds to proceed from them. It seems to me probable, since electricity can change into sound and takes part in producing the aurora, that the spectacle is attended by audible vibrations.

M. L. ROUSE

Chislehurst, Kent

ON THE PRACTICABILITY OF LIVING AT GREAT ELEVATIONS ABOVE THE LEVEL OF THE SEA¹

"UP to this time most of the loftiest portions of the earth are totally unexplored, and this arises principally from the fact that the mountaineer, in addition to experiencing all of the troubles which occur to other travellers, has to deal with some which are peculiar to his work. I do not now refer to the 'distressing hæmorrhages,' 'alarming vomitings,' and 'painful excoriations' which are said to afflict him. Hæmorrhage and excoriation are rather large words, and they are apt to be alarming if they are not translated. But they do not seem so very formidable if they are rendered 'bleeding at the nose' and 'loss of skin through sunburn'; and it may perhaps tend still further to allay alarm if I say that I have never known bleeding at the nose to occur upon a mountain except to those who were subject to the complaint; while with regard to vomitings, although such unpleasant occurrences *do* happen, they have only been known when persons have taken that which has disagreed with them.

"There is, however, behind these, another trouble, which cannot be dismissed so lightly. All travellers, without exception, who have ever attained to great altitudes, have spoken of having been affected by a mysterious complaint, and this complaint is known to affect native races living in high mountain regions, as well as casual travellers. With us it is usually called mountain sickness. There are many native names for it, and numerous conjectures have been put forward as to its cause. Very commonly it is supposed to be the work of evil spirits, or mysterious 'local influences'; but there is no doubt that it is simply an effect which is the result of the diminution in the atmospheric pressure which is experienced as one goes upward. The reduction which takes place at great heights is quite sufficient to account for disturbance of the human system. At 20,000 feet pressure is less than half the amount that it is at the level of the sea; that is to say, whereas at the level of the sea atmospheric pressure is generally capable of sustaining a column of mercury of thirty inches, at 20,000 feet it will not sustain a column of thirty inches.

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"From air-pump experiments, and from purely philosophical considerations, it is obvious that the human system must be liable to derangement if subjected to sudden diminution of the atmospheric pressure to which it has been accustomed. These disturbances have often been so severe as to render mountain travellers incapable, and their lives well-nigh unendurable; and it is scarcely to be wondered at that they have endeavoured to escape from the infliction by descending into lower regions. I do not know a single instance of a traveller who, having been attacked in this way, has deliberately, so to speak, sat it out, and had a pitched battle with the enemy. Nor am I aware that any one has even suggested the bare possibility of coming out victorious from such an encounter. Yet, upon doing so, depended the chance of pushing explorations into the highest regions of the earth; and I long felt a keen desire to know whether my own organisation, at least, could not accommodate itself to the altered conditions. From considerations which would occupy too long to enter into now, I gradually acquired the conviction that patience and perseverance were the principal requisites for success; and the journey of which I am now going to speak was undertaken with the view of bringing this matter, amongst other things, to a definite issue. In the course of it we camped out at very great heights. Twenty-one nights were spent above 14,000 feet above the level of the sea; eight more above 15,000 feet; thirteen more above 16,000 feet; six more above 17,000 feet; and one more at 19,450 feet. I shall not now anticipate what you will presently hear, and I have made these preliminary observations to render less frequent the interruption of the narrative, and for the purpose of explaining allusions in it which might otherwise perhaps have been only half-understood."

After describing the route taken to Chimborazo, Mr. Whymper proceeded to mention the first journey he made to that mountain; and said that whilst returning from it to the town of Guaranda (8870 feet), whilst still about 13,000 feet above the sea, he was overcome by dizziness, feverishness, and intense headache, and had to be supported by two of his people for the greater part of the

¹ Extracts made, by permission of the author, from a lecture delivered by Edward Whymper to the Society of Arts in the Theatre at South Kensington, March 9, 1881.—"On Chimborazo and Cotopaxi."